

THE IMPACT OF INFORMATION SYSTEM IMPLEMENTATION IN
ENHANCING THE EFFECTIVENESS AND EFFICIENCY OF TRAVEL
MANAGEMENT BUSINESS PROCESS
(A Study Case In PT. Oil Diamond)

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Abstract-Business Process Management (BPM) has long been used by organizations to improve their business process to be more effective and efficient in order to gain competitive advantage. Information Technology has been long acknowledged as one of the important role for BPM. One of the famous information technology implementation is Human Resource Information System (HRIS) that is used to support Human Resource business process especially in administration field. PT. Oil Diamond is one of the companies in Indonesia that implement HRIS to enhance their HR activity effectiveness and efficiency and currently adding new features called E-Travel Management. This research is conducted to analyze the impact of the implementation of E-Travel Management in enhancing the efficiency, how successful the new system produce output that met the user expectation with less cost and effort, and effectiveness, how successful the new system in solving the previous problem, of Travel Management business process in PT. Oil Diamond personnel administration services. Four independent variables was used in this research which are System Quality, Ease of Use, Information Quality and Usefulness and one dependent variables which is User Satisfaction. The result of the research shows E-Travel Management success in making the process of travel management more effective and efficient.

Keywords: Business Process Management, HRIS, User Satisfaction, Information System Success

Introduction

Organizations nowadays are focused to improve their business process to be more effective and efficient in order to compete in this modern competitive world. By optimizing and continuous improvement of business processes, organizations hope to gain a competitive advantage by reducing cost, improving quality and efficiency, and more adapting to changes to survive in this volatile situation. Business Process Management is not a new concept, many organizations has used the process-oriented transformation but only a few had completely integrated the business functions, to form end-to-end processes, and gain efficiency with process based activities (Spanyi, 2003). Information technology has been seen as one of the important role for Business Process Management. Information Technology (IT) is defined as "any form of computer-based information system, including mainframe as well as microcomputer applications." (Orlikowski & Gash, 1992). There is several issues that should be concerned when applying IT, as it can have a considerable negative effect in business process improvement and be an obstacle for success of the business processes projects (Boudreau & Robey, 1996)

One of the companies in Indonesia that implement information technology to improve its business activities is PT. Oil Diamond. PT. Oil Diamond implement human resource information system to support its human resource activity in 2009. Human Resource Information System (HRIS) help

organizations make more informed decisions, get the most out of people assets, streamline HR processes and better allocate HR resources (Berardine, 1997). The Human Resource Information System was made to support the Human Resource Administration services in PT. Oil Diamond. David Ulrich said that there are four key HR roles that he sees as crucial to the future success of the function (Ulrich, 1996). The four key of HR roles are strategic partner, administrative expert, change agent and employee champion. HR professional acting as administrative experts ferret out unnecessary costs, improve efficiency, constantly find new ways to do things better and need to undertake activities leading to continual reengineering of the work processes they administer. In PT. Oil Diamond, the HR administrative manages leave, absence, monthly activity, payroll, employee loan and travel management.

There is two process managed in travel management, Mission Order sheet and Mission Expense sheet. Mission Order sheet is used when employee should work outside of the city or abroad, often called mission. The employee should fill the mission order sheet and then give it to HR administrative and then after they done their mission, they should fill the mission expense sheet so all the expense made while doing the mission. However, there were several issues occurred in the travel management process, such as a lot of mistake was found in the several employee's mission order sheet and mission expense sheet that need to be corrected and affected the process time, validation process that is too complicated and use too many paper. Therefore, PT. Oil Diamond implements E-Travel Management as one of their HRIS to make the travel management more effective and efficient. However, the success of E-Travel Management in accommodating PT. Oil Diamond objectives has not been identified yet.

Literature Review

Business Process Management

Business process management, often shorten as BPM, is an approach that "presents a more comprehensive array of improvement options" and can help organizations "avoid the tendency to fall prey to the hype of a new management fad" (DeToro & McCabe, 1997). If business process management projects are implemented correctly and with effective use of Information Technology, it will give significant advancements of organizations' performance (Ranganathan & Jasir, 2001). Information Technology has been considered as one of the important role of Business Process Management success from the early founding of BPM (e.g Davenport (1993)). The best use of Information Technology is applying IT capabilities, rather than just automate the process, to make business processes more effective. However, Information Technology could give a negative effect in business process if not applied correctly and it could become an obstacle for success of the business process projects (Boudreau & Robey, 1996 ; Al-Mashari & Zairi, 2000).

