

TASK-TECHNOLOGY FIT WHICH AFFECT INDIVIDUAL PERFORMANCE

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Abstract

This research aims to identifying the relationship between task-technology fit and user evaluation, that influences individual performance. The hypothesis are; (1) The characteristic of system information will affect user evaluation of task-technology fit; (2) The characteristic of task will affect user evaluation of task-technology fit; (3) The characteristic of individual ability will affect user evaluation of task-technology fit; (4) The interaction between task, technology and individual will affect user evaluation of task-technology fit; (5) User evaluation will affect individual performance.

Research subject consist of 135 manager from manufactures and services industry which implemented system information technology. The data are analysed by regression (multiple and linier). The interaction on hypothesis 4 are analysed by moderated regression analysis.

Research finding shows; partially, the characteristic of information system, task and individual ability will affect user evaluation. When the three variables on task-technology fit make an interaction effect therefore user evaluations will have a better result. Another findings show user evaluation has a positive significant effect to individual performance. The conclusion from this research is if user evaluation have a better result because of task-technology fit therefore individual performance will improved indirectly.

Key Word : *System Information technology, User Evaluation, Task-Technology Fit, Moderated Regression analysed, Individual Performance.*

I. Background

Every business organization is required to be ready all the times to face the competition in business area to keep surviving in running their business. One way to compete with other competitors is to use information system. Rockart (1995; in Djatikusumo, 1999) stated that in the 1990s, information technology in the fourth resources after human resources, money (capital), and machines used by manager to design and run the company or information. The information system is not only used as a device in data processing, but also to find out in shorter time if there is problem in organization and to focus on certain elements to take appropriate step (Ives et al., 1984). Information system technology of a company will help providing information rapidly in accordance with the manager's need in decision making. There is one point which should be noticed by company or bussines applying this information technology, that is, how far the success of the systems brings about positive effects in performance improvement either on individual o organization on the whole.

To measure how much the systems gives advantage to organization, we need an evaluation that can accord the overview of the systems success itself. The evaluation to information technology applied by the company is started from user because they are assumed to give information about the required information technology and in agreement with their ability and need.

According to Goodhue (1995) the success of information system in a company depends on how the system is run. The simple operations of the systems for the user, and utilization of the information technology. The problem is, which of the user evaluations concept can be used as a guidance to evaluate user in the information system. Depart from this point; Goodhue (1995) proposed a task-technology fit construction as a guidance to measure the users evaluations in the systems information. The user evaluation on task-technology fit becomes a significant point concerning the high individual performance achievement. Goodhue and Thomson (1995) discovered that the task-technology fit would lead individual to obtain a better performance. Therefore, the technology application in company information system should consider the users so that they can use the technology in line with their task and ability.

Based on the problem above, the Goodhue's model (1995) will be tested again by adding individual performance variable into research model. This addition based on the assumption that if there is a high task-technology fit the applied system or information service is suitable with the task characteristic need then the individual performances will increase (Goodhue, 1995). The inter-variable relation in their model will be analysed by using regression analysis both the simple linier regressions and multiple one.

II. Theoretical outline and Hypotheses formulation

The basic model that used in this research is one that has been developed by Goodhue (1995). In this research, Goodhue tried to measure the success of information system implemented in organization or company by using users evaluation. The model is a development of Goodhue and Thompson (1995) research, which previously attempted to see the relation between information technology and performance (Technology to Performance Again). In that research they discovered that use of information system significantly affect to performance.

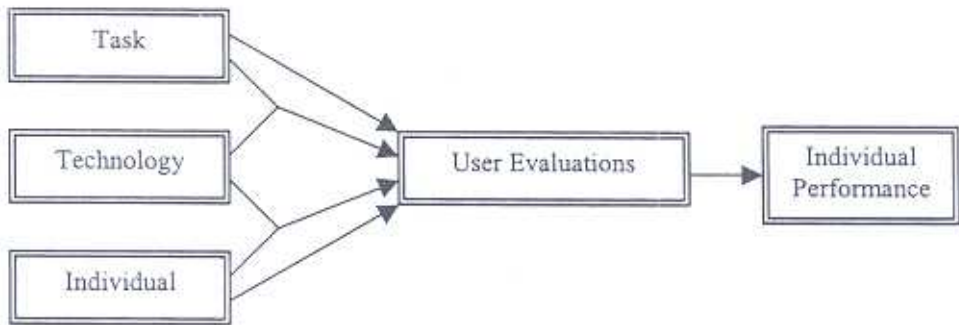
Similar research to measure between the task-technology fit and performance has been once conducted by some other researchers. Sugeng (1997) and Sumardiyanti (1999) in their research discovered that the task-technology fit positively affect to performance. However the research did not merely use TTF model, but also put the utilization variable. This model is known as TPC developed by Goodhue and Thompson (1995).

