

Online Survey for supporting and developing IT Master Plan: The case of HVA Toelongsredjo Hospital

Mochammad Kautsar Sophan, Arief Muntasa, Annisa Sukma Putri

Informatics Department, Faculty of Engineering, University of Trunojoyo Madura
Bangkalan, Indonesia

kautsar@trunojoyo.ac.id

Abstract. The IT master plan is a long-term plan in an organization in terms of developing Information Technology to support the organization's vision and mission. The IT master plan is important for hospitals because it will provide direction on how hospital information systems are built. However, because the main business of a hospital is not IT, it is often the development of hospital information systems without a master plan that the application of information systems that are made does not fit the hospital's needs. The purpose of this research is to design an online survey system that is used to support the preparation of the IT master plan, especially in hospitals so that it will be easy to get an evaluation of the conditions of implementing IT in hospitals. The online survey system was built using the Unified Software Development Process (USDP) approach. By using this method, it turns out that it is easy to model the system, so that the system analysis and design process can be made quickly. This research was conducted in the HVA Toelongsredjo hospital. The survey application that was built has been used to get a response to the IT conditions at HVA Hospital. On the results of online survey processing analyzed using a Likert scale. It was found that 42 respondents of HVA Hospital stated that 84.30% of IT master plan conditions were ideal supported by good IT conditions of 73.40%, resulting in a level of IT implementation in HVA Hospital is very good.

Keyword: Masterplan IT; Survey; Internet

1. Introduction

In today's business world, IT is used in 2 ways, the first IT is used to increase business competitiveness, and the second is IT to help business processes. In order for the application of IT to be maximized, a comprehensive study is needed to carry out IT planning[1]. IT master plan for organizations can be used as a reference for the implementation of systems and information technology, where information technology planning must be aligned with organizational goals, so that IT planning can provide benefits to the organization[2].

The preparation of a master plan is very important for business success because IT strategies must be planned simultaneously with the business strategy. Some IS / IT planning implementations fail because they do not link between IT strategies and Business strategies. Some papers discussing IS / IT planning encourage the planning team to align IT planning with business planning[3]–[5]. This paper



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

discusses the implementation of an online survey to support the IT master plan activities in the HVA Toelengredjo hospital. One stage in the IT master plan is data collection [4]. In this study, data collection uses online surveys.

HVA Toelengredjo Hospital is a type C general hospital under the auspices of PT Nusantara Medika Utama whose business strategy lies in public health services and from time to time the HVA hospital continues to make adjustments to improve service quality. Since 2011 HVA hospitals have accredited in 5 basic services, which include administrative services, medical record services, emergency installation services, medical services and nursing services. HVA hospitals have adopted information technology in their business services such as administrative services to patients and the use of hospital management information systems used from the head office. HVA hospitals already have an IT master plan even though it is still in document form.

From the implementation of IT to the business services of the hospital, the success of its implementation depends on the support factor of five dimensions of the IT master plan, which includes the use of hardware, software, infrastructure, quality of human resources and predetermined SOPs. This study will examine the ideal conditions of IT master plans and IT implementation conditions related to the five dimensions of the IT master plan, including hardware conditions, software conditions, infrastructure conditions, conditions of quality of human resources, and SOP conditions which include the use of account access rights for each member to operate a hospital MIS.

In this study a survey step is needed to determine the level of IT implementation that supports IT master plans in HVA hospitals. Survey methods such as interviewing or distributing questionnaires are considered ineffective because they require a long time, such as distributing surveys, and spending more expensive costs such as printing questionnaires, also allowing incorrect input when recapitulating survey data. By utilizing internet technology, surveys can be conducted online so that it can facilitate collecting information from respondents automatically.

Online surveys allow getting a response from the user without any place and time constraints. However, if it is not done properly, for example unclear questions or unclear directions so that it is considered junk e-mail, then online surveys can become ineffective [6]. Online surveys are an appropriate method to get responses from virtual communities. A virtual community is a group of people who use the network to work or collaborate in an organization [7].