Effectiveness and Efficiency

Most organizations assess their performance in terms of effectiveness. Their main focus is to achieve their mission, goals and vision. At the same time, there is plethora of organizations, which value their performance in terms of their efficiency, which relates to the optimal use of resources to achieve the desired output (Chavan, 2009). In this research effectiveness means that the process output is meet the user expectation and output usefulness by observing whether the system able to solve the previous problems or not and for the process efficiency is viewed from the time of the process, the easiness of the system that led to the less effort used in using the system and the capability of the system in helping doing the process correctly and properly.

HR Champion

David Ulrich (Ulrich, 1996) said that there are four key HR roles that he sees as crucial to the future success of the function. The four key of HR roles are strategic partner, administrative expert, change agent and employee champion. Ulrich (1996) stated in his book "Human Resource Champion" that Human Resource professionals could accomplish administrative efficiency in two ways. First, by

ensuring the efficiency in HR process and second, by hitting, training and rewarding managers who increase productivity and reduce waste. HR professional acting as administrative experts ferret out unnecessary costs, improve efficiency, constantly find new ways to do things better and need to undertake activities leading to continual reengineering of the work processes they administer.

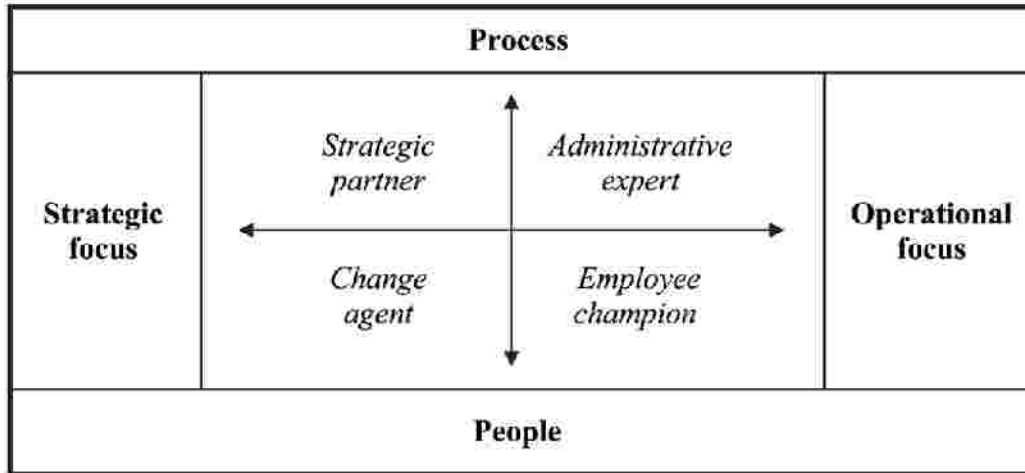


Figure 1 Four Key of Human Resource Roles

HRIS Success Model

Human Resource Information System (HRIS) help organizations make more informed decisions, get the most out of people assets, streamline HR processes and better allocate HR resources (Berardine, 1997). Kavanagh and Thite define Human Resource Information System (HRIS) as a system used to acquire, store, manipulate, analyze, retrieve, and distribute resources (Kavanagh & Thite, 2009). HRIS serves two major purposes in organizations. One relates to administrative and operational efficiency, the other to effectiveness. The main purpose of an HRIS is to improve the efficiency with which data on employees and HR activities is compiled. The second purpose of an HRIS is more strategic and related to HR Planning. Accessible data enabled HR planning and managerial decision making to be based to a greater degree on information rather than relying on managerial perception and intuition.

There are three models that often used to measure the success of information system and also used to measure the success of HRIS. Those three models are Technology Acceptance Model (TAM) (Davis, 1989), User Satisfaction and DeLone and McLean information systems success model (DeLone and McLean, 1992, 2003).