In this research, they use the Goodhue's model (1995) namely one that analysing the relation between users evaluations of TTF to performance. The fundamental difference between the TTF model developed by Goodhue and Thompson's TPC (1995) is that, Goodhue and Thompson include utilization variable to TPC model. Whereas, in the TPC model, Goodhue (1995) no longer include the utilization variable with consideration that if TTF is a mandatory (choice/compulsory) then the utilization can be not included as a variables to measure performance. Utilization refers to individual decision whether he or she will use the technology in completing his or her task (Sugeng, 1995).

From the research model on the previous picture 1, we can find out that there are three direct relations between task variable, technology and individual ability to users evaluations and two-interaction relation describing the task-technology fit. These relations in research models are then stated into

four general hypothesis (by grouping the interaction relations into one hypothesis). The fifth hypothesis describes the relation between users evaluation and performance.

Picture1: Task-Technology Fit



A. The relation between information system/technology and users evaluation

The first hypothesis in their research can be strongly used as a basic of user evaluations. The user evaluation mentioned here will be based objectively on the information user characteristic which is implemented by company or is provided for user in the company. The implemented information system had better meet the following considered giving advantages/benefits to the task accomplishment.

In general, the information system implemented in accompany should be easily used in identifying, accessing and interpreting data. The data should be an integrated one from the entire company business units so that they can be applied for some various task need in company (Date 1981 & Martin 1982, in Goodhue, 1995). The number of workstation in company is influential in implementing the information system technology of company as well. Since with the more supporting facilities provide for the users, the easier for the users to access required data to accomplish individual task in a company. The assisters applied role is not less important in implementing the information system by users. Assisters is an officer spending 75% or up their time helping users to find, access or use the data in information system. The role of the assisters is very meaningful to the users, because they can get help in a shorter time in case of difficulty in using information systems. Users will give evaluation value if the existing information system characteristic will help them in accomplishing organization or in making a managerial decision.

From the explanation above we can formulate the first hypothesis as the following:

Hypothesis 1 : Characteristic of information (technology) will affect the user evaluation of task-technology fit (TTF).

B. The relation of between task characteristics with user evaluation

The context of task in this hypothesis formulating is the utilization of quantitative information in managerial task. Fry and Siocum (1984; in Goodhue 1995) proposed a task characteristic that is stated in three-dimension construct namely: diversity, difficulty and interdependence. Perrow (1967;

correspondence of these aspects with the user task need. From the explanation above, we can formulate the fourth hypothesis:

Hypothesis 4: *The interaction between task, technology and individual will affect the user evaluations of the task-technology fit.*

III. Research Method

1. Population and research sample

The research samples are taken from the population of manufacturer and service. The company in Indonesia. Data are taken from the responses of managers working in the company. In this case, we use the purposive sampling, that is, the computer-based information system to perform the company using managerial using managerial tasks (decision making).

2. Data Collecting

The data used in this research is collected with questionnaire by mail and addressed to some manufacturer and service companies. For example: manufacturer, banking, hotel and transportations. The advantage of questionnaire by mail is that it can reach wide geographical area in relatively low cost. Moreover, this procedure enables respondents to take sufficient time to consider every single question thoroughly before giving answers. With considering the low response rate in Indonesia (10%-20%), then we need 300 questionnaires.

3. Validity and Reliability Measurement.

The variable measurement in this research purposes to make the proposed hypothesis can be tested and the questionnaires can be answered. The instruments in the measurement should be good enough in order that the result will be more accurate and consequently it will improve the scientific quality of the research. The major criteria's to examine test how good the applied measurement instrument is, are the validity and reliability one. Validity is related to whether or not researcher measures the precise concept. In this research the approach that is used to test the construct validity for each variable is a factor analysis with 10.01 versions of SPSS for window program. A measurement has a unidimensional characteristic if it uses items firmly only by measuring one and does not become a part of other factors. In this research, we use the test of measurement reliability for each variable with cronbach's alpha coefficient and item to total correlation which is useful to fix the measurement by eliminating items whose presence will lesser cronbach's alpha. Rules of thumb suggest that the value of cronbach's alpha should be at or more than 0,70 and item to total correlations at or more than 0,50.

