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Evaluating of Employee Performance Appraisal Information System at PT Sigma Cipta Caraka by Using HOT-Fit Model on Human Component

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***Abstract*— *Employee performance is a result of work achieved by employees that are carried out tasks by assigned responsibilities. Employee performance appraisal is carried out to determine employee success rate on a performance that has been done. Telkomsigma implements PRouDS (Project Management & Resources Delivery System) application, which is an effective employee performance appraisal application to monitor and control processes to complete projects on schedule. PRouDS application needs to be evaluated to determine the success of its implementation so that is by the objectives of the organizer. The research purpose is to determine the achievement of results of PRouDS information system evaluation in employee perceptions. HOT-Fit model is used as a research method to determine whether there is a match between the components of Human, Organization, Technology and their compatibility with Net Benefits. The analysis technique uses Partial Least Squares-Structural Equation Modeling (PLS-SEM) which is assisted by using the SmartPLS software application.*

***Keywords*— *HOT-Fit, Information System, SEM, SmartPLS, PRouDS.*

I. Introduction

Employee performance is the result of work performance achieved by employees in carrying out their duties by the responsibilities assigned to them. An effort to determine the level of success of an employee on the performance that has been done is by conducting performance appraisals of employees. Reporting employee appraisals in an agency can be facilitated by the presence of information technology-based applications by companies to monitor employee performance. One company that innovated the employee performance appraisal reporting system was PT Sigma Cipta Caraka (known as Telkomsigma). Telkomsigma is a telecommunications and information technology company that is included in one of the subsidiaries of PT Telekomunikasi Indonesia (Persero) Tbk, or known as Telkom, which is the largest information and telecommunications company in Indonesia that provides integrated information technology services, such as managing services, software development, and system integration.

Telkomsigma implements an employee performance appraisal application called PRouDS (Project Management and Resources Delivery System). The PRouDS application is an effective project management application in the process of monitoring and controlling to complete projects according to schedule, scope and budget. This application provides a historical graph of employee performance appraisals from filling out the timesheet entered by the employee. The timesheet in question is a work report that must be filled in by employees every day based on tasks, projects being worked on, the number of hours worked, along with details of their work.

The PRouDS application needs to be evaluated to determine the success of its implementation so that it is by the objectives of the organizer. Information system evaluation is useful for knowing the benefits of information systems so that they can be developed according to user needs. Also, evaluation of information systems is needed as an effort to improve information system performance in knowing the positive aspects that encourage system use and identifying factors that cause obstacles [1].

HOT (Human Organization Technology)-Fit model is used as a research method to determine whether there is a match between the components of Human, Organization, Technology, and their suitability with Benefits. This analysis technique uses Partial Least Squares-Structural Equation Modeling (PLS-SEM) which is assisted by using the SmartPLS software application. The purpose of this study is to evaluate the PRouDS information system on employee perceptions and as a basis for the development of the PRouDS application in the future.

II. Literature Review

A. Information System Evaluation

Information system evaluation is an activity to measure or explore all the attributes of the system, in planning, developing, implementing, or operating [2]. Information system evaluation is a planned activity that aims to measure or assess the technical capability of a system, operational implementation, and system utilization. In general, the scope of information system evaluation is focused on all information and communication technology resources, including applications, information, infrastructure, human resources, and organizations [3].

B. Employee Performance Appraisal System

Performance appraisal is a process by which organizations evaluate the implementation of individual work [4]. The importance of employee performance appraisal can have a positive impact on both parties, namely the appraiser (company) or the party being assessed (employees). The positive impact for the company is that the company can recognize job talents, understand psychological conditions, and know the level of leadership of each employee. Meanwhile, the positive impact on employees will give birth to better work motivation and a healthy competitive spirit for every employee [5]. The employee performance appraisal system is reliable and is used as the basis for performance appraisal and employee performance development. The employee performance appraisal system is made by organizational goals so that each employee can assess how far their performance has resulted in the expected performance according to organizational goals. This system is a system of periodic assessments of the implementation of an employee's work [6].

C. HOT-Fit Model

Yusof et al. (2006) provide a new framework that can be used to evaluate information systems called the Human-Organization-Technology (HOT)-Fit Framework. This framework is built based on the IS Success Model in categorizing evaluation factors, dimensions, and measures. As well as adopting the concept of conformity or conformity from the IT-Organization Fit Model [7].

