

Modeling of development of performance evaluation on health information systems implementation

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Abstract. In any organization, the appropriate use of information systems will have an impact on the effectiveness of day-to-day operations. To find out how the performance of an information system is necessary to do an evaluation of the implementation of which has been run. This study evaluates the implementation of information systems in the Maternity Hospital St. Yosef. By adopting PIECES framework as an evaluation, primary data collection is done through questionnaires distributed. Of the some respondents who collected the data used factor analysis to get factors and indicators affect the successful implementation of system and get right model for evaluation of the Maternity Hospital in St. Joseph. The results showed that the factor of ease use and suitability to needs of a positive effect on the success, while reliability of system negatively affect the success. On a scale of 0-100 obtained an un-expected value of system performance is at 45.75 and the expected value of performance of the system is equal to 83.77.

1. Introduction

The role of information systems and information technology increasingly important. Rapidly changing business situations should certainly be anticipated quickly by management. Similarly, in the management of hospitals, especially in large cities, where the level of competition intensifies, management requires quick and appropriate information to be able to take the right decisions [1]. The hospital play its role both in terms of business and system social, both the new system and the old system, should be evaluated periodically to determine whether the system is functioning as expected or not [2]. The function main evaluation in this case is to provide information that is useful to the decision-makers to determine policy will be taken based on the evaluations that have been conducted [3]. Until now, the activity evaluation of information systems of smartHIS (Smart Hospital



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Information Systems) in RSBSY (The one of Hospital name) has never been implemented by management of hospital. Therefore, the objectives of the study are: Factors that influence the successful implementation of smartHIS in RSBSY, indicators that can be used in the implementation of information systems evaluation smartHIS in hospital, and what an appropriate model for the evaluation of information systems in hospital smartHIS. With this research will benefit was as follows: For the management of Hospital, the user can know the perception of the system that has been used so as to take the necessary steps to make improvements. The intended use of technology-based information systems that improve efficiency and effectiveness in the organization can be achieve by smartHIS vendor of the application program, so it may be a reference to improve and enhance the quality of the application program in the future. For participant readers can learn and be a reference for the implementation of information systems implementation, in particular the hospital information system. Discussion conducted includes the results of the implementation of which has been implemented in Hospital with scope of the discussion as follows: The object of research is a maternity hospital that has carrying out the implementation of computer-based hospital system, in part of administration. Data resources in this study is a system user applications, management and directors at that hospital. Evaluation carried out in accordance with the period and conditions of the hospital during the period.

2. Methodology

Information is data that contains the meaning and context of use by end users [4,5] while says that the information is data that has been processed or data that have meaning [6]. Based on this it can be said information is data that has been processed to produce a useful meaning for the end user. The information system is an arrangement of information (data), processes, people and information technology interact to collect, store and provide the necessary information as output, to help an organization [7]. The information system is to collect, process, store, analyze and disseminate information for the purposes of the definition [4,5]. From it can be concluded that the information system is a combination of human, hardware, software, network communications and data resources interrelated to collect, process, and disseminate information for specific purposes within an organization. The hospital as organization of health is a complex organization [8]. However, the use of information systems in the field of health care, including slow [9]. Consideration of health care organizations to use information systems and information technology is to improve efficiency, save costs, improve services and patient safety. Hospital Information System is a computer system that is large and complex, designed to organize the information needed in the hospital. This system is a device used in internal departments and between departments in the hospital [10]. While the clinical information system contains information relating to clinical and health that are used by service providers to perform diagnostics and action to patients and monitoring for the benefit of patients. Clinical information systems are generally different for each department, such as radiology, pharmacy, laboratory, electronic medical records. Evaluation is a systematic assessment process, including the provision of value, attribute, appreciation, recognition of the problem and providing solutions to the problems encountered [11]. Understanding of evaluation is a process to provide information about the extent to which a certain activity has been achieved, how the differences in achievement with certain standards to determine whether there are differences between them, and how the benefits have been made when compared with the expectations to be obtained. From this definition, it can be concluded that evaluation is a process of gathering and providing information as a systematic process that will be used to determine appropriate alternatives in decision making [12] According, evaluation of the effectiveness of an information system is one of the important material in information systems research. In one study, the results of the measurements are clearly needed to ensure that the results of different studies can be [13,14]. This is a prerequisite for the study of information systems so as to contribute to the world of information systems. In practice, the measurement of success is needed to evaluate the practice of information systems, policies and procedures.

