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The Implementation of Hospital Management Information Systems Using Human, Organization, Technology, And Benefit Models at Dinda Hospital Tangerang

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The purpose of this research was to examine the results of the implementation of hospital management information system using the HOT-Fit Model approach, so that it can be seen which variables (Human, Organization, Technology) have the most significant influence in improving the health service process in hospitals. The research was conducted in 3 (three) weeks using purposive sampling technique and an explanatory approach with using primary and survey data collection. The respondents were hospital employees who used the hospital information system. The population numbered 248 with a sample of 153. The data analysis was performed using the path analysis method. The results showed that there was simultaneous positive influence of human, organizational and technology variables towards net benefit. In singular, there was a positive influence of human variables on net benefits, organizational variables on net benefits, and technology variables on net benefits. The research findings indicated that human and organizational variables could not mediate technology variables towards the net benefit. Directly, the technology variable affects net benefit higher than the effect of technology on net benefit with human and organization variables as mediation. In depth interviews were also conducted to find out more about the problem and it was found that the human factor consisting of acceptance and knowledge of the hospital information system was the main problem.

Keywords: Acceptance, HOT-Fit, Implementation, Knowledge, HMIS

1. INTRODUCTION

The development of computer-based Hospital Management Information Systems, (HIMS) or known as SIMRS in Indonesia has started in the last two decades. The regulation of Minister of Health Republic Indonesia No 82/2013 Article 3 stated that every hospital is obliged to organize a HMIS, each hospital must provide services with the HMIS application as quality control of services, overall quality control, assessment productivity, and service simplification. HMIS is an integrated process to help improve the efficiency and effectiveness of health organizations in carrying out their functions and achieving their goals [1]. For this reason, the use of information systems in hospital certainly requires an internal control mechanism [2]. Dinda General Hospital is a class C hospital located in Jatiuwung, Tangerang with 248 employees. To improve its services, in 2014 Dinda General Hospital began implementing the HMIS system although there were still several obstacles related to the system and organization in implementing the system. The problem is the lack of supervision of the technology sector for implementing HMIS. The implementation was not maximal, errors in data entered often occurred due to delays in data entry or input. A preliminary survey conducted on 30 employees at Dinda General Hospital showed that 60% of respondents felt quite difficult in using HMIS and 56.7% were less satisfied in using it. Furthermore, 56.7% of respondents stated that they wear less for using HMIS as a means of collaboration between units, while 60% of respondents felt that they were lacking in the features and quality of information displayed in HMIS. In addition, there were several obstacles raised by the director of the Dinda Hospital, such as three times changing software's vendor in the last 3 years, the less capacity of Information Technology personnel which only 2 employees, problems with IT equipment that resulted in problems using HMIS, also the hospital service's process delays. Moreover, the organizational structure in the IT sector that overlaps with

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the finance department causes problems in the reporting process, with the result with no evaluation in using HMIS. Research conducted by [3] showed that the success HMIS supported by key factors such as human as the user system, Organizations support, and the ability of technology HMIS itself. Therefore, the implementation of HMIS can be evaluated using the model approach Human, Organization and Technology (HOT) Fit. This variable is used as the criteria for performance appraisal carried out in the hospital, which can then be used as a reference in improving or perfecting the HMIS, so that it runs optimally in accordance with the vision and mission of the hospital. The model was chosen in this research because it provides a new frame work, that can be used to evaluate performance of MIS at Dinda Hospital. The HOT-Fit model approach focuses on analyzing human, organizational and technological aspects. These aspects will be used to assess the successful implementation of the HMIS, because several studies have shown a significant effect on the Net Benefit (NB) of the HMIS implementation. In addition, the researcher wants to identify the HOT-Fit model developed by [3, 4], in which the modeling states that there is no direct relationship between the Technology variables on the implementation performance variable. The technology variable also wants to be seen further whether it has direct effect without passing through the other two variables (Human and Organization)

A. Intervariable Relationship

H_1: *Variable of organization technology human influence simultaneously to HMIS implementation performance.*

B. The Relationship of Variables Human to the Performance of the HMIS

H_2: *Variables Human which consist of system use and user satisfaction, have an effect on the performance variables of HMIS implementation.*

C. **Relationship between Variables Organization HMIS Performance**.

H_3: *Variable Organization consisting of structure and system quality environment, affects the performance variable of HMIS implementation.*

D. Variable Relations Technology Towards Human

H_4: *variables Technology consisting of system quality, information quality and service quality have an effect on variables human consisting of system use and user satisfaction.*

E. The Relationship between Variables Technology and the Organization

H_5: *Variables Technology consisting of system quality, information quality and service quality have an effect on variables organizational consisting of structure and environment.*