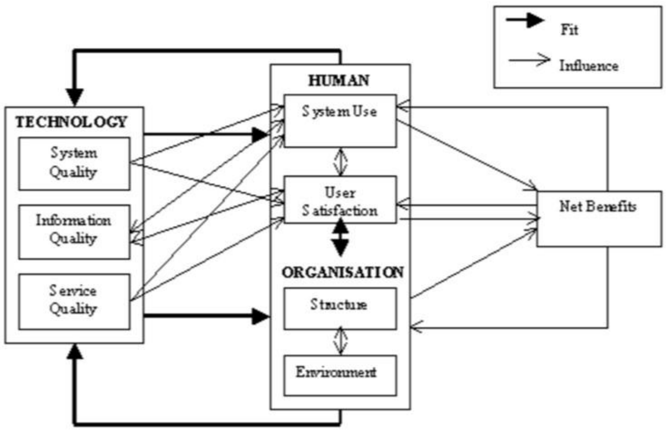

Fig. 1. Human-Organization-Technology (HOT)-Fit Framework

In Fig. 1, it can be seen that the HOT-Fit model consists of important information system components, namely Human, Organization, Technology, and the suitability of the relationship between the three.

The Human component assesses the information system in terms of system use on the frequency and breadth of functions and investigations of information systems. The System Use is also related to who uses, the level of user, training, knowledge, expectations, and attitudes to accept or reject the system. This component also assesses the system from the aspect of User Satisfaction which can be related to perceived usefulness and user attitudes towards information systems that are influenced by personal characteristics [8].

D. PLS-SEM

Structural Equation Modeling (SEM) is a technique that combines factor analysis and regression. SEM can account for the relationship between many variables simultaneously and differently, with techniques such as regression that assume variable measurement [9].

There are two types of SEM, namely covariance-based and variant-based. This research uses variant-based SEM, namely SEM which uses variants in the iteration process or block variants between indicators or parameters estimated in one latent variable and does not correlate indicators between other latent variables in one research model. PLS is a variant-based SEM statistical method designed to solve multiple regression when specific problems occur in data, such as sample size, missing data, and multi-collinearity. PLS-SEM can simultaneously test the measurement model as well as test the structural model. The method of estimating the weights of latent variables is carried out by building an inner model (a structural model that connects between variables) and an outer model (a measurement model to produce the specified) [10].

III. RESEARCH METHOD

The steps taken to evaluate the PRouDS information system is to identify the problem, then collect all the information through literature study. After that, it is continued with the formulation of hypotheses and data collection which will be discussed in this chapter. The data analysis step and the results of the analysis will be discussed in the next chapter.

This research model is presented based on the HOT-Fit model. This model is made of a one-way relationship between variables to find out whether the technology component affects the human component in obtaining the overall benefit, and knowing the organizational component in getting benefits. Based on the hypothetical model in Fig. 2, the hypotheses tested in the Human component are as follows:

H7: System Use (PS) has a significant effect on User Satisfaction (KP)

H9: System Use (PS) has a significant effect on Net Benefits (M)

H10: User Satisfaction (KP) has a significant effect on Net Benefits (M)

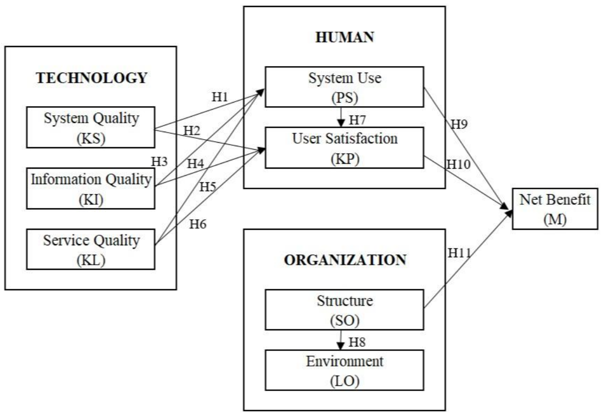

Fig. 2. Problem Formulation Model Used

The population that is the object of data collection in this study is the PRouDS application users, namely employees who work at the Telkomsigma company. The questionnaire data was distributed to 50 employees in the IT Security

Management Operational (MO) division.