Therefore, in this study an online survey application will be developed to support the IT master plan in HVA Toelengredjo hospitals. This paper will discuss the implementation of an online survey that is used to conduct surveys relating to the need for supporting data to conduct an IT Master Plan study in a hospital.

2. Literature Review

Some masterplan evaluations that have been conducted have not yet used specific online survey tools. Some of the master plan development research that has been done, has not clearly used online survey tools [8], [9]. The method of obtaining data in the preparation of a master plan is more determined based on the characteristics of the respondents and the type of data obtained.

Some of the online survey tools that have been carried out focus more on the ease and user opinion of an application or information system [10]–[12]. There are no online surveys specifically used to obtain responses regarding the use of IT in an organization. More specifically, there are no online surveys that focus on getting responses from users for the dimensions of software, hardware, infrastructure, Human Resources and Standard Operating Procedures.

There are several basic foundations in the process of preparing an IT master plan [2], namely

- a. The basic principle of the master plan is a guidance system and information technology designed in accordance with the planning for the organization
- b. The teams involved are from technical and non-technical parties
- c. Details of information technology architecture; and
- d. The governance of the validity of the master plan is revised every six months.

The organizational plan must be in line with the IT implementation plan that will be developed. So there is no gap in the implementation of the IT master plan and planning of the organization. As technology advances rapidly, technology planning in organizations must also develop and so that up-to-date IT planning is needed [3]. There are 5 stages of compiling an IT master plan, namely environmental studies and organizational strategy, analysis of information system requirements, determination of information technology specifications, portfolio management of programs and projects, and governance and management of systems and information technology [2].

The survey method is used to collect information about behavioural studies, the level of service satisfaction by users and the opinions of a user about a product. Along with the development of the world of information technology, this has had an impact on research methods including surveys. E-surveys as a new generation have made research more economical. The e-survey is carried out through two methods, namely personal computers and network systems [8]. The e-survey was conducted in several stages, namely sample determination, questionnaire preparation, questionnaire competency measurement by testing the technical capabilities and imperfections of e-questionnaires, questionnaire distribution, and data processing. In processing data, a repetitive answer check is performed. Repeated answers must be removed in the data analysis process.

Likert scale is a scale to measure attitudes or opinions of a person or group regarding an event or social phenomenon [9]. This scale is widely used for research using descriptive surveys. The Likert scale is a bipolar scale that measures positive or negative responses to a statement. Likert scale questionnaires are also often used to measure affective variables such as motivation, anxiety and self-confidence.

3. Research Method

This study focuses on the results of survey analysis related to IT conditions in the dimensions of IT master plans in hospitals HVA Toeloengredjo. Figure 1 shows the sequence of research stages.

Unified Modeling Language is a standard modeling language commonly used to design an object-based system model [15]. A model is built to communicate the structure of the system, show the behavior of the system, visualize and control the system architecture, simplify complex problems so that they better understand the system being built, can be used again, and also built to manage risk. There are three main aspects in system modeling supported by UML, namely functional models using use case diagrams, object models, using class diagrams, dynamic models using sequence diagrams, activity diagrams and state chart diagrams [16]. UML is a proven modeling system that can be used to model a system by utilizing a combination of several diagrams and modeling concepts in UML [17].

Unified software development process (USDP) is a software development method that uses object oriented programming [18]. USDP uses UML as a tool for modeling and analyzing software development. Some of the characteristics of the USDP include use-case driven software that is produced according to user needs, architecture-centric namely software that requires architecture to model software components as a system organizing requirement. Iterative and incremental, namely the software development process can be used continuously so that it can produce optimal application business processes in a short time.

The framework of the USDP method has several models, namely the analysis model, detailing the definition of each use case; design model, defines the static structure of the system such as class, interface and their respective relationships within the framework of software development; implementation model, representing codes in the chosen programming language and mapping classes to components; construction model, defines computer nodes physically and maps each component to each existing computer node; testing model, describing testing scenarios to verify the software being developed [16].

Black box testing is one method of software testing that focuses on the functional requirements of software [19]. Black box testing tries to find errors in categories (a) functions that are incorrect or missing, (b) interface or interface errors, (c) errors in data structures or external database access, (d) performance or behavior errors, (e) initialization error and termination.