Although the desire to obtain a measure of the success or effectiveness of information systems continue to study, but this is unlikely to be found. Instead, research has provided taxonomy of variable

success, which can be applied in various situations in general, the success of an information system can be evaluated through:

1. The quality of information provided to the user (User Experience)
2. The impact of information systems for the thoughts, decisions and actions of the user (Impact for Users)
3. The impact of information systems on the costs and benefits at the organizational level (Impact for Organizations)

To evaluate information systems, there are a variety of measurement, one of them is PIECES. PIECES is a framework that was introduced by James Wheterbe [7]. PIECES framework consists of Performance, Information/Data, Economic, Control/Security, Efficiency, Service. This framework can be used to analyze both the manual system and computer-based systems. In this study, will be implemented through the data collection, and these data will be processed further using factor analysis. Factor analysis is a branch of the dual variable or a multivariate analysis that takes into account the internal relationships of a set of variables in which the relationship can be interpreted as a linear relationship or close. In the analysis of this factor all variables are set to see its relationships (inter-dependent between variables), so it will produce a grouping or rather abstraction of many variables to just a few new variables or factors. The main purpose of factor analysis is to describe the diversity among the many variables that can actually be divided into several basic properties but can not be observed quantity. The fundamental properties can not be observed but this quantity is called factor [8]. In principle, trying to find a correlation factor analysis (interrelationship) between a number of variables which originally mutually independent with each other, so that it can be made of one or a set of variables that is less than the amount of the initial variables [9]. Research will be conducted in the Maternity Hospital St. Joseph, Jakarta. The performance of the system that has been implemented by the user, then the population of this study are all users of information systems in hospital smartHIS, well operators, managers and directors [15]. Collecting data in this study using a survey method using a questionnaire as a data collection instrument [16].

3. Results

In the assessment variables viable, first performed the calculation of the correlations between the independent variables. This correlation value is called the α value, where the value should be greater than 0.5. The research result shows the value of $\alpha = 0.894$, which means that existing samples are qualified and computation can proceed. After that the process followed by testing the entire matrix of correlation (correlation between variables) as measured by the amount of Bartlett's Test of Sphericity or Measure Sampling Adequacy (MSA). This test aims to determine the existence of a significant correlation between at least some of the variables.

Figures KMO and Bartlett's test was 0.814 with a significance of 0.000. Because the figure is already above 0.5 and a significance far below 0.05, then the variables and sample there has been qualified to be further analyzed using factor analysis. The next step is an analysis of each variable using Anti Image Matrices. On the Anti-Image Correlation, especially on a marked correlation number, visible all the variables have values above 0.5 MSA. This means that all the variables are qualified or competent to do the following analysis. Communality. In communalities calculation results using SPSS, it appears that any baseline variables could be explained by factors that are formed. The variable smallest is communalities its accuracy, at 0.293 which means that 29.3% of the variance could be explained by the variable accuracy form factor. While the variables that have the greatest communalities is Error Tolerance is equal to 0.749, which means 74.9% of the variance could be explained Error Tolerance variables of the form factor. Determine the amount factor, the extraction process from a set of variables that has met the requirements of the previous one test, with this factoring process one or more factors will be formed, which is the extraction of the variables that begin. In the study the number of factors will be determined as many as 3 pieces. Cumulative percentage of extracted with 3 factors reaching 54.955%, which means it has met the requirements greater than 50%. After many factors are determined, three factors meet the requirements, then the

next step is to determine what variables will be included in a factor, to determine this, use the Component Matrix, in the seventeenth distribution is shown The initial Component Matrix initial variable on the three factors formed. rotation needs to be done on the matrix that has been make the position variable a clear factor. Rotation of results with loading factors a value smaller than 0.5 for easy reading. Then make the selection of each variable into several factors.

Based on the rotation process that has been generated, it can be determined that:

1. The first factor consists of a variable Simplicity, Usability, Accuracy Service, Presentation of Information, Maintainability, and reliability.
2. The second factor consists of variable Error Tolerance, Security, Response Time, The prevalence of Communications, and Flexibility Data.
3. The third factor consists of variable Audabilitas, Resources, Information Relevance, Accuracy and Completeness.
4. While variable throughput, integrity and reusability are not entered into one of the factors which formed.

