

The Effect of Participation on User Satisfaction in the Development of Information Systems with Five Moderator Variables

Dina Alafi Hidayatin^a, Habiburrochman^b, ^{a,b}Faculty of Economics and Business, Universitas Airlangga, Surabaya 60286, Indonesia,

This study aims to examine: 1) whether participation affects user satisfaction, 2) whether the complexity of the task, the complexity of the system, the influence of the user, the user-developer communication, and top management support moderates the effect of participation of user satisfaction in information system development, and 3) whether there is an average difference in user participation in information system development at State Electric Company and the Government of Lamongan. Hypothesis testing conducted on 200 respondents in which 100 respondents came from PT State Electric Company certification services and 100 respondents from four SKPD Lamongan Government. The method used in testing this hypothesis is the linear regression to examine the effect of participation of user satisfaction in information system development. To test the five ariabel moderation using MRA (Moderated Regression Analysis). Meanwhile, the average difference in user participation in information system development between State Electric Company and the Government Lamongan test was tested using Paired Sample T Test. Results showed that: 1) the participation of users affect the user satisfaction in information system development, 2) the effect of user participation to user satisfaction in information system development is moderated by the five moderator variables, namely the complexity of the task, the complexity of the system, the influence of the user, the user-developer communication and top management support, 3) variable task complexity, system complexity, the influence of the user, the user-developer communication and support of top management is a quasi-moderator, 4) there was an average difference of user participation in information system development at State Electric Company and the Government Lamongan.

Key words: *Information systems, task complexity, system complexity, the influence of the user, the user-developer communication, top management support.*

Introduction

Background

Information systems must be able to support the needs of management in providing accurate information, therefore the information system should always experience a development tailored to the information needs for management, which is also constantly changing (Kushniruk & Nøhr, 2016). The most important thing to note in the information system development project is the information system should be developed to meet the needs and wants of its users (Dwivedi et al., 2015).

Development of information systems must also consider the factors that can improve the success of the development of the system itself, because the information system is a very expensive investment (Nugroho & Prasetyo, 2018). It should not arbitrarily choose alternative development, because if not careful, it can cause big losses (Naser & Al Shobaki, 2016). One of the factors that can support the success of the system is to involve the user in the development stage of the system (Tjahjadi & Soewarno, 2019). The participation of users is expected to affect the acceptance and satisfaction of the user on the system developed.

Research Problems

Research problems in this research are:

1. Does the user's participation affect the user's satisfaction in the development of information systems?
2. Does the task complexity, system complexity, user influence, user-developer communication, and top management support and moderate the influence of user participation on user satisfaction in information systems' development?
3. Is there any difference in the average user participation in the development of information systems at State Electric Company and Lamongan District Government?

Research Purpose

This study aims to obtain empirical evidence on:

1. The effect of participation on user satisfaction in information system development.
2. The influence of participation on user satisfaction in the development of information systems is moderated by task complexity, system complexity, user influence, user-developer communication, and top management support.
3. There is an average difference of user participation in the development of information systems at State Electric Company and Lamongan District Government.

Theoretical Framework and Development of Hypotheses

Information System Development

The development of information systems can be defined as the process of modifying or altering parts or whole information systems (Kwary, 2017). The development of the system can mean composing a new system to replace the old system as a whole, or improve the existing system. There are many ways that can be used for the development of information systems. Development of information systems can be done with conventional development and with alternative methods (Romero & Vernadat, 2016). Conventional development is the development of information systems using the system development life cycle method, while the development with alternative methods is the development of the system using the following methods: (1) package method, (2) prototype method, (3) End User Computing (EUC) development methods, and (4) outsourcing methods. From the existing method, each has advantages and disadvantages. Therefore, the organisation needs to pay attention to the suitability of the condition of the organisation with the consequences caused after the method is applied (Akkermans & Van Oorschot, 2018).

Relationship of Participation and User Satisfaction

User participation in this research are behaviours, occupations and activities that can provide benefits during the process of developing information systems conducted by individuals directly involved in the use of information. This participation is done because it is considered to show real personal intervention from the user at each stage of information system development (Ciborra & Lanzara, 2017). User satisfaction can be interpreted as a disclosure of feelings of pleasure or not that arise in the user in connection with the participation it provides during the development of the system (Handte et al., 2016).

Previous studies conducted a study of 151 respondents from eight large organisations, with various degrees of participation from end users, showing the findings that participation has a positive and significant relationship to user satisfaction (McKeen, Guimaraes & Wetherbe, 1994). Based on the results of previous research, this study will test again the relationship between user participation in the information system development process. However, there is no strong relationship between the influence of participation on user satisfaction in the development of information systems (Imbiri, 2006). Based on the results of previous research, this study will test again the relationship between user participation in information system development process, by formulating the following hypothesis:

H1: User participation in the development of information systems affects user satisfaction.