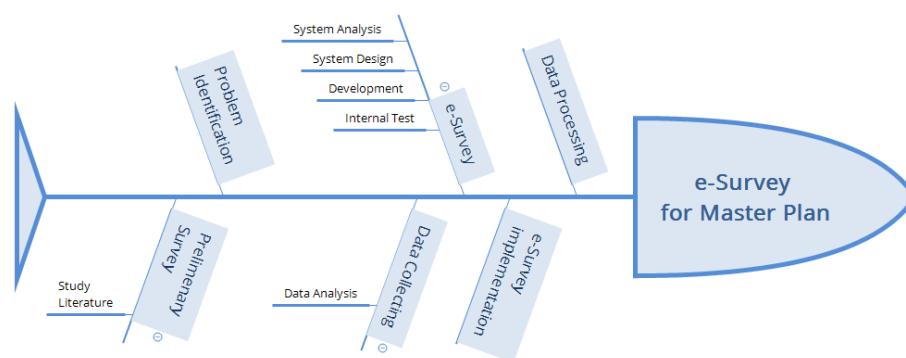


Figure 1. Research Methods

4. Result and Discussion

At each phase of the USDP, the work phase is always repeated. The work phase starts from business modeling, requirements, analysis and design, implementation, testing, and deployment. Several phases carried out

1. Inception

At this stage the system requirements analysis is carried out. The emphasis at this stage is business modeling and needs analysis. At this stage it was found that the online survey must be able to accommodate 5 dimensions in the IT master plan. And each question and alternative type of answer must be adaptable to the user's needs.

2. Elaboration

At this stage the focus is on business modeling, requirements analysis, and system design. At this stage, business modeling is confirmed, and the system design is done using UML. At this stage the system implementation has also begun to build database needs.

3. Construction

At this stage, focus on implementation or application development. At this stage, an initial version of the application is formed. The application is hosted on a production server and is ready for testing

4. Transition

At this stage, the application is ready to use. The application has entered the deployment server and can be used by users.

The online survey application system was built to do two types of surveys, namely an IT condition analysis survey and an analysis of the ideal IT master plan conditions at HVA hospitals. The system

can provide information about the results of survey analysis related to the five dimensions of the IT master plan, namely software, hardware, infrastructure, HR and SOP.

In this survey system there are 2 types of users. There are surveyors and respondents. Surveyors are users who make surveys, and respondents are users who answer surveys. Online surveys that are made are dynamic, can be used to make several surveys separately, so that in this system, surveyors and respondents must register into the system first.

Surveyors are IT employees who will create, edit and view survey results. While the respondents were IT employees and non-IT employees at HVA hospitals. Respondents can fill out surveys and can also see survey results. Based on the specifications of functional requirements and actors involved in the system, the system can be modelled by functional modelling, using use case diagrams. Use case diagrams are a form of system functionality. Figure 2 and Figure 3 show the modelling of survey and survey delivery.

