

The Effect of E-Human Resource Management (E-HRM) on Cost Efficiency and Productivity of Employees in the Company

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Abstract— Human Resource Management (HRM) transforms by using information technology to improve its performance, to carry out the transformation of investment issued by the company, so the most important question arises whether the investment made has benefits to the company. This study aims to determine the effect of the implementation of E-HRM activities such as, E-Recruitment, E-Compensation, E-Training, and E-Performance Appraisal, which have the most positive and significant impact on employee productivity and cost efficiency in the company.

This research is a quantitative study, using the SEM-PLS method. The population in this study is PT. Pertamina (Persero). The sample in this study was the Directorate of Human Capital, with the sampling technique used was purposive sampling. Based on the results of testing using SEM-PLS shows that the E-Compensation and E-Performance Appraisal variables have a positive and significant impact on Cost Efficiency. E-Training Variables have a significant influence on Employee Productivity. Meanwhile, the E-Recruitment variable does not have a significant effect on Cost Efficiency and Employee Productivity

Keywords— E-Human Resource Management (E-HRM), Cost Efficiency, Employee Productivity, SEM-PLS.

I. INTRODUCTION

The development of information technology on the company, making companies transform from traditional to digital technology. This is supported by International Data Cooperation (IDC), where IDC conducts research with company samples throughout the world, this study shows the prediction of IT needs in companies from 2020 to 2023, as 80% of companies will create data management and monetization capabilities, thereby it can increasing the functioning of the company, strengthening competitiveness, and creating new sources of income.

In the process of corporate change, one thing that must be considered is the company's employees or human resources in the company (careertrend, 2018). Human Resource Management (HRM) transforms by using information technology to improve its performance. The result of this transformation is Electronic Human Resource Management (E-HRM). In implementing E-HRM, the investment spent by the company is not small, so the question arises whether the investment has a positive impact on the company.

This study aims to determine whether the application of information technology has a positive effect on productivity and cost efficiency in the company. The results of this study

are expected to describe E-HRM activities such as, E-Recruitment, E-Compensation, E-Training, and E-Performance Appraisal, which of the following E-HRM activities has the most positive and significant impact on employee productivity and cost efficiency at the company. Application of E-HRM activities that have a positive impact can help companies in the efficiency of costs incurred and increase employee productivity

II. THEORY REVIEW AND REFERENCES

A. E-HRM

E-HRM is a new method of managing human resources (HR), where E-HRM will reduce company costs and increase efficiency, effectiveness and productivity of the company that leads to the company's survival and success (Seyed Mehde Mousavi Davoudi & Kiarash Fartash, 2012). Previous research shows that E-HRM is a comprehensive term that covers a range of activities, but the most widely used E-HRM activities are as follows (Bakheet AlAmeri, 2017):

1) *E-Recruitment*: refers to the use of portals such as websites, both the official website of the company or the job search website, the website will post the position of available vacancies, and also helps to review resumes that have been entered (Fahimeh Babaei Nivlouei, 2014).

2) *E-Compensation*: can be in the form of a website that allows companies to collect, store, manipulate, evaluate, utilize, and distribute compensation, data, and information (Menka, 2015).

3) *E-Training*: Most companies start thinking about making online training, because online is more efficient for distributing training within companies, making training available "anytime" and "anywhere", besides reducing direct costs (instructor, printed materials, and training facilities), and indirect costs (time travel, lodging costs, and travel). (Swaroop & Zafar, 2012) in (Fahimeh Babaei Nivlouei, 2014).

4) *E-Performance Appraisal*: is applying E-HRM for employee performance appraisal at the company. E-Performance Appraisal refers to the use of technology such as using e-mail and electronics such as websites, which are needed to create systems and processes used to evaluate and assess employees (Asmaa Ata Atallah, 2016).

B. Cost Efficiency

At the beginning of the introduction of E-HRM there were many cost reductions and efficiency improvements, so they could provide strong evidence when needed to run an E-HRM implementation project. In fact, the payback period, or time needed to cover investment from the implementation of E-HRM, can be as short as one to three years (Lego, 2001). In addition, with the existence of E-HRM, HR can now better control costs associated with managerial negligence (Lengnick-Hall & Moritz; 2003).

C. Employee Productivity

Productivity in employees in the HR division will be more influenced by E-HRM technology. E-HRM will directly influence their tasks, including reduced administrative processes in HR, because some processes are automated and make the process of activities faster. Productivity assessment itself requires 2 (two) measurements, first the achievement of work targets, second is time or hours of work (Marco Maatman, 2006).

D. SEM-PLS

The SEM method is one of the methods in multivariate analysis. The PLS approach is asymptotic distribution free (ADF), meaning that the data analyzed does not have a specific distribution pattern, it can be nominal, category, ordinal, interval and ratio. The PLS approach is particularly useful for predicting dependent variables by involving many independent variables. (Siswoyo Haryono, 2015). The software used in this study is SmartPLS 3.0.