Contingent Factors

The findings of previous researchers indicate that many contingency factors are believed to have an effect on user participation relationships and user satisfaction. Of the many contingency factors, in this study we focus on five contingency factors, as follows:

Task Complexity

Complexity plays an important role in the relationship of participation and satisfaction (McKeen et al., 1994). High task complexity occurs when tasks to be resolved by the user are unclear or confusing and unstructured (O'Neill, Beauvais & Scholl, 2016). Further, increasing the complexity of tasks will decrease the level of certainty of the success of the system development project. It is further recommended that the user proportionally participate with the complexity (Jain et al., 2017). However, the complexity of the task is a pure moderator (McKeen et al., 1994). Upon these findings, hypotheses are formulated as follows:

H2: The complexity of the task of moderating the influence of user participation on user satisfaction in the development of information systems.

System Complexity

The complexity of the system comes from the developer's environment and is related to ambiguity and uncertainty that occur around system development practices. Furthermore, the complexity of the system is concerned with decision-making on the selection of technology platforms that support automation of billing, design techniques and computer languages used, development methodologies to be carried out, and so on (McKeen et al., 1994). High system complexity occurs when the developed system is too complicated and confusing, so developers need information from users about the system that has been applied by the organisation. This requires solving through effective user participation to achieve system success (Gu, Peng & Li, 2016).

The complexity of the system is a pure moderator (McKeen et al., 1994). This is different to the results of other research which states that the complexity of the system is a predictor variable (Imbiri, 2006). Based on these findings, re-testing with hypothesis formulation as follows:

H3: The complexity of the system moderates the influence of user participation on user satisfaction in the development of information systems.

User Influence

The influence referred to in this study differs from "participation". Influence is the degree to which organisational members influence decisions related to the final design of an information system. While 'participation' is the extent to which members of the organisation are involved in activities related to system development. Through this participation the user can run it's influence in system development. Without participation, they cannot exercise their influence. But the opposite can happen. Users can participate in system development without having real influence. So users can still participate in the development of information systems without real influence, but such participation will be considered a waste of time, and is a useless activity. When users can influence decisions related to system development, user participation becomes more valuable (Ahmadi, Nilashi & Ibrahim, 2015). However, the results shows that the effect of the user is not as a moderating variable but as an independent predictor (McKeen et al., 1994). Based on the results of these studies, re-testing with hypothesis as follows:

H4: The influence of the user moderates the influence of user participation on user satisfaction in the development of information systems.

User-Developer Communications

User-developer communication aims to avoid misunderstanding between user and developer perceptions in view of system development projects. The relationship between the user and the developer is always symbolic (Smith, 2015). Users as parties who know the business environment, and developers as parties who understand about the system environment, must have the same perception of how system development is done. The existence of communication between users and developers, is expected to assist developers in interpreting what kind of system development should be done, so the system is developed on target (Gwynne, Hulse & Kinsey, 2016). Furthermore, if the system is developed in accordance with the needs of users, this can encourage user satisfaction.

User-developer communication is a direct predictor variable (Setianingsih, 1998), while other research concluded it as a quasi-moderator (Imbiri, 2006). On the difference of these results, they were re-examined on the hypothesis as follows:

H5: User-developer communication moderates the influence of user participation on user satisfaction in information systems' development.

Top Management Support

Any information system development activity will require a decision from top management (Setianingsih, 1998). The form of support can vary, not only on the allocation of resources needed for the development of information systems, but also as a strong signal for employees about the importance of changes made to the information system (Pearlson & Saunders, 2019). In addition, top management also has the power and influence to socialise the development of information systems, allowing users to participate in every stage of system development, and this will affect user satisfaction. The higher the top management support in the information system development project, the more it will strengthen the influence of participation on user satisfaction (Noe et al., 2017). On the results of these studies, they were re-tested on the hypothesis as follows:

H6: Top management support moderates the influence of user participation on user satisfaction in the development of information systems