Technology Acceptance Model

Davis (1985), in his proposal, suggests that there are three factors that can explain user's motivation: Perceived Ease of Use, Perceived Usefulness, and Attitude Toward Using the system. The attitude of a user toward a system was a major determinant of whether the user will actually use or reject the system. The attitude of the user is influenced by perceived usefulness and perceived ease of use, with perceived ease of use has a direct influence in perceived usefulness. Perceived usefulness is the degree to which an individual believes that using a particular system would enhance his or her job performance. Perceived ease of use is the degree to which an individual believes that using a particular system would be free of physical and mental effort

User Satisfaction

User satisfaction often suggested as a surrogate indicator of IS success and the reliance on user satisfaction in measuring IS success is common among management information systems (MIS) researchers and practitioners (Ives & Olson, 1984). User Satisfaction also regarded as an important proxy of IS success and the most employed measure of IS success due to its applicability and ease of

use (Zviran & Elrich, 2003). Baroudi et al. (Baroudi, Olson, & Ives, 1986) defined User Satisfaction as the “extent to which users believe the information systems available to them meets their information requirement”. Baroudi et al (1986) highlight that user satisfaction is an attitude toward the IS. One of the implicit suppositions made by researchers employing user satisfaction measurements for IS effectiveness evaluation that there will be a correlation between user satisfactions and IS effectiveness.

DeLone and McLean Information System Success Model

Even though user satisfaction has been recognized as an indicator of IS success (Bailey & Pearson, 1983) but the measurement mechanism was not clear. The information and system feature were not always been explicitly separated as dimensions of user satisfaction until DeLone and McLean (1992) distinguished information quality and systems quality. DeLone and McLean (1992) conceptually developed a model of IS success that contain of six aspects: system quality, information quality, system use, user satisfaction, individual impact of IS and organizational impact of IS.

Research Framework

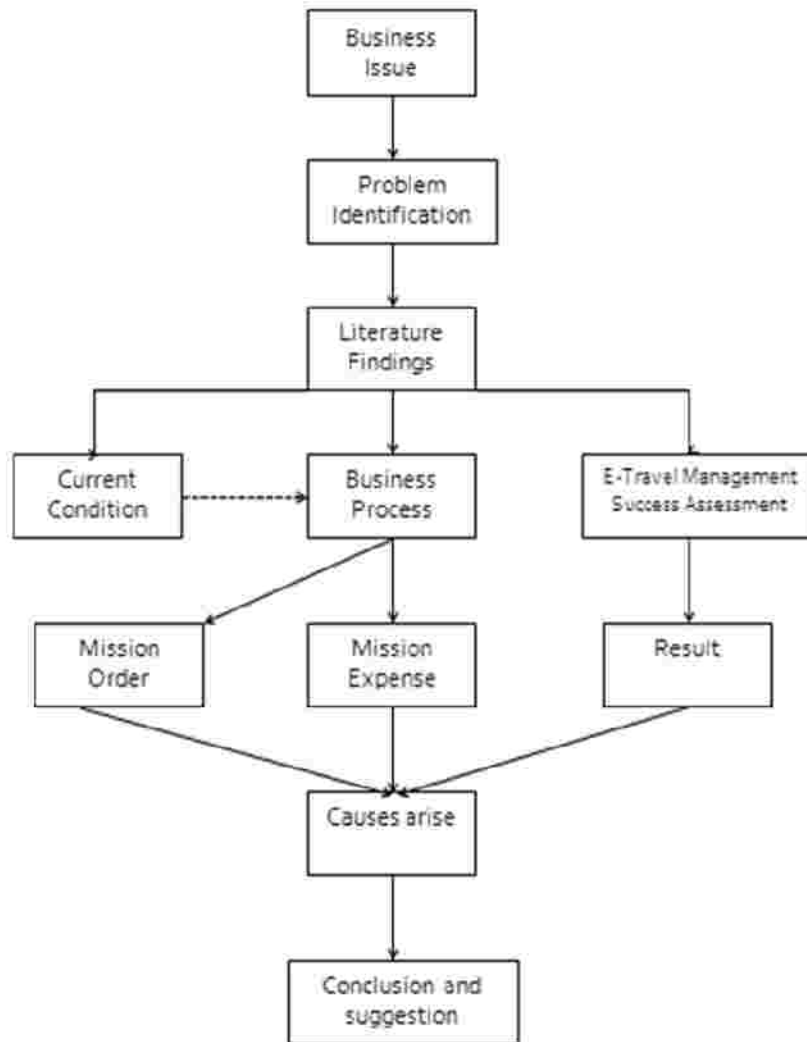


Figure 2 Research Frameworks

The figure 3.1 shows the framework that will guide the writer in doing the research. First the writer observed the condition in PT. Oil Diamond, what is the issue that currently happening. Then, after the problem was identified, the writer search previous study and journals that related to the research and used it as a reference and guidance for the writer in conducting the research. The writer then observe the business process of the Travel Management by asking to the employee that involved in the process in order to get an in-depth understanding of the business process. The data collected then will be used as the comparison to the final result. The E-Travel Management success assessment then will be conducted. The result of this assessment then will be compared to the previous data. By doing so, the conclusion can be drawn whether the E-Travel Management could accommodate and reduce the problem in the business process and meet the expectation of the employee. The final step is giving solution or suggestion to the company.