The measurement scale used is a closed questionnaire that uses a Likert scale, in which the Likert scale is used to measure attitudes, opinions, and perceptions of people or groups of people about social phenomena [11]. The measurement scale in this study uses four scales so that respondents can answer with full certainty without having to answer hesitantly or look for neutral answers. The measurement scale is made in the form of multiple choices consisting of Strongly Disagree (STS) with a score of 1, Disagree (TS) with a score of 2, Agree (S) with a score of 3, and Strongly Agree (SS) with a score of 4.

The instrument used in this study was based on the HOT-Fit model on the Human component which can be seen in Table I.

TABLE I. Research Indicators.

Latent Variables	Indicators	Indicator Codes
System Use (PS)	Direct or indirect use	PS1
	The nature of use	PS2
	Acceptance attitude	PS3
	Hope	PS4
	Training	PS5
User Satisfaction (KP)	Benefits	KP1
	Enjoyment	KP2
	Decision-making satisfaction	KP3

Research indicators are arranged into instrument items which will then become statements given to respondents to seek answers to this research problem in the form of a questionnaire. The questionnaire design in this study can be seen in Table II.

TABLE II. Research Questionnaire Design.

Indicator Codes	Statements
SYSTEM USE	
PS1	PRouDS implemented directly to me
PS2	Filling in the timesheet in PRouDS is important as a reference for employee performance appraisal
PS3	I received PRouDS well
PS4	PRouDS implementation has met my expectations as a more effective and efficient performance reporting information system
PS5	I received training before using PRouDS
USER SATISFACTION	
KP1	PRouDS is very helpful in the process of reporting employee performance
KP2	PRouDS has an attractive interface
KP3	PRouDS produces performance reporting information that can be justified

IV. Discussion

The data collection was conducted using a questionnaire that has been filled in by 50 respondents online using Google Form. The data is collected in Microsoft Excel with the CSV (Comma-Separated Values) data format so that the data can be processed in the SmartPLS application. In Table III, an example of the results of the questionnaire answers from five respondents is displayed.

The first step in creating a new project using SmartPLS is importing the questionnaire data file in CSV format. After the questionnaire data has been imported successfully, a worksheet space will appear provided for drawing the path diagram. The path diagram drawn is by the relationship of the latent variable (blue circle) with the indicator (yellow rectangle) adopted from the HOT-Fit model used as in Fig. 3.

TABLE III. Examples of Answers to Questionnaires from Five Respondents.

Indicator Codes	R1	R2	R3	R4	R5
PS1	3	3	4	3	3
PS2	3	3	4	2	3
PS3	3	3	4	3	3
PS4	3	3	4	2	3
PS5	2	3	3	2	2
KP1	3	2	4	3	3
KP2	3	3	3	3	2
KP3	3	2	3	2	3

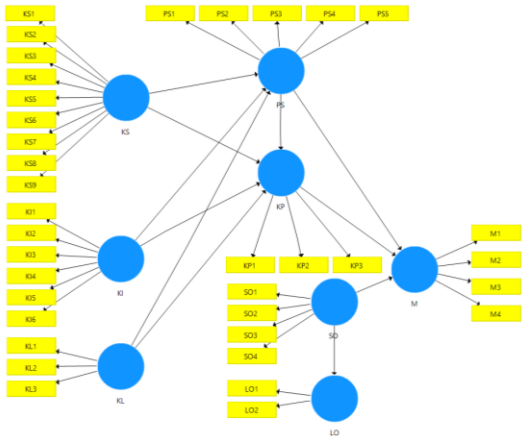

Fig. 3. Path Diagram

A. *Outer Model Analysis*

The outer model analysis is an analysis of testing the relationship between construct variables (indicators) and their latent variables [12]. The outer model analysis is carried out through three parameters, namely convergent validity testing, discriminant validity testing, reliability testing.

The convergent validity testing was evaluated with Outer Loadings and Average Variance Extracted (AVE). The Outer Loadings value is said to be valid, at least greater than 0,7 because this value is considered practically significant provided that the higher value indicates that the indicator represents the latent variable correctly [13]. After calculating, the value on the PS5 indicator (0,461) does not meet the rule of thumb, which means that the indicator cannot reflect any of its latent variables. Thus, the PS5 needs to be removed from the path diagram and recalculated to get the overall Outer Loadings value. Outer Loadings values are summarized in Table IV.