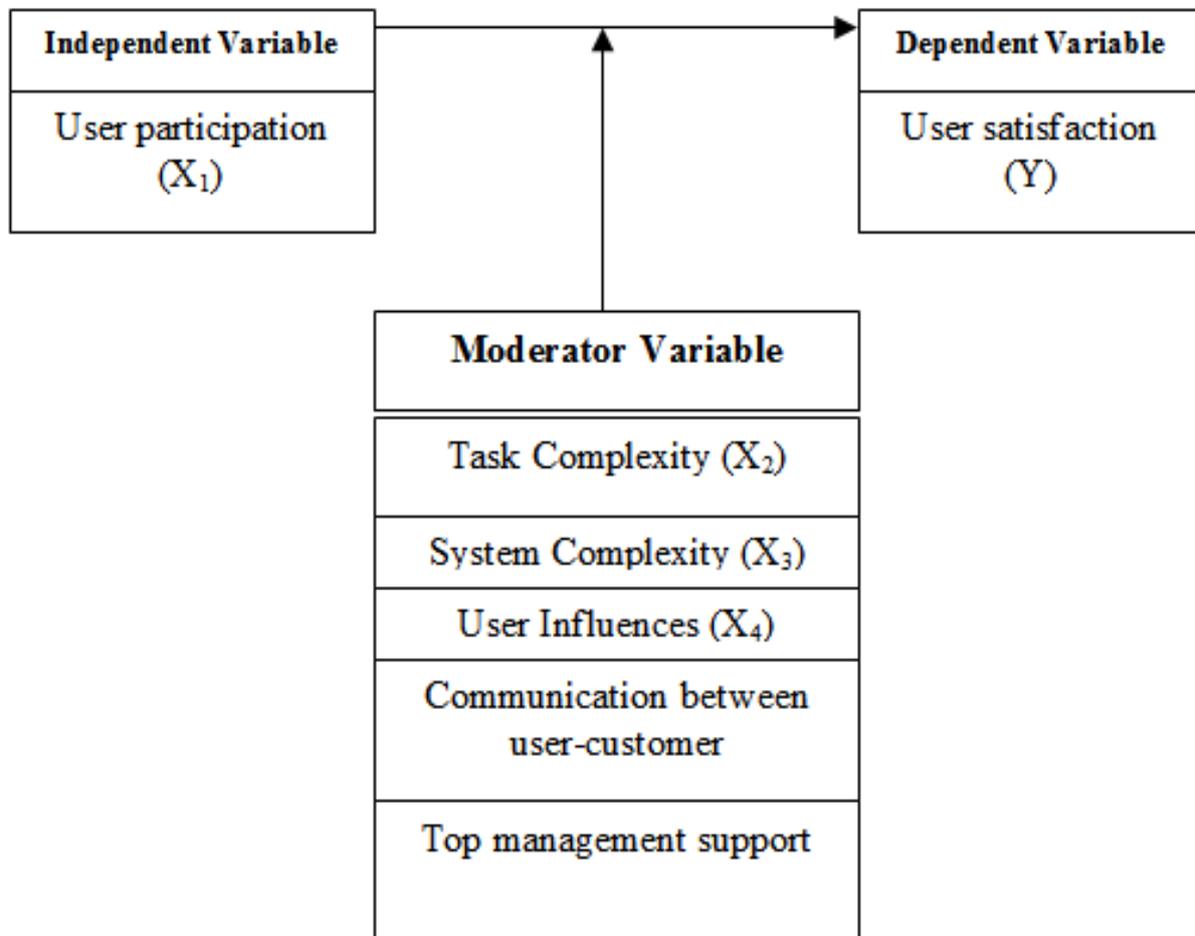
Differences in Average Value of User Participation between State Electric Company and Lamongan District Government

In principle every organisation has a certain culture. This cultural system is often called organisational culture. The existence of organisational culture will give it's own distinctive characteristics for each organisation. Organisational culture will affect the attitude and behaviour of all members of the organisation. A strong culture within the organisation can give encouragement to it's members to behave as expected by the organisation. Adherence to the rules and policies of the organisation, is expected to optimise the performance and productivity of employees to achieve organisational goals. Differences in organisational culture also affect employee behaviour patterns to participate in the development of information systems. Because corporate culture will also determine the behaviour of employees, including user behaviour in the use and development of information systems (Khan, 2017). Differences in behaviour patterns may also occur in employees of State Electric Company Certification Services and Lamongan District Government at the time of participating in the development of information systems. So a hypothesis can be concluded as follows:

H7: There is a difference in average value of user participation between State Electric Company and Lamongan District Government.

Conceptual Framework

Figure 1. Conceptual Framework



Research Methods

Operational Definition of Variables

User participation is the behaviour, work, and activities performed by the user during the process of developing the information system or in other words the level of individual involvement in the development of information systems. This variable was measured using an instrument with 4 Likert scales of 13 items (McKeen et al., 1994). User satisfaction reveals the suitability of one's expectations with the results obtained, due to participation during system development. Variable measurements were performed with 4 likert scores of 18 items. The complexity of the task is based on the high level of difficulty of the task that must be implemented by the user. Measurement of this variable using 4 Likert scale of 9 items. The complexity of the system is related to the high ambiguity and uncertainty that

occur in the developer environment around system development practices. This uncertainty is related to the system to be developed. To measure the complexity variables of the system, 4 Likert scale of 5 items were used

User influence provides an assessment of how much user participation can contribute during the information system development process. The instrument used is 4 Likert scale of 11 items. User-developer communication is the relationship or interaction between users and developers in system development projects. This interaction aims show that there is no difference between users and developers in perception of the system developed. This variable is measured using an instrument with 4 likert scores of 19 items. Top management support is the involvement of executives related to information systems' planning, development and implementation. This variable is measured by an instrument with 4 Likert scales of 13 items.