Methodology

Both qualitative and quantitative method will be used in gathering the data. Quantitative method will be used to gather the primary data and qualitative method will be used to gather the secondary data to support the primary data. In this research, the respondent should be employee as end user of E-Travel Management from the three divisions where the E-Travel Management has been implemented. The three divisions are Human Resource, Finance, and Project divisions. There are 34 employees that will be the respondents of this research and 6 employees will also be interviewed. The data is collected by distributing questionnaire and conducting an interview. Questionnaire is used to measure the system success of E-Travel Management and the result will be the primary data of this research. The interview is conducted to get a more extensive and in-depth data to support the primary data and sharpen the analysis.

Questionnaire

There are 4 independent variables, which are System Quality, Ease of Use, Information Quality and Usefulness and 1 dependent variable, which is User Satisfaction. The variables are breakdown into some statements. The respondents will show their opinion towards each statement using 5 likert scales, where: 1 is Strongly Disagree, 2 is Disagree, 3 is Neither Agree nor Disagree (Neutral), 4 is Agree, 5 is Strongly Agree. For each statement, the respondent was asked to give their opinion for E-MO and E-MES.

The questionnaire was in English and distributed in Hard Copy directly to the respondents. There are two parts of the questionnaire that the respondents need to finish. Part A contains questions about respondents' characteristic such as age, gender and education. Part B contains group of statements to measure the E-Travel Management System success. Some of the statements in the questionnaire was taken from the previous study "Human Resource Information System success Assessment: An Integrative Model" (Shibly, Human Resource Information success Assessment : An Integrative Model, 2011) and has been modified by adding few statements that suitable to measure E-Travel Management System success and deleting statements that not to compatible.

Interview

The interview will be conducted in PT. Oil Diamond and using Bahasa. The interview is semi-structured and consists of 7 main questions. The objective of this interview is to get a broader employee perspective towards E-Travel Management and to support the data from the questionnaire. There will be 7 respondents for the interview from HR and Finance.

Research Model

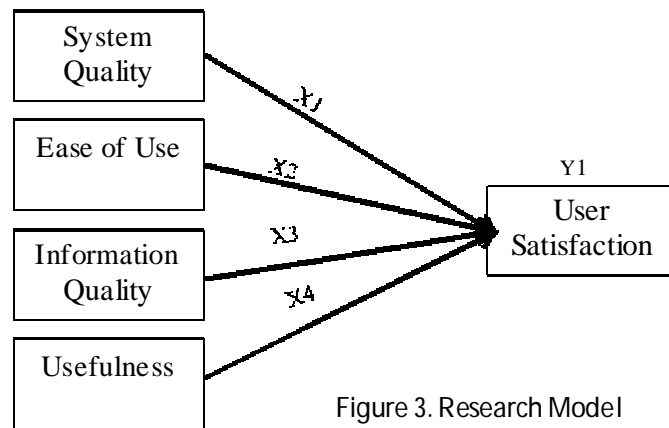


Figure 3. Research Model

The figure 3.2 is the model that I developed and used in assessing the user satisfaction of E-Travel Management. I use System Quality and Information Quality from the DeLone and McLean Model as two of the independent variable. These two variables are used to measure the system quality and information quality according the user perspective. The independent variables Ease of Use and Usefulness are taken from the technology acceptance model. Davis (1989), who established the model, stated that the Ease of Use and Usefulness is the determinant of attitude of a user toward a system and whether the user will actually use or reject the system. These four independent variables then will influenced the User Satisfaction as the dependent variables.