TABLE IV. Outer Loadings

Indicator Codes	KP	PS
KP1	0,901	
KP2	0,835	
KP3	0,883	
PS1		0,732
PS2		0,793
PS3		0,848
PS4		0,811

The second convergent validity testing was evaluated by AVE. The AVE value is said to be valid if the value is greater than 0,5 which means that the latent variable can represent more than 50% of its indicators [12]. After being evaluated, all latent variables on Human component have AVE values that meet the rule of thumb. The AVE value can be determined using the following formula [10]:

$$AVE = \frac{\Sigma \lambda_{(i)}^2}{\Sigma \lambda_{(i)}^2 + \Sigma_i var\, \varepsilon_{(i)}} \quad (1)$$

$\lambda_{(i)}$: Outer Loadings values

$var\ \varepsilon_{(i)}$: 1 - $\lambda_{(i)}^2$

An example of how to get the following AVE value uses KP latent variables which have indicators KP1 (0,901), KP2 (0,835), and KP3 (0,883).

$$AVE = \frac{(\lambda_{KP1}^2 + \lambda_{KP2}^2 + \lambda_{KP3}^2)}{(\lambda_{KP1}^2 + \lambda_{KP2}^2 + \lambda_{KP3}^2) + ((1-\lambda_{KP1}^2) + (1-\lambda_{KP2}^2) + (1-\lambda_{KP3}^2))}$$

$$= \frac{((0{,}901)^2 + (0{,}835)^2 + (0{,}883)^2)}{((0{,}901)^2 + (0{,}835)^2 + (0{,}883)^2) + ((1-(0{,}901)^2) + (1-(0{,}835)^2 + (1-(0{,}883)^2))}$$

$$= \frac{2{,}288715}{2{,}288715 + 0{,}711285} = 0{,}762905 \approx 0{,}763$$

The AVE value for the Human component indicates that the latent variables PS and KP can represent the indicators in the block and marked in green, which can be seen in Table V.

TABLE V. AVE

Latent Variables	AVE	Notes
KP	0,763	Valid
PS	0,635	Valid

The discriminant validity testing was evaluated using the value of Cross Loadings and Fornell-Larcker Criterion. After being evaluated, all latent variables have a Cross Loadings value that meets the rule of thumb, which is the latent variable value is greater than the correlation of the indicator with the latent variables in other blocks. Thus, the value of Cross Loadings for the Human component shows that the correlation between the indicator and the block's latent variable is valid and marked in green, which is summarized in Table VI.

TABLE VI. Cross Loadings

Indicator Codes	KP	PS
KP1	0,901	0,695
KP2	0,835	0,389
KP3	0,883	0,510
PS1	0,486	0,732
PS2	0,526	0,793
PS3	0,448	0,848
PS4	0,535	0,811

The second discriminant validity testing was evaluated by the Fornell-Larcker Criterion. After being evaluated, the Fornell-Larcker Criterion values for PS and KP latent variables meet the rule of thumb, which is the latent variable values are greater than the correlation between other latent variables. The Fornell-Larcker Criterion value can be determined using the following formula [10]:

$$FLC = \sqrt{AVE_{(i)}} \quad (2)$$

$AVE_{(i)}$: AVE value

An example of how to get the Fornell-Larcker Criterion value below uses the AVE value in the KP (0,763) latent variable which can be seen in Table V.

$$FLC = \sqrt{AVE_{(KP)}} = \sqrt{0{,}763} = 0{,}873498 \approx 0{,}873$$

The Fornell-Larcker Criterion value for the Human component indicates that all correlations between the latent variables PS and KP are valid and marked in green, which can be seen in Table VII.