Population and Sample Determination Procedure

The population in this research is manager / division head / section chief / head section and employee / staff using an information system in State Electric Company and Lamongan Government. To determine the sample to be used, it is done with non-probability sampling design. The sampling method used is purposive sampling.

In this study at least 30 samples are required. Samples belonging to large samples of normal distribution are samples of > 30 cases taken randomly. Sample in this research is manager / division head / section chief / head section and employee / staff using an information system in the State Electric Company Certification Service and 4 SKPD Lamongan District Government.

Data Collection Method

One hundred questionnaires addressed to State Electric Company Certification Services were delivered with the help of mail survey by enclosing envelopes and postage stamps. It was intended that after the questionnaire was completed and collected, it could be sent back to the researcher's address. This was in contrast to the dissemination of questionnaires to SKPD staff of Lamongan District Government. One hundred questionnaires for 4 SKPD Lamongan District Government was delivered directly to each SKPD with a total of 25 questionnaires at DPU Cipta Karya, 25 questionnaires at DPPKA, 30 questionnaires at BAPPEDA, and 20 questionnaires at KPDE. After the questionnaire was completed and collected, the researcher took it directly to each SKPD.

Data Analysis Technique

Descriptive Statistics

This provides an overview of the respondents demographics (age, occupation type, length of work, occupation, occupation, education and gender) and descriptions of the research variables (user participation, user satisfaction, task complexity, system complexity, user influence, developer-user and top management support).

Data Quality Test and Hypothesis Testing

A validity test and data reliability test was done by using Corrected Item-Total Correlation with SPSS program. To examine the relationship between participation and satisfaction of the pemekai, a simple regression equation method was used to examine the interaction effects of two contingency factors using Moderated Regretion Analysis (MRA), and to examine the average difference of user participation in the development of information systems between State Electric Company and Lamongan District Government, Paired Sample T Test method was used.

The statistical equation used to describe the relationship between variables is as follows:

$$Y = a + b_1 X_1 \dots\dots\dots(1)$$

$$Y = a + b_1 X_1 + b_2 X_2 \dots\dots\dots(2)$$

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_1 * X_2 \dots\dots\dots(3)$$

$$Y = a + b_1 X_1 + b_2 X_3 \dots\dots\dots(4)$$

$$Y = a + b_1 X_1 + b_2 X_3 + b_3 X_1 * X_3 \dots\dots\dots(5)$$

$$Y = a + b_1 X_1 + b_2 X_4 \dots\dots\dots(6)$$

$$Y = a + b_1 X_1 + b_2 X_4 + b_3 X_1 * X_4 \dots\dots\dots(7)$$

$$Y = a + b_1 X_1 + b_2 X_5 \dots\dots\dots(8)$$

$$Y = a + b_1 X_1 + b_2 X_5 + b_3 X_1 * X_5 \dots\dots\dots(9)$$

$$Y = a + b_1 X_1 + b_2 X_6 \dots\dots\dots(10)$$

$$Y = a + b_1 X_1 + b_2 X_6 + b_3 X_1 * X_6 \dots\dots\dots(11)$$

Information:

- | | |
|--------------------------|----------------------------------|
| Y: User satisfaction | X5: User-developer communication |
| X1: User participation | X6: Top management support |
| X2: Complexity of task | a: Intercept |
| X3: Complexity of system | b: Slope |
| X4: User effect | c: Other Influence Variables |

If equations (2) and (3) are not significantly different i.e. $b_3 = 0$ and $b_2 \neq 0$, then X2 is not a moderator variable. Variable X2 is a pure moderator, if equation (1) and (2) are not different, but different from equation (3), that is $b_2 \neq 0$; $b_3 \neq 0$. The variable X2 is classified as a quasi-moderator, if equations (1), (2) and (3) are different, i.e. $b_2 \neq 0$ and $b_3 \neq 0$.

If equations (4) and (5) are not significantly different i.e. $b_3 = 0$ and $b_2 \neq 0$, then X3 is not a moderator variable. Variable X3 is a pure moderator, if equation (1) and (4) are not different, but different from equation (5), that is $b_2 \neq 0$; $b_3 \neq 0$. The X3 variable is classified as a quasi-moderator, if equations (1), (4) and (5) are different, i.e. $b_2 \neq 0$ and $b_3 \neq 0$.