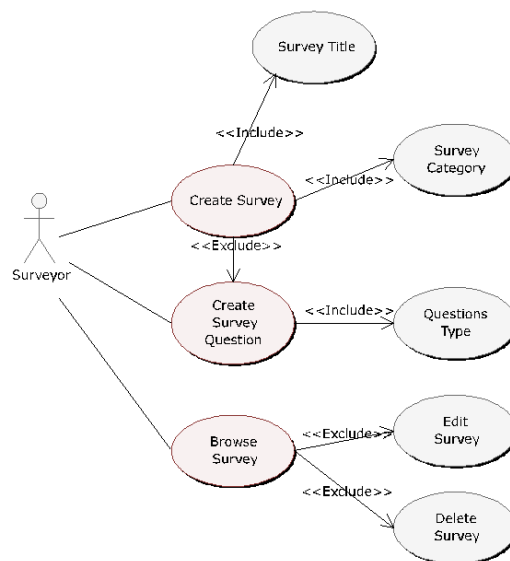


Figure 2. Use Case User Create Survey

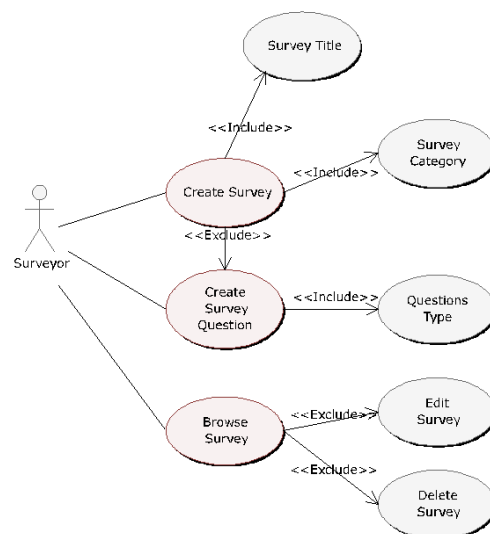


Figure 3. Use Case Sending Survey

Sequence Diagrams are used to model and explain the behaviour and flow of functionality in usecase. This diagram contains descriptions of design objects to interact with each other. Structural modelling is described using class diagrams. Class diagrams describe the static structure of classes in the system and describe attributes, operations, methods and relationships between classes (UML). Class diagrams can realize the structure of classes from the system into interfaces related to system implementation. Figure 4 shows the class diagram in the online survey application. The design of this web-based survey application infrastructure uses a hosting system. To access the survey application the user must use an internet network connection. All users can access this online survey application anywhere and anytime. Figure 5 shows the infrastructure used by the online survey system.