Data Analysis

From the total of 34 respondents, there are 29% who are 20 to 25 years old. Then, 23% respondents are 26 to 30 years old and 18% are 31-35 years old. The other 15% respondents or 36 to 40 years old and the last 15% are more than 40 years old. Based on the gender, there are 18% respondents who are male and there are 82% respondents who are female. Last, from the educational background, there is 12% respondent that has a post graduate formal education. Then, there is 18% respondent who has a diploma or academy formal education. The majority of the respondent has an undergraduate formal education, data shown that there is 70% respondents who have an undergraduate formal education.

Classic Assumption Test

This type of test is used to examine the assumption whether the regression model used in this research has met the classic feasible assumption or not. Classic assumption test is used to make sure that the multi-correlation, auto-correlation and heteroscedasticity not found in the model used and the data used was normally distributed. The Normality Test is to find out whether in the regression model, the dependent variable and the independent variable has normal distribution or not. Normality test could be conducted by observed the Normal Probability Plot graphic from the SPSS calculation. The result of the Normality Test output from SPSS 20 stated that the probability is 0,297 and 0,345. Therefore the data follows the normal distribution pattern because the probability is higher than 0,05.

Multicollinearity test is to shown if there any perfect corelation or near perfect between indepent variables in the model, that high coeficient corelation or even one (Algifari, 2000: 84). In order to find out if there is multicollinearity indications or not, can be done by observing the value of VIF (Variance Inflation Factor) through SPSS. The result of the Multicollinearity test shows that VIF

value is below 10. It shown that there is no multicollinearity in the independent variables. Heteroscedasticity test is to examine if there is inequality varians occurred in the regrestion model from one observation residual to other observation. If the variance from one observation residual to other residual remain the same, then it is called homoscedasticity. To examine if there presence of heteroskedasticity, Rank Spearman corelation is used by coorelating every independent variable with the residual exact value. The result of the Heteroscedasticity test shows that the correlation probability value for the variables is higher than 0,05. It means that there is no heteroscedasticity in every variable.

Multiple Regression Analysis

In order to see the influence of System Quality (X_1), Ease of Use (X_2), Information Quality (X_3), Usefulness (X_4) towards User Satisfaction (Y), therefore regression analysis is used with the following equation:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 \quad (1)$$

Where :

Y = User Satisfaction

X_1 = System Quality

X_2 = Ease of Use

X_3 = Information Quality

X_4 = Usefulness

a = Constanta

b_1, b_2, b_3, b_4 = Regression coefficient

From the multiple linear regression equation, the constanta value 4.739 and 4.256 is obtained. It means, if the variable User Satisfaction (Y) did not influenced by the independent variables, then the average value of User Satisfaction (Y) are 4.739 and 4.256.

The result from the equation shows that:

- If there is a one percent increase in System Quality (X_1) will cause an increase by 0.052 and 0.149 percent in User Satisfaction (Y).
- If there is a one percent increase in Ease of Use (X_2) will cause an increase by 0.144 and 0.075 percents in User Satisfaction (Y)
- If there is a one percent increase in Information Quality (X_3) will cause an increase by 0.138 dan 0.141 percents in User Satisfaction (Y)
- If there is a one percent increase in Usefulness (X_4) will cause an increase in User Satisfaction (Y) by 0.053 and 0.054 percent in User Satisfaction (Y)

Regression Coefficient Significance Test

The F-test is used to find out the significance of the influence of the independent variables simultaneously towards the dependent variable.

Ho : There is no significance influence from System Quality (X_1), Ease of Use (X_2), Information Quality (X_3) and Usefulness (X_4) towards User Satisfaction (Y).

Ha : There is significance influence from System Quality (X_1), Ease of Use (X_2), Information Quality (X_3) and Usefulness (X_4) towards User Satisfaction (Y).

$\alpha = 5\%$

Statistic test:

$$F = \frac{R^2(n-k-1)}{k(1-R^2)} \quad (2)$$

- Test criteria: 1. Accept H_0 if $F \text{ value} < F \text{ table}$
 2. Decline H_0 if $F \text{ value} = F \text{ table}$

From the equation using SPSS 20, the F value is 17,583 and 15,744. Because the F value (17,583 and 15,744) $> F \text{ table} (2,70)$ and the significance value (probability) is $0,000 < 0,05$, then H_0 is rejected. Therefore, it can conclude that System Quality (X_1), Ease of Use (X_2), Information Quality (X_3) and Usefulness (X_4) has significance influence towards User Satisfaction (Y).