If equations (6) and (7) are not significantly different i.e. $b_3 = 0$ and $b_2 \neq 0$, then X4 is not a moderator variable. Variable X4 is a pure moderator, if equation (1) and (6) are not different, but different from equation (7), that is $b_2 \neq 0$; $b_3 \neq 0$. The X4 variable is classified as a quasi-moderator, if equations (1), (6) and (7) are different, i.e. $b_2 \neq 0$ and $b_3 \neq 0$.

If equations (8) and (9) are not significantly different i.e. $b_3 = 0$ and $b_2 \neq 0$, then X5 is not a moderator variable. Variable X5 is a pure moderator, if equation (1) and (8) are not different, but different from equation (9), that is $b_2 \neq 0$; $b_3 \neq 0$. The variable X5 is classified as a quasi-moderator, if equations (1), (8) and (9) are different, i.e. $b_2 \neq 0$ and $b_3 \neq 0$.

If equations (10) and (11) are not significantly different i.e. $b_3 = 0$ and $b_2 \neq 0$, then X6 is not a moderator variable. Variable X6 is a pure moderator, if equation (1) and (10) are not different, but different from equation (11), that is $b_2 \neq 0$; $b_3 \neq 0$. The X6 variable is classified as a quasi-moderator, if equations (1), (10) and (11) are different, i.e. $b_2 \neq 0$ and $b_3 \neq 0$.

Results and Discussion

Respondents Description

Table 1: Sample and Level of Return

PT PLN (Persero) Certification Service :			
	Questionnaire sent		100
	Questionnaire not returned		24
	Questionnaire returned		76
	Questionnaire cancelled		16
	Questionnaire used		60
Government of Lamongan District :			
	BAPPEDA	25	
	DPPKA	30	
	KPDE	20	
	DPU Cipta Karya	25	
	Questionnaire sent		100
	Questionnaire not returned		11
	Questionnaire returned		89
	Questionnaire cancelled		29
	Questionnaire used		60
	Total of Questionnaire used		120

Source: Primary analysed data (2010)

Table 2: Respondent Characteristics of PT PLN (Persero) Certification Service

	Total	Percentage
Age Classification		
25-35 years old	32	53%
> 35-45 years old	17	29%
> 45 years old	11	18%
Sex		
Male	50	83%
Girl	10	17%
Education Level		
Master	2	3%
Bachelor	34	57%
Diploma	24	40%
Others	0	0%
Position		
Head of information technology division (TI)	1	2%
Head other than information technology division (TI)	2	3%
Others	57	95%
Work Duration		
0 – 2 years old	14	23%
>2 – 5 years old	18	30%
>5 – 10 years old	23	38%
>10 years old	5	9%
Position Duration		
0 – 2 years old	19	32%
> 2 – 5 years old	25	42%
> 5 – 10 years old	12	20%
> 10 years old	4	6%

Source: Primary Data Analysed (2010)

Table 3: Respondent Characteristic 4 SKPD Government of Lamongan District

	Jumlah	Persentase
Age		
< 25-35 years old	35	58%
> 35-45 years old	18	30%
> 45 years old	7	12%
Sex		
Male	36	60%
Female	24	40%
Education Level		
Magister	13	22%
Bachelor	42	70%
Diploma	5	8%
Others	0	0%
Position		
Head of information technology section (TI)	3	5%
Head other than information technology section (TI)	26	43%
Others	23	38%
Work Duration		
0 – 2 years old	14	23%
>2 – 5 years old	12	20%
>5 – 10 years old	16	27%
>10 years old	18	30%
Position Duration		
0 – 2 years old	17	28%
> 2 – 5 years old	26	43%
> 5 – 10 years old	15	25%
> 10 years old	2	3%

Source: Primary Data analysed (2010)

The above is the profile of the respondents participating in the education level, the type of work handled, and the current level of positions. Thus it may represent the user of the information system intended in this study. Gender is not the focus of research so male domination does not disturb the sample distribution.

Validity and Reliability Test

The results of data collection from the respondents need to be tested to determine the validity and reliability of the data. Data is valid if the value of r count (Corrected Item-Total

Correlation) is greater than r table for two-sided test at 5% significance level ($p = 0,05$). R value of table can be known from the number of respondents or N . Because $N = 60$, the degrees of freedom (df) is $N - 2 = 58$. It is known that the table value with $df = 58$ and $p = 0.05$ is 0.254. While the data is said to be reliable if the value of Alpha is greater than r table.