Naming factor, the next step is naming a factor, based on the existing variables of each of the factors that determined the name of each of the following factors:

1. the first factor was named: Ease of use
2. The second factor was named: The reliability of the systems
3. The third factor was named: Conformity to the needs

Model formulation, from the analysis of the factors that has been done, the next will be determined by using linear regression models. Furthermore can be generated in a model of multiple linear regression equation as follows:

$$Y = 64.416 + 3.302 X_1 - 1.117 X_2 + 2.906 X_3$$

Where:

Y : Performance smartHIS system

X₁ : Factors ease of use

X₂ : The reliability factor system

X₃ : Factors conformance to requirements

From the results of the t test, the result is that only one factor that has qualified significant value (<0.05)., Which is a factor to 1 (ease of use), while two other factors that are formed (system reliability and conformance to requirements) of the results t test has a significance value of each of 0,296 and 0.052, which means it does not meet the predetermined value significance. F test, to test the significance of the overall form factor, From the results obtained F-test significance value of 0.004 which means the overall factors formed qualify signifikan predetermind value (<0.05).

4. Discussion

The model shows that the performance of the system formed smartHIS in RSBSY influenced by three factors formed the ease of use (X₁), the reliability of the system (X₂), and conformance to requirements (X₃). Factors ease of use and suitability to the needs of a factor that is positive, it means an increase in the value of these two factors will make the performance of the system is increased. While the reliability factor of the system based on this research is a negative factor for the performance of the system. Minimum and maximum values, Using SPSS calculated minimum and maximum values of each form factor.

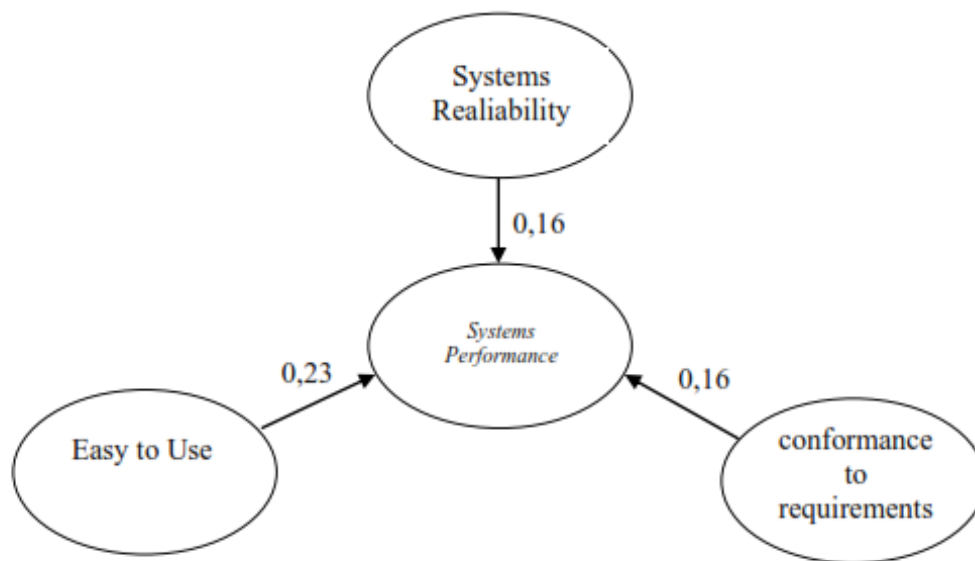


Figure 1. Health information systems performance

Table 1. The results of the data analysis

Performance (Y)	X ₁	X ₂	X ₃	Remark
83.77	Maks = 1.89	Min = - 2.76	Maks = 3.45	Expected value
45.75	Min = -2.62	Maks = 2.82	Min = -2.37	Un-Expected value

Maximum system performance will be obtained when the maximum value of X₁, X₂ minimum value and a maximum value of X₃. From the calculation results obtained expected performance value is 83.77. Minimum system performance will be obtained when the minimum value of X₁, X₂ maximum value and minimum value of X₃. From the calculation results obtained un-expected performance value is 45.75.

5. Conclusion

From the analysis of the performance of the system in RSBSY smartHIS can be concluded as follows:

1. Factors that influence the successful implementation of smartHIS in RSBSY is ease of use, reliability and suitability to the needs of the system. Ease of use and suitability to the needs of a positive effect on the success, while the reliability of the system negatively affect the success.
2. The indicators should be measured in the evaluation of information systems in RSBSY is Simplicity, Usability, Accuracy Service, Presentation of Information, Maintainability, reliability, error tolerance, security, Response Time, The prevalence of Communication, Data Flexibility, Auditabilitas, Resources, Information Relevance, accuracy and completeness.

The right model for the evaluation of information systems in Hospital is:

$$Y = 64.416 + 3.302 X_1 - 1.117 X_2 + 2.906 X_3$$

Where:

Y : Performance smartHIS system

X₁ : Factors Ease of use

X₂ : The reliability factor system

X₃ : Factors Conformance to requirements

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