4. Variable measurement

To measure the factors of task-technology fit, user evaluation and individual performance, this research adopts the measurement of Dale L Goodhue (1995), Information technology systems is measured with 30 item, the task characteristic with 4 items, the individual characteristic with 4 items, user evaluation with 5 items and the individual performance with 3 items.

5. Hypothesis test

The Hypothesis test (H1), Hypothesis 2 (H2), Hypothesis 3 (H3) is the main effects model, which are tested with multiple regression analysis. Hypothesis 1 (H1) will test the relation between the information systems with user evaluation; the hypothesis 2(H2) will test the relation between the task characteristics with user evaluation. Hypothesis 3 (H3) will test the relation between individual capabilities with users evaluation. The regression of main effect model is as following:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

In which:

Y	=	user evaluations
X ₁	=	tehcnoogy characteristic
X ₂	=	task characteristis
X ₃	=	individual characteristic
β	=	regression coefficient
ε	=	error/residual
α	=	constanta

The signification of β_1 , β_2 and β_3 show the signification of major effects from each technology characteristic variable, task characteristic and individual to user evaluation. So it is related to the test of H1, H2, H3.

The Hypothesis 4 (H4) is tested with moderated hierarchical regression technique (Venkantraman, 1989 and Sharma, et.al. 1981 in Goodhue, 1995). This fourth hypothesis wants to anticipate if there is an inter-variable interaction or inter-task and technology fit relation, will users evaluation became better or not in this case, term of interaction (the interaction between technology with the task characteristic and the interaction of technology with characteristic) is included into main effects model by hierarchy to isolate the main effect of technology variable, task-characteristic and individual characteristic to user evaluation and also to predict whether the task and individual characteristics will moderate the relation between technology and user evaluation.

The regression used in this second step is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_1 X_2 + \beta_5 X_1 X_3 + \varepsilon$$

In which:

Y	=	Users evaluation
X ₁	=	Technology
X ₂	=	Task characteristic
X ₃	=	Individual characteristic
α	=	Constant
β	=	Regression Coefficient
ε	=	<i>Error/residual</i>
X ₁ X ₂	=	Interaction of technology with task characteristic
X ₁ X ₃	=	Interaction of technology with individual characteristic

The signification of R² comparison (ΔR^2) with F test (F change) between term interaction model and non term interaction one, show that both the variables the task characteristic and individual in moderate the relation between technology with user evaluation, so its related to H4.

6. Result of data analysis

The data which is used in this research is collected with questioners by mail without postage, the first questioners are first given to 300 respondent working in 85 company (each company is sent 3 or 4 questioners). The returned questioners are 157 or response rate approximately 35%. These are not used all together because there are some questionnaire is inappropriate to be analysed or incomplete, so that from 157 questioners only 135 of which are appropriate. The number of the questioners above is assumed to meet the requirement the statistic analysis the inter-variable relation. From 135 respondent, all of them are executive manager (from all degrees) whose last education is S1 degree in majority (11%) followed by S2 degree (88,15%), Diploma degree (0,74%). The main business of these companies is adequate to meet the requirement of the organization setting. Most of the respondent working in manufacturer (35%), agricultural (18,52%), banking (28,15%), telecommunication (10,37%) and transportation (7,41%).

In this research, all variables are measured by questionnaire with 7-point likert scale with 1 at the lowest and 7 at the highest. Thus the median is $(7+1)/2=4,00$. The data descriptive statistic table 1 of the respondent show that score mean of all variables is up of the median (4.00). The value of mean observation is around from 4.52-5.91. Since the mean is above the median value, then we can conclude that the rate of respondent tendency to all variables is quite high. Table 2 show a matrix of inter-variable correlation.

Table 1.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Karakteristik sistem informasi	135	1.70	6.53	4.9881	.8441
Karakteristik tugas	135	1.00	7.00	4.6296	1.1698
Karakteristik individual	135	2.00	7.00	5.3889	1.1560
Evaluasi pemakai	135	1.60	7.00	4.5244	1.0515
Kinerja individual	135	1.00	7.00	5.9111	1.1176
Valid N (listwise)	135				

Table 2. Correlation matrix

	Characteristic System information	Characteristic Task	Characteristic Individual	Evaluation User	Performance Individual
Characteristic system information	1,000				
Characteristic task	0,177**	1,000			
Characteristic individual	0,363***	0,169**	1,000		
Evaluation user	0,284***	0,244***	0,280***	1,000	
Performance individual	0,333***	0,158*	0,254***	0,336***	1,000

*Significant at level 0,10 **Significant at level 0,05 ***Significant at level 0,01

Table 2 show that the correlation between information system characteristics with users evaluation is significant ($r=0.284$; $p<0.01$), the correlation between task characteristics with evaluation is significant ($r=0.244$; $p<0.01$) correlation between individual characteristics with user evaluation is also significant ($r=0.280$; $p<0.01$).