Table 4: Validity Test Result and Reliability Test

	PT PLN (Persero) Certification Service		4 SKPD Government of Lamongan District	
Variable	Alpha	Correlation	Alpha	Correlation
User participation	0.7669	(0.0238)– 0.6234	0.7411	0.1879 – 0.5157
User satisfaction	0.8569	0.1565 – 0.6051	0.9081	0.4625 – 0.6812
Task complexity	0.8953	0.4195 – 0.8097	0.8437	0.3110 – 0.6732
System complexity	0.7335	0.3649 – 0.6162	0.8388	0.4401 – 0.7569
User influences	0.8268	0.3401 – 0.7436	0.7644	0.2313 – 0.5433
Communication between user-customer	0.8397	0.2096 – 0.5978	0.9469	0.5100 – 0.7942
Top support management	0.8478	0.3718 – 0.6105	0.9029	0.5097 – 0.7331

Classic Assumption Test

Test assumptions include normality test, Heteroskedasticity Test, Multicollinearity Test, Otokorrelation Test and all of them fulfill.

Hypothesis Test Results

Table 5: Regression Result of PT PLN (Persero) Certification Service

Hypothesis	Equation	Regression Equation	F	Result
			Probability	
H ₁	1	$Y = 32.790 + 0.709 X_1$	(0.000)	Significantly positive
H ₂	2	$Y = 29.632 + 0.679 X_1 + 0.144 X_2$	(0.000)	Quasi-Moderator
	3	$Y = 35.394 + 0.475 X_1 - 0.058 X_2 + 0.007 X_1 * X_2$	(0.001)	(strengthen)
H ₃	4	$Y = 33.397 + 0.712 X_1 - 0.044 X_3$	(0.000)	Quasi Moderator
	5	$Y = 26.325 + 0.973 X_1 + 0.397 X_3 - 0.016 X_1 * X_3$	(0.001)	(weaken)
H ₄	6	$Y = 25.982 + 0.603 X_1 + 0.3 X_4$	(0.000)	Quasi Moderator
	7	$Y = 77.643 - 1.212 X_1 - 1.217 X_4 + 0.053 X_1 * X_4$	(0.000)	(strengthen)
H ₅	8	$Y = 18.408 + 0.698 X_1 + 0.303 X_5$	(0.000)	Quasi-Moderator
	9	$Y = -48.394 + 3018 X_1 + 1.693 X_5 - 0.048 X_1 * X_5$	(0.000)	(weaken)
H ₆	10	$Y = 21.573 + 0.598 X_1 + 0.355 X_6$	(0.000)	Quasi-Moderator
	11	$Y = -40.481 + 1.892 X_1 + 2.789 X_6 - 0.054 X_1 * X_6$	(0.000)	(weaken)

Source: Primary data analyzed (2010)

Table 6: Regression Result 4 SKPD Government of Lamongan District

Hypothesis	Equation	Regression Equation	F	Result
			Probability	
H1	1	$Y = -5.522 + 1.391 X_1$	(0.000)	Significantly positive
H2	2	$Y = -10.675 + 1.335 X_1 + 0.306 X_2$	(0.000)	Quasi Moderator
	3	$Y = 28.116 + 0.4 X_1 - 1.233 X_2 + 0.037 X_1 * X_2$	(0.000)	(strengthen)
H3	4	$Y = -7.006 + 1.384 X_1 + 0.125 X_3$	(0.000)	Quasi Moderator
	5	$Y = -63.222 + 2.738 X_1 + 4.048 X_3 - 0.094 X_1 * X_3$	(0.000)	(weaken)
H4	6	$Y = -10.878 + 1.238 X_1 + 0.398 X_4$	(0.000)	Quasi Moderator
	7	$Y = -37.042 + 1.862 X_1 + 1.283 X_4 - 0.021 X_1 * X_4$	(0.000)	(weaken)
H5	8	$Y = -8.379 + 1.280 X_1 + 0.127 X_5$	(0.000)	Quasi Moderator
	9	$Y = 49.835 - 0.107 X_1 - 0.846 X_5 + 0.023 X_1 * X_5$	(0.000)	(strengthen)
H6	10	$Y = -9.985 + 1.176 X_1 + 0.337 X_6$	(0.000)	Quasi Moderator
	11	$Y = 49.626 - 0.293 X_1 - 1.167 X_6 + 0.037 X_1 * X_6$	(0.000)	(strengthen)

Source: Primary data analysed (2010)

Equation 1 shows that the probability value of $F = 0.000$ indicates that user participation in information system development has a significant influence on user satisfaction of the information system at the State Electric Company Certification Service and 4 SKPD Lamongan District Government.

The second and third equations are used to test hypothesis 2. From the equation it states that task complexity is quasi-moderator. Besides, it is also seen that the interaction of participation and task complexity have a positive value, both in State Electric Company Certification Service and 4 SKPD of Lamongan District Government, that is 0.007 and 0.037, and it means that the task complexity variables can strengthen the influence of participation on user satisfaction.