III. RESEARCH METHOD

This research is a quantitative descriptive research. Descriptive research is research conducted to provide a more detailed picture of a symptom or phenomenon. The variables used in this study are independent variables (X), namely E-Recruitment (X1), E-Compensation (X2), E-Training (X3), and E-Performance Appraisal (X4), while for the dependent variable (Y) namely Cost Efficiency (Y1), and Employee Productivity (Y2).

The population taken is companies that have implemented E-HRM in their companies, one of which is PT. Pertamina (Persero). The sampling technique used was purposive sampling, which is the work unit or HRM division. Data analysis techniques in this study used the Structural Equation Model - Partial Least Square (SEM-PLS) method. The approach used is SEM with the variance approach (VB-SEM) with Partial Least Squares Path Modeling (PLS-SEM). The software used is SmartPLS

IV. DISCUSSION

The stages in the analysis using SEM-PLS, among others, as follows:

A. Model Conceptualization

The development and measurement of variables (constructs) is done by developing and defining variables (constructs) conceptually by conducting literature reviews and

previous research to determine variables (constructs) and determining items that represent constructs.

B. Determine the Algorithm Analysis Method

According to Wold, the suggested PLS algorithm is path weighting (Latan & Ghozali, 2012). So, in this study using the path algorithm or structural weighting for analysis.

C. Using the Resampling Method

Bootstrapping method according to Nevitt and Hancock (2001) in Kock (2011) states that bootstrapping results in a more stable path coefficient for larger sample sizes, but can be used for smaller sample sizes. So this study uses a bootstrapping method for resampling because the sample held in this study is relatively small, only 40 (less than 100).

D. Path Chart Formation

Create a null model that consists of constructs and items that are modeled reflexively where the direction of the indicator is from the construct to the items. This is done to calculate scores on latent variables based on the items.

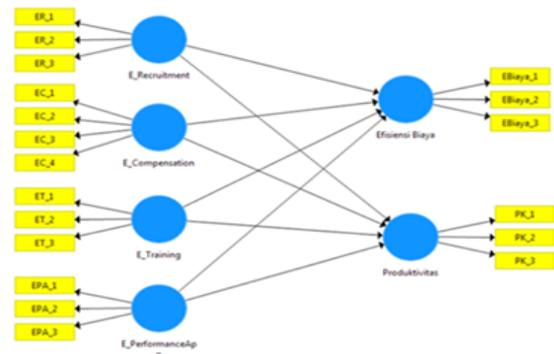


Figure 1. Indicator for Each Latent Variable

E. Outer Model Evaluation

The first SEM-PLS model measurement in the outer model is reflective measurement. This measurement model was assessed using validity and reliability tests. The reflective indicator model includes examining: (1) individual item reliability, (2) internal consistency, or construct reliability, (3) average variance extracted (AVE), and (4) discriminant validity.

Convergent validity from checking individual item reliability can be seen from the value of the standardized loading factor. The standardized loading factor illustrates the magnitude of the correlation between each measurement item (indicator) and its construct.

A loading factor value > 0.7 is said to be ideal, meaning that the indicator is said to be valid in measuring the construct. In this research, the loading factor value > 0.5 is still acceptable, if the loading factor value is below that value, then the item must be removed from the model (dropped).

The results of the convergent validity test through loading factors in Table 1 show that the items that were declared valid were 18 items. There is 1 item that is declared invalid, the item is ER_1 with a loading factor value of 0.492, because the value is below 0.5 then the item ER_1 is eliminated.

TABLE 1. Factor Loading (LF) of Each Item in Construct

Item	LF	Item	LF	Item	LF
EC_1	0.863	ER_1	0.492	PK_2	0.968
EC_2	0.882	ER_2	0.911	PK_3	0.961
EC_3	0.831	ER_3	0.916	Ebiaya_1	0.957
EC_4	0.890	ET_1	0.827	Ebiaya_2	0.972
EPA_1	0.946	ET_2	0.908	Ebiaya_3	0.951
EPA_2	0.958	ET_3	0.809		
EPA_3	0.938	PK_1	0.930		

Fornell and Larcker (1981) in Siswoyo (2015: 8) recommend that the use of AVE for a criterion in assessing convergent validity of at least 0.5, where this value indicates a good measure of convergent validity.

TABLE 2. AVE Value of Each Variable

Variable	AVE Value
E-Compensation	0.751
E-Performance Appraisal	0.897
E-Recruitment	0.855
E-Training	0.721
Cost Efficiency	0.922
Employee Productivity	0.909

Based on table 2, it can be seen that all variables have AVE values greater than 0.5, which means they can be said to have convergent validity. The discriminant validity (cross loading) calculation concluded that all variables had the highest correlation on their own compared to correlations on other variables.

TABLE 3. Correlations between Variables and Root Values of AVE for Each Variable

	E-Compensation	E-Performance Appraisal	E-Recruitment	E-Training	Cost Efficiency	Employee Productivity
E-Compensation	0.867					
E-Performance Appraisal	0.440	0.947				
E-Recruitment	0.739	0.491	0.925			
E-Training	0.619	0.701	0.588	0.849		
Cost Efficiency	0.801	0.559	0.685	0.618	0.960	
Employee Productivity	0.683	0.595	0.634	0.702	0.877	0.953

In Table 3 above it can be seen that the value of the AVE root in each variable is greater than the root correlation value which means the measuring tool has discriminant validity.