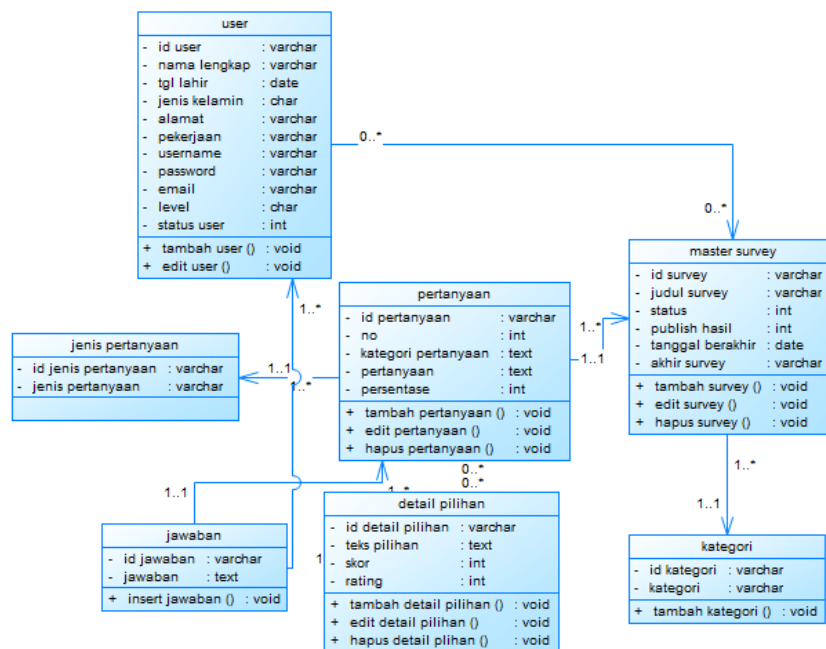


Figure 4. Class Diagram

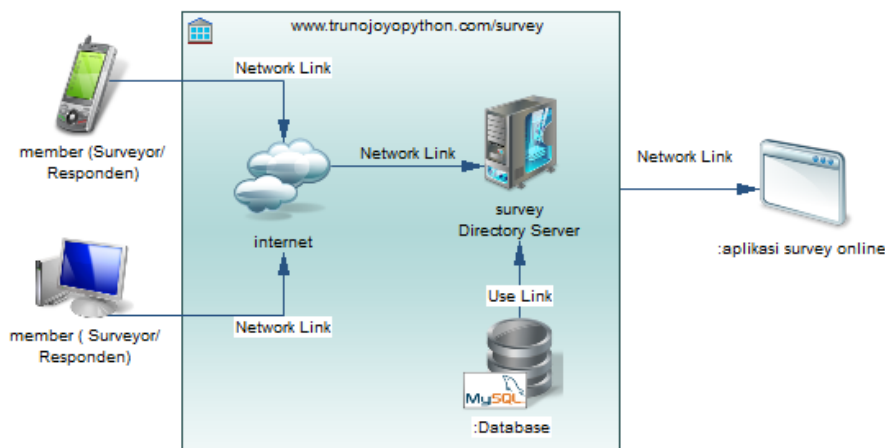


Figure 5. Online Survey Infrastructure

The design of an on line survey system architecture was developed by making several system packages that support system management that can be seen to be simpler. This system package or

program module is made according to the online survey application features that will be developed. The system implementation for testing is applied first to the local server. Local web servers use XAMPP for Windows version 5.6.30 and include Apache Web Server Version 2.4.25, MySQL Database Version 5.0.11, PHP Script Language Version 5.6.30 and phpMyAdmin Database Manager Version 4.6.5.2. After a local trial, the Online Survey application is then hosted with the hosting address <http://www.trunjoyopython.com/survey>. After hosting, user surveyors and respondents can interact directly with the online survey application via the internet. The results of the implementation of the design of online survey applications can be seen in Figures 6.

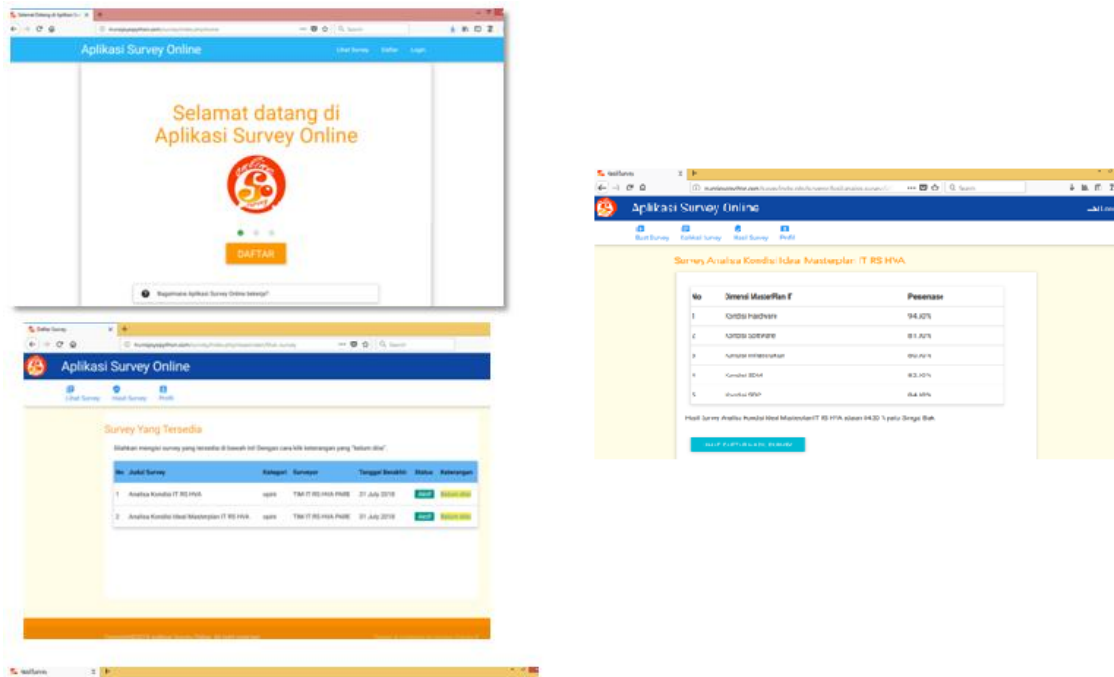


Figure 5. Survey Online Interface

For testing the system, we use the black box testing method. This method focuses on the functional requirements of the system created. Stages carried out on the black box testing method starts from the case, test scenario, test results and conclusions. Table 1 shows the results of testing on the online survey application. Table 1 shows the results of functional testing with black box testing methods for respondents of HVA hospital IT employees and the results were in line with expectations. It can be concluded from the test results based on several test scenarios that the online survey application is feasible to use for IT master plan data retrieval.