F. The Relationship between Variables Technology and HMIS Performance

H_6: *The variables technology consisting of system quality, information quality, and service quality have an effect on the performance variables of HMIS implementation.*

2. METHODOLOGY

This research is using a mix method with causality analysis and design in cross sectional, which measurements and observations are carried out simultaneously at one time. The population of this research is all hospital's employees as users HMIS, from management, nurses, medical personnel, pharmacists, medical records officers, and hospital administrative (total of 248 people). This study uses a Likert scale by measuring the variables described based on indicators. Then the indicator is used as a starting point for arranging instrument items in the form of questions or statements. Likert scale, giving a score on each alternative statement answer as below 1 = Strongly Disagree (STS), 2 = Lightly Disagree (TS), 3 = Disagree (KS), 4 = Agree (S), 5 = Strongly Agree (SS).

A. Validity and Reliability Test

The Results of validity testing are carried out using the correlation method Product Moment, where if the question item has a p-value (Sig.) <0.05 (α) or the calculated r value (correlation coefficient) of the question item> r table value, then the question item is said to be valid. Reliability is tested by looking at the Cronbach's Alpha value on research instruments that have been declared valid previously. If the research instrument tested has a Cronbach's Alpha value > 0.6, then the research instrument can be said to be reliable for use.

B. Hypothesis Test

The value is obtained path using standardized regression weight as shown in the Table I.

Table I. Hypothesis test

Parameters / Variable			Estimate	S.E.	C.R.	P	Information
Technology	→	*Human*	.479	.046	10.391	***	Signified
Technology	→	*Organization*	.495	.050	9.978	***	Signified
Technology	→	*Net Benefit*	.201	.050	4.065	***	Signified
Human	→	*Net Benefit*	.156	.070	2.227	.026	Signified
Organization	→	*Net Benefit*	.135	.065	2.068	.039	Signified

Based on Table I, it is found that the Probability (P) value in the Human variable is 0.026 <0.05 and a CR value of 2.227> t table (1.960) with an estimated regression coefficient value of 0.479, then H_0 is rejected and H_1 is accepted. This means that there is a significant positive (unidirectional) influence between Humans on the HMIS (Net Benefit) implementation performance. So, it is concluded that the first hypothesis in this study can be accepted. This also explains, the higher the Human value, the higher the HMIS implementation performance value.

Probability value (P) on the Organization variable is 0.039 <0.05 and the CR value is 2.068> t table (1.960) with an estimated regression coefficient value of 0.135, then H0 is rejected and H1 is accepted. This means that there is a significant positive (unidirectional) influence between the Organization variable on the HMIS (Net Benefit) implementation performance and it can be concluded that the second hypothesis in this study can be accepted. This also explains that the higher the organization value, the higher the HMIS implementation performance value.

Probability Value (P) on the Technology variable is *** or equal to 0.000 <0.05 and a CR value of 10.391> t table (1.960) with an estimated regression coefficient value of 0.479 then H_0 is rejected and H_1 is accepted. This means that there is a significant positive (unidirectional) influence between the Technology variable on the Human variable. So, it can be concluded, the third hypothesis in this study is accepted. This also explains that the higher the value of Technology, the higher the value of Human.

Probability Value (P) on the Technology variable is *** or equal to 0.000 <0.05 and a CR value of 9.978> t table (1.960) with an estimated regression coefficient value of 0.495, then H_0 is rejected and H_1 is accepted. This means that there is a significant positive (unidirectional) effect between Technology on the Organization variable. So, it is concluded that the fourth hypothesis in this study can be accepted. This also explains if the higher value of Technology, the higher the value of Organization.

Probability value (P) on the Technology variable is *** or equal to 0.000 <0.05 and a CR value of 4.065> t table (1.960) with an estimated regression coefficient value of 0.201 then H_0 is rejected and H_1 is accepted. That is, there is a significant positive (unidirectional) influence between the Technology variable on the HMIS implementation performance variable. So, it is concluded that the third hypothesis in this study can be accepted. This also explains if the higher the value of Technology, the higher the value of HMIS implementation performance.

C. Intervening Test

Based on data processing that has been carried out using the AMOS application, it can be seen that the indirect effect of the independent variable (Technology) on the dependent variable (Net Benefit).

Table II. Intervening Test

Parameter / Variable			*Direct Effect*	*Indirect Effect*
Technology	→ →	*Net benefit*	0,201	0,142

The Technology variable affects Net Benefit by 0.201, while the Technology variable affects Net Benefit by 0.142 indirectly. So, if we compare the direct effect and the indirect effect, we get the direct effect (0.201)> the indirect effect (0.142). That is, there was no intervening in this study. This is because both Human and Organization variables are not able to give more influence on the interaction between Technology and Net Benefit.