B. Validity and reliability test

This research adopts the instrument which has been used in previous one (Goodhue, 1995). However it still needs a test for instrument validity to convince that the instrument is suitable to be used for company in Indonesia (not affected by the culture). Then we will test the reliability of each instrument. These are meant to meet the requirement that an instrument is appropriate to be used to reveal something with the real one. Based on the result of factor analysis, we can see that generally loading factor is consistent as expected, each item-loading factor more than 0.40 and definitely only high loading on each factor which based on it. The exception is four items measuring the construct of technology, namely: item KU04, OT01, KU04 and MU03 whose have factor loading lower than recommended value. Thus, those items that have met the convergent validity requirement.

The reliability test is called consistency which means that the rate of research instrument ability to collect data constantly from individual group. Instrument whose has high rate of reliability tends to create the same about a variable or its elements, if it is repeated in different time on the same individual group.

The reliability test item to total correlation shows a good result because the coefficient value item to total correlation generally is up to 0.50. The coefficient value item to total; correlation is around 0.05071-0.7844 (Information system characteristic), 0.5386-0.6558 (task characteristic), 0.5544-0.7899 (Individual characteristic), and 0.5578-0.7505 (users evaluation). And so is the internal consistency reliability for each variable, the coefficient value cronbach's alpha has met the rules of thumb requirement namely ≥ 0.7 , in which coefficient value cronbach's alpha is around 0.7769-0.09546.

Based on the validity and reliability test above, we can conclude that the questionnaire used to measured the construct of information system characteristic, task characteristic, individual characteristic, user evaluation and individual the requirement of recommended validity and reliability. Then data from those questionnaires can be used to the following analysis in accordance with the concern of this research.

IV. The result of hypothesis test

The result of the multiple regression analysis (main effect model) with the dependent variable, users evaluation, in the test of hypothesis 1, hypothesis 2 and hypothesis 3 is shown on this following table 3.

Table 3. Analysis Result of Multiple Regression (Main Effects Model)

Variable Independent	β	T	prob	r^2
Characteristic system information	0,232	2,137	0,034	0,148
Karakteristik tugas	0,162	2,183	0,031	
Characteristic individual	0,165	2,084	0,039	
Constant	1,726	2,869	0,005	

Based on the analysis result in table 3. It is seen that:

- **The result of hypothesis 1 (H1)**

The result of data analysis to hypothesis 1 (H1) testing the relation of information system characteristic to user evaluation is positive and significant ($t=2.137$; $p=0.034 < 0.05$). By looking at the direction of the relation, it means that if the score of the information system characteristic variable increases, then its predictable that the score of users evaluation variable will also increase. In this case, Hypothesis 1 representing the effect of the information system characteristic to the user evaluation is supported. The result is suitable with the Goodhue's (1995) research findings which stated that the users giving a high evaluation value is the one feels that the information system characteristic being implemented by the company is easier to be used.

- **The result of Hypothesis 2 test (H2)**

The result of data analysis to hypothesis 2 (H2) testing the relation of the task characteristic to user evaluation is positive and significant ($t=2.183$; $p=0.031 < 0.05$). By looking at the direction of this relation, it means that if the score of the task characteristic variable increase, then it is predictable that the score of user evaluation variable will also increase. In this case hypothesis (H2) representing the effect of the task characteristic to the user evaluation is supported. This result is suitable with the Goodhue's (1995) research findings, which stated that the task characteristic is positively related to the information system implemented by a company.

- **The result of Hypothesis 3 test (H3).**

The result of data analysis to the hypothesis 3 (H3) testing the relation of the individual characteristic to the user evaluation is positive and significant ($t=2.084$; $p=0.039 < 0.05$). By looking at the direction of this relation, It means that if the score of the individual characteristic variable increases, then the score of the user evaluation variable will also increase. In this case, the hypothesis 3 (H3) representing the affect of individual characteristic to the user evaluation is supported. The result of the analysis is suitable with the Goodhue's (199%) research findings, which states that user whose has high competency and capability in information system utilization will give high user evaluation value.