A t-test is used in order to find the significance of the independent variables partially towards a dependent variable.

Statistic Test:

$$t_{hit} = \frac{b}{Se(b)}, \text{ degree of freedom} = n-k-1 \tag{3}$$

- Test criteria: 1. Accept H_0 if $-t \text{ tabel} = t \text{ value} = t \text{ table}$
 2. Reject H_0 if $t \text{ value} < -t \text{ table}$ or $t \text{ value} > t \text{ table}$

The result of t-test from the SPSS calculation shows that:

- The t value of E-MO variable System Quality (1,126) $< t \text{ table} (1,70)$ then the H_0 for E-MO variable System Quality is accepted and because the t value of E-MES variable System Quality (2,294) $> t \text{ table} (1,70)$ then H_0 for E-MES variable System Quality is rejected.
- The t value of E-MO variable Ease of Use (2,813) is higher than t table (1,70) then the H_0 for E-MO is rejected and because the t value of E-MES variable Ease of Use (1,279) is lower than t table (1,70) then the H_0 for E-MES is accepted.
- The t-value for variable Information Quality for both E-MO and E-MES are 2,789 and 2,275 and higher than the t-table (1,70). It means that the H_0 for both E-MO and E-MES are rejected.
- The t-values for variable Usefulness both for E-MO and E-MES are 0,884 and 1,044 and lower than the t-table (1,70). It means that the H_0 for both E-MO and E-MES are accepted.

The impact of System Quality (X_1), Ease of Use (X_2), Information Quality (X_3) and Usefulness (X_4) towards User Satisfaction (Y) could be shown by the determination coefficient by the following formula:

Table 1. E-MO Determinant Coefficient

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.841 ^a	.708	.668	.86740

a. Predictors: (Constant), Usefulness, System Quality, Ease of Use, Information Quality

Source: Output from SPSS 20 Calculation (2014)

Table 2. E-MES Determinant Coefficient

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.827 ^a	.685	.641	1.07591

a. Predictors: (Constant), Usefulness, Information Quality, Ease of Use, System Quality

Source: Output from SPSS 20 Calculation (2014)

$$\begin{aligned} \text{KD}_{E-MO} &= R^2 \times 100\% \\ &= 0.708 \times 100\% \\ &= 70,8\% \end{aligned}$$

$$\begin{aligned} \text{KD}_{E-MES} &= R^2 \times 100\% \\ &= 0.685 \times 100\% \\ &= 68,5\% \end{aligned}$$

It means that the variables System Quality (X_1), Ease of Use (X_2), Information Quality (X_3) and Usefulness (X_4) influence the User Satisfaction (Y) by 70,8% and 68,5%. While the other 29,2% and 31,5% explained by other variables that didn't included in the research.

Variable Analysis

There are five main statements used as an indicators to measure the System Quality variables. In this research, System Quality is used to measure how satisfied the user towards E-Travel Management based on the system. From the result of respondent assessment mean toward each indicator, it shows that most of the respondents are satisfied with the system quality offered by E-Travel Management. Since most indicators has mean above 3,50. However, there is a statement that has a mean below 3 that says "E-Travel Management System never not responding (crash)", it shows that there is still several system error found in the E-Travel Management. The result from the interview also support this statement, says there is still some several error such as system not responding. The interview result also stated that even though the respondents are satisfied with the system quality, there would be still some unfamiliarity for the first time user of E-Travel Management

For the variable Ease of use, there are 7 statements used to measure the respondents. Most of the indicators of Ease of Use has a high mean value and categorized as "very easy". This shown that it is very easy for the respondents to use the E-Travel Management with the mean value of 3.87. The result from the interview support this findings and shows that it will be better if the E-Travel Management has an electronic step-by-step guidelines and frequently asked question to help the user in using E-Travel Management.

For the variable Information Quality, there are nine statements used as an indicators to measure this variable. In this research, Information Quality is used to measures how good the information quality of E-Travel Management according to the users. The statement "E-Travel Management provide up to date information" and "The information in E-Travel Management is accurate" have a mean value of 3.91% and 3.70%, which is quiet high. It means that the respondents agree that the information provides by the E-Travel Management quiet accurate and up-to-date.