3. RESULT AND DISCUSSION

From the result above, the probability value (P) is 0.000 <0.05 and the calculated F value is 35.914> F table (2,665). It can be interpreted that there is a significant (unidirectional) and simultaneous positive effect between Human Organization Technology on Net Benefit implementation performance. The three variables simultaneously influence the net benefit variable with the highest index found in the index value of 121.8. These results are in how far the HMIS application helps in daily work. The index value shows the HMIS application helps in completing tasks or daily routine work carried out by the user. This is part of the job effect indicator. This simultaneous influence is in accordance with the theory of [3, 4] which states that the success model of an information system will be influenced by comprehensive and specific evaluation categories, extensive validation and its application to the evaluation of an information system.

Based on the distribution analysis of respondents using the three-box method, the lowest human variable at the index value of 117.0. These results are in the indicators of satisfaction in the function of using the HMIS application. The index value shows user satisfaction in terms of the function of the HMIS application in the lowest index in the human variable. The use of functions in the HMIS application is part of the system use indicator. The analysis theory suggests that the use of HMIS application functions tends to have a more important influence on predicting user behavior with a system than attitudes towards an object (e.g., the system itself). Dinda Hospital employees have quite low knowledge of IT, because many employees are elderly. The switch from a manual system to HMIS had some problems at first. Therefore, employee knowledge about technology and the use of the HMIS application system needs to be improved. An information system is a collection of human resources and equipment, which is organized to convert financial data or other data into information. This information is confirmed to various decision makers.

From the analysis of the distribution of respondents using the three-box method, the average value for organizational variables for organizational variables is 117.6 and is included in the high category. The lowest index is in question number 3 with the result of the index value of 113.4. These results are in the indicators of the quality of IT services in handling when a HMIS application malfunction occurs. This value shows the quality of IT services, in this case the tiered submission of complaints, has the lowest influence in the dimensions of the organizational structure. The problems at the organizational level above are related to the lowest index in the relationship between the organization and the HMIS performance. The flow of requests for maintenance of the HMIS application at Dinda Hospital has never been made before, so if there is a problem with software or hardware, each employee can only complain and ask for advice from

the management manually. The response given from the management will also be given manually so it takes a long time. The IT organizational structure that is under finance is a major problem in the process of completing IT needs related to the HMIS application.

Based on the analysis of the distribution of respondents using the three-box method, the lowest index is in the index value of 110.8. These results are in the indicators of the quality of IT services in handling when a HMIS application malfunction occurs. This value shows the quality of IT services, there is a shortage in the speed of handling errors in the HMIS application. The quality of IT services at Dinda Hospital is on the lowest index on the technology variable because the number of IT human resources is only 1 person. The In-Depth Interview conducted also stated that the difficulty in handling HMIS problems lies in the number of IT officers. The availability and quality of information that is needed in assessing various alternative decisions and determining strategies will be fulfilled if the information system is reliable enough, as well as the implementation of strategies. The information system referred to here is a system that facilitates and supports decision making or strategy determination and implementation. The quality of information systems focuses on the performance of information system components, namely how well the capabilities of hardware, software, people, procedures, databases, communication networks, data, activities, networks and technology from information systems in producing information for users. The quality of human resources owned by IT can determine the speed and accuracy of handling problems that occur in HMIS.

From the analysis of the distribution of respondents using the three-box method, the technology variable the average value for organizational variables is 118.0 and is included in the high category. This is supported by research conducted by [1] saying that in the technology factor, system quality has an important role in user usage and satisfaction; Meanwhile, organizational factors, organizational structure, have a very positive and significant effect on the organizational environment. Lack of IT personnel at Dinda Hospital to handle system problems. Users who still don't understand how to use the system. In this study, it was concluded that information system technology factors have an influence on existing components from the human, organizational side and also end-user satisfaction in line with the results of respondents' answers regarding the effect of technology on humans.

Based on the analysis of the distribution of respondents using the three-box method, the highest index for the net benefit variable is the HMIS implementation component to help with daily work with an index value of 121.8 [4, 5]. state that the hospital is expected to increase the service quality sub-variable, namely communication between the IT department and users and the policy side of the hospital management in supporting implementation, the best types of variables are human (system use) and technology (system quality) and benefits. The HOT variable that needs to be improved is the organization. The strength of the HOT-FIT HMIS factor at Dinda Hospital lies in the benefits and technology factors. The main weakness is the organizational factor. This research supports the research findings which state that there is a direct influence between the technology variable and the net benefit variable. This also explains that the higher the value of the technology components at Dinda Hospital, the higher the performance value of the HMIS implementation

Based on the analysis of the distribution of respondents using the three-box method, the lowest index of the net benefit variable is in question number 4 with an index value of 120.0. These results are in the indicator of increasing service speed after using HMIS. Down or system errors that occur in the HMIS application hamper the service. [4] also stated that the use (benefit) of information technology is the main support obtained by organizations in using an information system. This is in accordance with the findings on the implementation of HMIS at the Dinda Hospital. High quality information system support is an important factor in the success of a hospital. The accuracy and speed of service have a direct effect on the performance of the implementation of the HMIS application at Dinda Tangerang Hospital.