Table 1. Black Box Testing Result

Item	Testing Scenario	expected results	Result
Fill out the member registration form correctly	User input on the registration form is correct	The system displays a successful confirmation, Registration success.	Success
Fill in the member registration form incorrectly	User input on the registration form is incorrect	The registration form displays an error message, registration failed.	Success
Login correctly	Correct username and	user login to the user page	Success

Item	Testing Scenario	expected results	Result
Login incorrectly	password. inCorrect username and password.	The system displays an error message, the login failed.	Success
create survey identity by surveyor	input the survey title and category	The system displays the type of question for the first question.	Success
create survey question by surveyor	input type questions, make question sentences and answer choices.	The system stores surveys and can be seen in the preview survey.	Success
Sending survey	input the end date of the survey and publish survey.	The system activates survey status.	Success
Management of Survey	Add, Edit and delete surveys.	The management of surveyors' survey data is functioning properly.	Success
respondents answered survey questions	Fill out all survey questions.	The system saves the respondent's answers to the survey results.	Success
see the survey results	Access the survey results menu.	The system displays the number of respondents and graphs of survey results.	Success
manage member data	Edit member profiles	The system can save the results of the profile changes properly.	Success

The results of the application test have found that the application is feasible to be used as a survey tool to determine the level of IT implementation so that it can support the IT master plan in HVA hospitals. In this study two questionnaires were made for comparative analysis, namely the HVA hospital condition analysis survey and an analysis of the ideal condition of the HVA hospital master plan. The number of respondents obtained in this study amounted to 42 respondents, namely that the number of respondents was female as many as 30 respondents and respondents were male sex as many as 12 respondents. The classification of respondents based on their place of residence was found to be higher in respondents from Pare city than outside Pare, 27 compared to 15 respondents. The average age of respondents is at most 20-25 years. Two questionnaires will be analysed, namely the first questionnaire entitled analysis of HVA hospital IT conditions with a total of 8 questions and 7 questions from the second questionnaire, namely an analysis of the ideal condition of IT master plans in HVA hospitals. The questions in both questionnaires are related to the master plan dimension that supports the HVA hospital master plan. Table 2 shows some of the questions given.

Table 2. Questionnaire Questions

No	Master plan dimension	Questionnaire I Analysis of IT Conditions	Questionnaire II Analysis of Ideal Conditions of IT master plan
1	Hardware	Regarding the device you are	Is the number of

No	Master plan dimension	Questionnaire I Analysis of IT Conditions	Questionnaire II Analysis of Ideal Conditions of IT master plan
		using, what is the condition of the computer that you use in your room?	computer devices in your room sufficient for your task needs?
		Regarding the device you are using, what is the condition of the printer that you use in your room?	Are all computer devices in your room connected to a printer so that you can help with your task?
2	Software	Regarding the use of IT, what is the condition of the information system or the hospital SIM that you use?	Is the operation of the hospital Management Information System enough to support your assignment?
		If you already use the internet, what is the internet condition in your room?	Can internet access reach your room?
3	infrastructure	With regard to internet usage, has your LAN usage in your unit been smooth?	Is the computer device that you are using already connected to the LAN?
		Regarding the use of IT in your room, is the handling of trouble from the IT HR good?	In trouble IT handlers, is the amount of IT HR sufficient to handle the trouble in the trouble you are experiencing?
4	HR (Human Resources)	As an IT user in your room, what IT capabilities do you have?	
		As an IT user in your room, do you always use the access rights account to enter the hospital SIM in accordance with applicable regulations?	As the owner of access to account rights in your room, does the account right provide enough access to your assignments?
5	SOP (Standard Operating Procedure)		

At the stage of the questionnaire analysis carried out using a Likert scale. This scale is used for descriptive survey research and is a bipolar scale method that measures positive responses or negative responses to a statement. Likert scale is formulated by determining the maximum score for each answer [15]. The next step of analysis is to determine the criteria for the interval (distance range) and the percentage of interpretation used to find out the valuation using the formula in (1)

$$KI = \frac{100}{score(likert)} \quad (1)$$

where KI is Interval Criteria, and Score Likert = 5.