- **Hypothesis 4 (Moderating effects)**

The result of data analysis by using moderated hierarchical regression to test the hypothesis 4 (H4) which views the fit relation/interaction between the variables in task-technology fit with dependent variable, the user evaluations will be represented on this table 4.

Table 4: Result analysis of interaction effect

Variable Independent	β	t	Prob	r^2
Characteristic system information	1,408	3,731	0,000	0,212
Karakteristik tugas	0,728	2,536	0,012	
Characteristic individual	0,833	2,503	0,014	
Interacts technology x task	-0,120	2,031	0,044	
Interacts technology x individual	-0,140	2,091	0,038	
Constant	-3,751	2,098	0,038	

The comparison test R^2 (ΔR) with F test between with or without term interaction model is significant (F change = 5.278; $p > 0.006 < 0.01$). By adding term interaction into the main effects model, then the number of user evaluation Variance that can be explained is increasing as 6.4% (ΔR^2). By taking at the effect of each interaction term individually, it is found that there is a significant interaction between information system characteristic and task characteristic ($t = -2.031$; $p = 0.044 < 0.05$). It means that the effect of the information system characteristic to the user evaluation depends on its task characteristic. Then, it is found that there is a significant relations between the information system characteristic and the individual characteristic ($t = -2.091$; $p = 0.03 < 0.050$). It means that the effect of the information system characteristic. From the result of the test, we can conclude. The hypothesis 4 (H4) representing the relation between task characteristic and the individual characteristic moderates the relation between the information system characteristic and the user evaluation is supported. This result is similar to the one that has been found by Goodhue (1995), and also to the findings on some of TPC model which tested by Goodhue and Thompson (1995), that is, when the task, technology and individual are interacting one to another and creates a relation, then the users will give a better evaluation result.

Its support the theory proposed the task-technology fit relation without relating it with the utilization, and then the user evaluation value can be used as a guidance to see the increase or decrease of the organization performance.

V. Conclusion and Research Limitations

The result of this research is expected to give contribution in giving more comprehensive understanding about the measurement to the success of the information system implementation, which is, measured through user evaluations of the task-technology fit as proposed by Goodhue (1995). This positive effect will show that if the technology, task characteristic and individual ability are getting more suitable (fit), then the performance will also increasing. Generally in this research can conclude that user evaluation on task-technology fit shows a positive result. It means that the higher the relation of predictor variables fit in the task-technology characteristic, and the better the user evaluation will indirectly increase. We can also conclude that the success of an information system will be strongly depend on how the system is designed to fulfil the user task need and individual ability itself in system utilization, either partially or when these variables interact.

This research has some implication

1. The result of this research can become a considerations particularly for a company, that in this era, the development of information system technology is growing quickly and getting more sophisticated. The success of the information system implementation in a company can be measured from the user evaluation by performing from the user evaluation by performing a measurement to the relation of the task-technology fit (TTF) in the company, or how far the applied information system is suitable with the task need and how much the individual capability in using the information system.
2. The result of this research also shows that the variables interacting in the relation of TTF will refer to better result if seen from the user evaluation instead of connecting those variables with the user evaluation partially.

3. The result of this research also shows that in the end, the high relation of task-technology, which is seen from user evaluation, will increase the organization performance on the whole. These can be an input or consideration for the company that designing an information system which can meet the individual need in performing his or her task is very important, if company wants to improve its organization performance on the whole.

The result of data analysis to hypothesis 1 (H1) The research, which is related to information system, will not stop at a certain period only, but it will keep growing in line with the development of the information technology itself, including the research of information system concerning the user evaluation. From the result of this research, the researcher proposing some points that may be as an input or considerations for next research:

1. Data is collected from the response of the manager using the information system in the manufacturer or Service Company, which are involved in this research. However, this result cannot be generation in organization in all management level. If the research takes sample except the manager (for example: staff), then the conclusion may be different.
2. This research only to measure the information system user evaluation in general, without specifying the industry or the company group. If the research takes sample from the company population with the same characteristic using the information system and have the similar task characteristic the result maybe different.
3. This research does not measure the relation of task-technology fit and individual performance directly. This only to see whether the user evaluation has positive relations with performance. It means that if the result of user evaluation is good, then the individual performance will also increase. The following research probably can measure the effects of the relation of task-technology with performance directly.

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