In-depth interviews were conducted with informants in this study. The three of them consist of 3 people representing three different groups. The first informant is service staff, namely registration staff, the second informant is from the IGD nurse, and the third informant is the IT staff of Hospital. In-depth interviews were conducted on 3 -19 August 2020. Interviews were conducted to confirm the findings of previous data which stated that human and organizational variables were not a mediating factor for technological variables on the performance of HMIS implementation. Thematic analysis by looking at similar themes was also chosen to provide informants with research questions. The question and answer conducted resulted in 6 coding themes that were obtained, namely: (A) Access to the HMIS application, (WR) Response time, (KK) Security Quality, (F) System Function, (KR) Hospital Quality, and (WR) Response Time. The first informant who was in the IGD unit stated that theme (A) and (WR) were the main factors that emerged in the interview. The informant said that the unit needed fast time to process access and speed in response if the IT system had problems. According to him, the current HMIS system is quite sophisticated and completely adequate, but nurses in the unit often have difficulty accessing it. This proves, the technology from hardware and software is adequate, but the human factor in this case in terms of work units and knowledge does not mediate the technology factor to HMIS performance. The second informant is at the registration service unit. The results of the interview show the theme of Quality Security (F) System Function (KR). The informant stated that in every shift performed by Dinda Hospital employees, each employee needs to log-in first. However, the employees

often do not log out of the registration unit. Their used IDs can also be accessed by other employees. Another drawback is the system security which makes the monitoring process difficult. This proves that the security process owned by the HMIS application can actually decrease due to the negligence of the human factor who does not carry out the flow according to the protocol. The third informant, namely the IT staff from Dinda Hospital, produced the theme of coding (KR) Hospital Quality (WR) Response Time. The informant stated, using the HMIS application in the present era greatly helps the performance of hospital employees. The tracing and identification process can be done efficiently because it is done online. The problem actually arises from the hospital management response process itself. IT Dinda Hospital is said to be under the finance department. So that in making requests or suggestions, it cannot directly go to the management director. In addition, if an error occurs in the system, IT HR, which only amounts to one person, must immediately handle it because there is no clear Standard Operational Procedure in managing the error. SDM can handle problems remotely, but if they occur simultaneously, the handling process can be delayed. This again confirms that the organizational variables contained in HOT-Fit cannot be a mediation towards the performance of HMIS implementation.

4. CONCLUSION

Based on the analysis carried out, the conclusions in this study are: (1) There is a simultaneous influence between Human, Organization, Technology variables on Net Benefit or HMIS implementation performance. This means that the human, organizational and technology are simultaneously increasing, so the performance of implementing HMIS will also increase. (2) There is a positive influence between Human variable on Net Benefit or HMIS implementation performance. This can be interpreted that the human component which consists of application user satisfaction and also the use of the HMIS system increases, so the performance of implementing HMIS also increases. In this study, the greatest influence was on the use of the system that was understood by employees. (3) There is a positive influence between the Organization variables on the Net benefit or HMIS implementation performance. This means that the organizational components consisting of the organizational structure and the organizational environment have increased, so the performance of implementing HMIS has also increased. In this study, the greatest influence was on the use of HMIS in line with the organizational goals of Dinda Hospital which were stated in the hospital's vision and mission. (4) There is a positive influence between the Technology variable on the Human variable. This can be interpreted that if the technology component consisting of system quality, service quality and information quality increases, the human component will also increase. In this study, it was found that the greatest influence was on the quality of the system which was not difficult in accessing employees as users. (5) There is a positive influence between the Technology variable on the Organization variable. This can be interpreted that if the technology components consisting of system quality, service quality, and information quality increase, the organizational components will also increase. (6) There is a positive influence between the Technology variable on Net Benefit or the performance of implementing HMIS directly or indirectly. This means that the technology component consisting of system quality, service quality, and information quality increases, so the performance of HMIS implementation also increases directly or through Human or Organization variables. In this study, it was found that the greatest influence was on the direct influence between technology on the performance of HMIS, in which organizations and humans did not significantly influence the role of technology on Net Benefit.

Dinda Tangerang Hospital needs to conduct regular socialization and evaluation of the operation of the HMIS application to system's users. It is also recommended to make SOPs related to the operation of the HMIS application in each unit. Suggestions for further research are expected to be able to analyze more deeply related to the success of HMIS using the HOT-Fit model with HOT-Fit analysis techniques.

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