Test reliability in SEM-PLS by looking at the value of composite reliability and Cronbach alpha of indicators that measure constructs. The Cronbach alpha score and composite reliability that measures the reliability of the measurement model are more than the rule of thumbs 0.60 (Werts et al., 1974; Salisbury et al. 2002) in Hafiez Sofyani (2016: 18).

TABLE 4. Reliability Test Results

Variable	cronbach alpha	composite reliability
E-Compensation	0.890	0.924
E-Performance Appraisal	0.943	0.963
E-Recruitment	0.831	0.922
E-Training	0.807	0.885
Cost Efficiency	0.957	0.972
Employee Productivity	0.950	0.968

The reliability test results in table 4 show that the research variables can be said to be reliable because the Cronbach alpha value and composite reliability are greater than 0.7.

F. Evaluation of the Inner Model

Testing the inner model is to look at the R-square value in the equations between latent variables and path coefficients that illustrate the strength of the relationship strength between constructs.

TABLE 5. R-Square Values

Variable	R Square
Cost Efficiency	0.701
Employee Productivity	0.620

Based on table 5, it can be seen that the r-square value of cost efficiency is 0.701 or 70.10%, which means that the cost efficiency variable can be explained by the E-Recruitment, E-Compensation, E-Training, E-Performance Appraisal variables by 70.10% and the remaining 29.90% is explained by other factors not examined in this study. This value is included in the strong category because it is above 0.670.

The r-square value of employee productivity is 0.620 or 62.00% which means that the employee productivity variable can be explained by the variables E-Recruitment, E-Compensation, E-Training, E-Performance Appraisal of 62.00% and the remaining 38.00% explained by other factors not examined in this study. This value is included in the moderate category because it is between 0.670 - 0.333.

Path coefficient is used to describe the strength of the relationship between constructs, in addition to seeing whether the exogenous (free) variable influences or not, and how the direction of the relationship is owned. Path coefficients must have a calculated T value greater than 1.692 (this value is obtained from the T table with a confidence level of 0.05).

TABLE 6. Path Coefficients and T Value

	Path Coefficient	T Statistics	P Values
E-Compensation → Cost Efficiency	0.603	4.030	0.000
E-Compensation → Productivity	0.320	1.489	0.068
E-Performance Appraisal → Cost Efficiency	0.222	1.705	0.044
E-Performance Appraisal → Productivity	0.178	1.242	0.107
E-Recruitment → Cost Efficiency	0.120	0.689	0.245
E-Recruitment → Productivity	0.133	0.691	0.245
E-Training → Cost Efficiency	0.019	0.123	0.451
E-Training → Productivity	0.300	1.994	0.023

The E-Compensation (EC) and E-Performance Appraisal (EPA) variables have a positive and significant impact on Cost Efficiency. Variable E-Training (ET) has a positive and significant effect on employee productivity. Whereas the E-Recruitment variable does not significantly influence the Cost Efficiency and Employee Productivity.

E-Compensation increases the integration of HR processes (eg performance is associated with rewards and remuneration), including the report. It help get information about employee

salaries and leave, as well as other benefits in an accurate and real time (Walker, 2002) in (Asmaa Ata Atallah, 2016). This makes the HC directorate able to control costs associated with managerial negligence so that costs incurred become more efficient. E-Performance Appraisal is applying E-HRM for employee performance appraisal in the company, the assessment using e-mail and electronics such as websites, can make the company more efficient in terms of cost than manually (traditional). Aside from cost, E-Performance Appraisal makes the time needed to make an assessment of employees less or more efficient.

E-Training can make it easier for employees to understand their work, and can increase employee focus in accordance with their respective jobdesks, because the material provided is based on theoretical and practical realities that have been adapted to employee jobdesks.

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

Based on the results of research conducted on a positive and significant effect between E-HRM activities such as, E-Recruitment, E-Compensation, E-Training, and E-Performance Appraisal on cost efficiency and employee productivity, the conclusions obtained are on testing Using SEM-PLS shows that the E-Compensation and E-Performance Appraisal variables have a positive and significant impact on Cost Efficiency. E-Training Variables have a significant influence on Employee Productivity. Meanwhile, the E-Recruitment variable does not have a significant effect on Cost Efficiency and Employee Productivity.

B. Suggestions

For companies, the benefits of cost efficiency can be felt by the company if the company implements E-Compensation and E-Performance Appraisal, because with the right information, accurate, and real time, and an objective assessment in accordance with the jobdesk of each employee, this making the company able to control costs associated with managerial negligence so that costs incurred become more efficient. The benefits of increasing employee productivity can be felt by the company if the company implements E-Training, because with E-Training it makes the work of employees easier to understand their duties, and can increase employee focus in accordance with their respective jobdesks, so that the quality of employees increases and becomes more productive at work. For future researchers, it is recommended to use a larger sample size, not just 1 (one) division.

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