For the Usefulness variable, there are 7 statements that used as indicators to measure this variable. Usefulness is used to measure how useful the E-Travel Management performance in helping the

user finish their job. Most of the statements of usefulness has a high mean value and categorized as "very useful and useful". It shows that the respondents think that the E-Travel Management is useful with the mean value of 3.93. From the interview, most of the respondents said that by using E-Travel Management, the process of making an MO or MES is faster and easier. E-Travel Management is also reducing the use of paper and reducing the cost. The statement "E-Travel Management reduce the use of paper" with the mean value of 4.41 shows that the respondents very agree that by using E-Travel Management, they reduce the use of paper.

For the User Satisfaction variable, there are 4 statements that used as indicators to measure this variable. User Satisfaction is measured to find out how is the user reaction towards the new information system. There are four indicators in the User Satisfaction variables. From the means result, it shows that the respondents are satisfy with the E-Travel Management, the User Satisfaction has a mean value of 3.97. The respondents are agree that the E-Travel Management is high quality and has meet their expectation. The respondents also prefer using E-Travel Management rather than using paper based system.

Conclusions

The result of the t-test shows that for the E-MO the System Quality and Usefulness did not has a significant influence towards the User Satisfaction. However, the result shows that for the E-MES, the Ease of Use and Usefulness did not has a significant influence towards the User Satisfaction. For the E-MO, the Ease of Use and Information Quality are the variables that have a significant influence towards the User Satisfaction. For the E-MES, the System Quality and Information Quality are the variables that have a significant influence towards User Satisfaction. All the variables jointly have a significant influence towards User Satisfaction, both for E-MO and E-MES.

Efficiency and Effectiveness After Implementation

The efficiency and the effectiveness of the process after the implementation of E-Travel Management can be concluded by the result of the variable analysis and supported by the interview result. In this research the effectiveness is concluded by observing whether the system output met the user expectation and capabilities of the system in solving the previous problem and the efficiency is concluded by observing the process time after the implementation and the system easiness from the user perspective that causes the user use less effort in using the system and the use of the system in helping the user doing the process correctly and properly.

E-Travel Management system quality and information quality is really satisfy the user. The users agree that the information provided by the E-Travel Management is up to date and accurate. The E-Travel Management also make the process of superior approval that previously is an issue because long process time become faster and easier. E-Travel Management could be concluded makes the process of Travel Management more effective because the output of E-Travel Management meet the user expectation and the user feels the system solves the previous issues.

Furthermore, E-Travel Management also reduces the use of paper that led to the cost reduction because PT. Oil Diamond didn't have to produce the Mission Order sheet and Mission Expense sheet. The users also agree by using the E-Travel Management the process of making E-MO and E-MES become easier and faster that makes them didn't have to use much effort. In conclusion the E-Travel Management makes the E-Travel Management more efficient because it successfully make the process using less cost but the output is met the user expectation. The user feel satisfied in using the E-Travel Management and prefer using it than the paper-based system, they also think that the E-Travel Management is very effective and efficient. This conclusion describe that the user support the transition of the new system and E-Travel Management has successfully make the process of Travel Management more effective and efficient.

Recommendations

Based on the conclusion, there are several recommendations made for the company and for further researcher. The HR administration services could create an electronic instruction on how to use the E-Travel Management properly and an electronic Frequently Asked Questions. This instruction is for the first time users who didn't attend the E-Travel Management socialization or the users who attend the socialization but still confused in filling the E-Travel Management. The e-FAQ will help solve the problem faced by the user faster. The HRIS team in PT. Oil Diamond should make a regular system assessment to prevent system error and keep the data up-to-date.

According to the findings, the performance of E-Travel Management will not maximal and the objective of E-Travel Management will not achieved if the other processes that involved with the travel management still use the manual system. It is better if all the processes are integrated using the electronic system, so the business process will be more effective and efficient. However, if the process is supposed to use manual system, the process shouldn't use the electronic system because it will not add any value and will cause further problems.

Moreover, The E-Travel Management process will work smoothly and meet the expectation if the people involved in the system and used the system concern to the process of E-Travel Management. The head of service and head of management should make time to check if there is any mission order or mission expense sheets that need to be approved every day. The secretary should aware if the superior is available or not and if the superior is unavailable, who will be in charge as an acting of the superior. The secretary needs to check whether the person in charge as an acting of the superior has an access to give approval for the mission order and mission expense. In order to raise the awareness, HRO/NAT could work together with Communication Division to make a poster or campaign to remind the persons involved.

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