Departing from the fourth and fifth equations both from the State Electric Company Certification Service and 4 SKPD Lamongan District Government, proved that the results support the third hypothesis. The complexity of the system proved to be a quasi-moderate and weakened the influence of user participation on user satisfaction, as evidenced by coefficients of -0.016 and -0.094.

Based on the results of the analysis of the sixth and seventh equations both in the State Electric Company Certification Services and in 4 SKPD Lamongan District Government, they indicate that the user effect variable is quasi-moderator. When viewed from the coefficient value, there are differences in both samples. In the State Electric Company Certification Service, the influence variable of user as the variable of moderator is strengthened, which is shown with value 0.053, while at 4 SKPD Lamongan Government indicates that the influence variable weakened the influence of user participation to user satisfaction, 0.021.

Based on the eighth and ninth equations, it is evident that the user-developer communication variable is quasi-moderator. As seen from the coefficient value of the State Electric Company Certification Service of -0.048 states that these variables are weakening the influence of user participation on user satisfaction, while the results on 4 SKPD Lamongan District Government of 0.023 states that the user-developer communication variables are strengthening. Thus this result supports the fifth hypothesis and is in line with the research. Looking at the tenth and eleventh equations, it can be seen that the results obtained from both data show different conclusions. Research conducted on 4 SKPD Lamongan District Government shows that the support of top management as quasi-moderator strengthened the influence of user participation to user satisfaction in the development of information systems with a coefficient value of 0.037, while the State Electric Company Certification Services is weakening the influence of user participation against user satisfaction with a coefficient value of -0.054.

Table 7: Result of Paired Sample T Test (Correlation Value and Value t)

	Correlation	Sig.	T	Df	Sig.
State Electric Company - Government of Lamongan District	-0.081	0.538	-8.646	59	0.000

Source: Primary data analysed (2010)

Based on Table 7, known correlation value between the participation of information system users in the State Electric Company Certification Service with 4 SKPD District Government Lamongan is $r = -0.081$ with significance = 0.538. This means the correlation of both is still weak, because small r value that is only -8.1% and not significant ($P > 0.05$). Then when seen from the value of t arithmetic is $t = -8.646$ with $p = 0.000$. Therefore $p < 0.05$, and it can be

concluded that the two population averages are not equal. So it can be stated that there is a significant difference in the average participation of users of information systems at the State Electric Company Certification Service with 4 SKPD Lamongan District Government at 95% confidence level.

Conclusions and suggestions

Conclusions

Based on the results of analysis and discussion of the results of research as the output of data processing and hypothesis testing, then from this study conclusions can be drawn as follows:

1. It is proven that the research supports the first hypothesis, both on the State Electric Company Certification Services and at 4 SKPD Lamongan District Government.
2. It is proven that the research supports hypothesis 1-6. The complexity of the task, system complexity, user influence, user-developer communion, and top management support are quasi-moderators.
3. It is proven that the research supports hypothesis 7, which states that there are differences in the average value of user participation in the development of information systems at the State Electric Company Certification Service and 4 SKPD Lamongan District Government.

Limitations

The limitations contained in this study, which may lead to potential biases and inaccuracies in the conclusion are as follows:

1. The respondent's research is limited to the end of working on the State Electric Company Certification Services and 4 SKPD, namely BAPPEDA, DPPKA, DPU Cipta Karya, and KPDE. This research is likely to show different results if applied to end-user information systems throughout SKPD Lamongan District Government and end users of information systems in the State Electric Company other office units, and the results of the research are more generalised.
2. The data analysed in the study used an instrument based on perceptions of the respondents' answers. If the respondent's perception is different from the actual situation, this will cause problems. This research only uses survey methods through questionnaires. So the conclusions are drawn only based on data collected through instruments in writing, without conducting interviews or directly involved in activities that exist in the organisation.



Suggestions

Based on the limitations of the research mentioned before, further research is suggested to do the following:

1. The next researcher is expected to not only take samples from some SKPD. It would be better if researchers also take data (spread questionnaires) to all existing SKPD, so that the data obtained can be better and precise. Likewise for research on the State Electric Company Certification Services, further research is expected not only to take samples from 1 support unit office but also take it from the office unit supporting State Electric Company.
2. The next researcher is expected to not only rely on the results of the questionnaire. It would be better if the researcher also reviewed the situation directly on the ground in order to perform the analysis and draw a better and more appropriate conclusion.

Research Implications

Regardless of all the limitations, this research is expected to be useful as a consideration in the development of information systems involving the users in it. This study has research implications that there is a need for more attention to be given to the factors of human involvement in the development of information systems. The results of this study can be used as additional literature that explains the relationship of user participation to user satisfaction in the development of information systems.