TABLE VII. Fornell-Larcker Criterion

	KP	PS
KP	0,873	
PS	0,622	0,797

The reliability test was evaluated by assessing Composite Reliability and Cronbach's Alpha, both of which aim to measure how well the indicator can measure its latent constructs [12]. After being evaluated, all latent variables on Human component have a Composite Reliability value that meets the rule of thumb, which is more than 0,7. The value of Composite Reliability can be determined using the following formula [10]:

$$\rho c = \frac{(\Sigma \lambda_{(i)})^2}{(\Sigma \lambda_{(i)})^2 + \Sigma_i var\, \varepsilon_{(i)}} \quad (3)$$

$\lambda_{(i)}$: Outer Loadings values

$var\ \varepsilon_{(i)}$: 1 - $\lambda_{(i)}^2$

An example of how to get the following Composite Reliability value uses KP latent variables which have indicators KP1 (0,901), KP2 (0,835), and KP3 (0,883).

$$\rho c = \frac{(\lambda_{(KP1)} + \lambda_{(KP2)} + \lambda_{(KP3)})^2}{(\lambda_{(KP1)} + \lambda_{(KP2)} + \lambda_{(KP3)})^2 + ((1-\lambda_{KP1}^2) + (1-\lambda_{KP2}^2) + (1-\lambda_{KP3}^2))}$$

$$= \frac{(0{,}901 + 0{,}835 + 0{,}883)^2}{(0{,}901 + 0{,}835 + 0{,}833)^2 + ((1-(0{,}901)^2) + (1-(0{,}835)^2 + (1-(0{,}883)^2))}$$

$$= \frac{6{,}859161}{6{,}859161 + 0{,}711285} = 0{,}906044 \approx 0{,}906$$

The Composite Reliability value on the Human component shows that the internal consistency measurement for PS and KP latent variables has good reliability and marked in green, which can be seen in Table VIII.

TABLE VIII. Composite Reliability

Latent Variables	Composite Reliability	Notes
KP	0,906	Reliable
PS	0,874	Reliable

The second reliability testing was evaluated with Cronbach's Alpha. After being evaluated, all latent variables in the Human component have a Cronbach's Alpha value that meets the rule of thumb, which is more than 0,7. The Cronbach's Alpha value on the Human component shows that the internal consistency measurement for PS and KP latent variables has good reliability and marked in green, which can be seen in Table IX.

TABLE IX. Cronbach's Alpha

Latent Variables	Cronbach's Alpha	Notes
KP	0,845	Reliable
PS	0,809	Reliable

B. Inner Model Analysis

The inner model analysis is tested with the R-Square

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parameter or the coefficient of determination which assesses how an endogenous construct can be explained by an exogenous construct [12]. After being evaluated, all latent variables on the Human component have an R-Square value that satisfies the rule of thumb. If the R-Square value is more than 0.75, the R-Square value indicates that the model is strong, whereas if the R-Square value is more than 0.50 then the R-Square value has a moderate model, and if the R-Square value is above 0, 25 then the R-Square value shows that the model is weak [14].

The R-Square value of the KP latent variable (0,497) is in the weak category, while the PS latent variable (0,508) is in the moderate category.

C. Hypothesis Testing

Hypothesis testing is evaluated by the Bootstrapping procedure which produces a T-Statistics value for each relationship path used to test the hypothesis that is compared with the T-Table value [12]. This research uses a level of confidence that is commonly used in various research (95%). When seen in the t table, the 95% confidence level has a precision or a significant level (α) of 5% or 0,05, which means that the research results can be accounted for if there is an error in the analysis process that cannot be greater than 0,05. The T-Table value with a significant level of 5% in the t table is 1,96. So that the T-Table value used cannot be less than 1,96 and the probability value (P-Values) must be less than 0,05.

After being evaluated, most of the T-Statistics values are not by the rule of thumb, namely the T-Statistic value is smaller than the T-Table value (1,96), except for the relationship between the latent variables PS and KP. The Bootstrapping procedure are summarized in Table X.

TABLE X. Bootstrapping

Hypothesis	**T-Statistics**	**P-Values**	**Notes**
H7: PS -> KP	2,603	0,010	Accepted
H9: PS -> M	1,247	0,213	Rejected
H10: KP -> M	1,072	0,284	Rejected

V. CONCLUSION

The evaluation of the PRouDS application on the Human component has not fully influenced the HOT-Fit model contained in the objectives of this research. In this research, there is only one hypothesis that is accepted from the three hypotheses tested on the Human component, namely the latent variable of System Use (PS) has a significant effect on User Satisfaction (KP). Therefore, the advice that can be given to developers is to make improvements and development of PRouDS applications. Improvements that must be made by the developer, namely providing regular training to employees before using the PRouDS application if there is an application update, or adding collections in digital form such as e-books so that employees can easily access them to better understand the use of the PRouDS application.

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