REFERENCES

- Ahmadi, H., Nilashi, M. dan Ibrahim, O. 2015. Organizational decision to adopt hospital information system: An empirical investigation in the case of Malaysian public hospitals. *International journal of medical informatics*. 84 (3): 166–188.
- Akkermans, H.A. dan Oorschot, K.E. Van. 2018. Relevance assumed: a case study of balanced scorecard development using system dynamics. *System Dynamics*, hal. 107–132, Springer.
- Ciborra, C.U. dan Lanzara, G.F. 2017. Designing dynamic artifacts: computer systems as formative contexts. *Symbols and Artifacts*, hal. 147–165, Routledge.
- Dwivedi, Y.K., Wastell, D., Laumer, S., Henriksen, H.Z., Myers, M.D., Bunker, D., Elbanna, A., Ravishankar, M.N. dan Srivastava, S.C. 2015. Research on information systems failures and successes: Status update and future directions. *Information Systems Frontiers*. 17 (1): 143–157.
- Gu, C., Peng, Z. dan Li, C. 2016. High-precision motion detection using low-complexity Doppler radar with digital post-distortion technique. *IEEE Transactions on Microwave Theory and Techniques*. 64 (3): 961–971.
- Gwynne, S.M. V, Hulse, L.M. dan Kinsey, M.J. 2016. Guidance for the model developer on representing human behavior in egress models. *Fire technology*. 52 (3): 775–800.
- Handte, M., Foell, S., Wagner, S., Kortuem, G. dan Marrón, P.J. 2016. An internet-of-things enabled connected navigation system for urban bus riders. *IEEE internet of things journal*. 3 (5): 735–744.
- Imbiri, W. 2006. Hubungan Partisipasi Pemakai Dalam Pengembangan Sistem Dan Kepuasan Pemakai Dengan Empat Variabel Moderating (Sebuah Studi Pada Perbankan Indonesia). *Jurnal Fakultas Hukum UII*.
- Jain, A., Sarma, A. Das, Parameswaran, A. dan Widom, J. 2017. Understanding workers, developing effective tasks, and enhancing marketplace dynamics: a study of a large crowdsourcing marketplace. *Proceedings of the VLDB Endowment*. 10 (7): 829–840.
- Khan, M.L. 2017. Social media engagement: What motivates user participation and consumption on YouTube?. *Computers in Human Behavior*. 66 : 236–247.
- Kushniruk, A. dan Nøhr, C. 2016. Participatory design, user involvement and health IT evaluation. *Stud Health Technol Inform*. 222 : 139–151.



- Kwary, D.A. 2017. The Evolution of Dictionaries of Economics: from a Glossary to a. *HERMES-Journal of Language and Communication in Business*. (52): 59–73.
- McKeen, J.D., Guimaraes, T. dan Wetherbe, J.C. 1994. The relationship between user participation and user satisfaction: an investigation of four contingency factors. *MIS quarterly*. : 427–451.
- Naser, S.S.A. dan Shobaki, M.J. Al. 2016. Computerized Management Information Systems Resources and their Relationship to the Development of Performance in the Electricity Distribution Company in Gaza.
- Noe, R.A., Hollenbeck, J.R., Gerhart, B. dan Wright, P.M. 2017. *Human resource management: Gaining a competitive advantage*. McGraw-Hill Education New York, NY
- Nugroho, Y. dan Prasetyo, A. 2018. Assessing information systems success: a respecification of the DeLone and McLean model to integrating the perceived quality. *Problems and Perspectives in Management*. 16 (1): 348.
- O'Neill, J.W., Beauvais, L.L. dan Scholl, R.W. 2016. The use of organizational culture and structure to guide strategic behavior: an information processing perspective. *Journal of Behavioral and Applied Management*. 2 (2): 816.
- Pearlson, K.E. dan Saunders, C.S. 2019. *Managing and using information systems: A strategic approach*. John Wiley & Sons
- Romero, D. dan Vernadat, F. 2016. Enterprise information systems state of the art: Past, present and future trends. *Computers in Industry*. 79 : 3–13.
- Setianingsih, S. 1998. *Pengaruh dukungan manajemen puncak dan komunikasi pemakai pengembang terhadap hubungan partisipasi dan kepuasan pemakai dalam pengembangan sistem informasi*.
- Smith, A.N. 2015. The backer–developer connection: Exploring crowdfunding’s influence on video game production. *New Media & Society*. 17 (2): 198–214.
- Tjahjadi, B. dan Soewarno, N. 2019. The mediating effect of intellectual capital, management accounting information systems, internal process performance, and customer performance. *International Journal of Productivity and Performance Management*.