From the calculation of the interval criteria (KI) it is known that the distance range is 20% as the first interval starts from a very poor value. Table 3 shows the interval criteria.

Table 3.Interval Scale

Initial Interval	Final Interval	Questionnaire Interval Criteria 1	Questionnaire Interval Criteria 2
0%	20%	Very bad	Very not ideal
21%	41%	not good	Not ideal
42%	62%	pretty good	pretty ideal
63%	83%	Good	Ideal
84%	100%	very good	very Ideal

The next step is to determine the percentage of answers from the Likert scale using (2) and (3).

$$Y = \frac{TS}{idealscore} \times 100 \quad (2)$$

$$TS = \sum_{i=1}^n Pn_i \times Jri \quad (3)$$

Where:

TS : total score of respondents

Pni : likert score maximum i

Jri : the number of respondents who chose likert maximum numbers i

$Ideal Score$: maximum score x (total respondent), $5 \times 42 = 210$

Y : Percentage value

In this study, the percentage of answers from the first questionnaire about analysing IT conditions in HVA hospitals was then compared with the results of the second questionnaire analysis of the ideal IT master plan. From this comparison we can find out the level of IT implementation in HVA hospitals. Table 4 shows the results of the second percentage value of the questionnaire.

The table shows the total IT master plan dimensions, namely hardware, software, infrastructure, HR and SOP that the IT master plan conditions in HVA hospitals are ideal with a percentage value of 84.3% supported by good IT conditions of 73.4%. The percentage value of the level of IT implementation is calculated using (4).

$$Level\ of\ IT\ implementation = \frac{73,4\%}{84,3\%} \times 100\% = 87,07\% \quad (4)$$

It can be concluded that the level of IT implementation based on a comparison of the analysis of IT conditions at HVA hospitals and an analysis of the ideal condition of the IT master plan is 87.07% with the level of IT implementation in HVA hospitals being very good.

Table 4.Result of Questionnaire

Dimension of IT master plan	Percentage value of questionnaire 1		Percentage value of questionnaire 2	
Hardware	Item 1 = 87%	79,5%	Item 1 = 90%	94,5%
	Item 2 = 72%		Item 2 = 99%	
Software	Item 3 = 72%	72%	Item 3 = 81%	81%
	Item 4 = 60%		Item 4 = 60,5%	
infrastructure	Item 5 = 71%	65,5%	Item 5 = 99,5%	80%
	Item 6 = 74%		Item 6 = 82%	
HR	Item 7 = 68%	71%	Item 6 = 82%	82%

Dimension of IT master plan	Percentage value of questionnaire 1	Percentage value of questionnaire 2
SOP	Item 8 = 79%	Item 7 = 84%
analysis results	73,4%	84,3%

5. Conclusions

Research has conducted a survey using an online survey application to support the activities of making IT master plans in hospitals "HVA Toeloengredjo". The study obtained survey data about IT conditions and ideal conditions for IT master plans in HVA hospitals. This study uses Likert scale survey analysis. The survey was conducted on 42 respondents. The percentage of response results obtained was 84.3% stating that the condition of the IT master plan in HVA hospitals was ideal. 73.4% stated that the IT conditions at HVA hospitals were good. It can be concluded from the results of the comparison of the two analysis of the condition of 87.07% that the level of implementation of IT in HVA hospitals is very good.

The built online survey can be used to get the initial data needed to build an IT master plan. This is because with online survey, masterplan designers can make flexible surveys in accordance with the 5 dimensions in the IT masterplan. In the future, an online survey for the IT masterplan can be developed with additional analysis for each question item, so that more accurate results can be obtained relating to the IT conditions on a particular item.

6. References

- [1] Andrew C. Boynton and Robert W. Zmud, "Information Technology Planning in the 1990's: Directions for Practice and Research," *Manag. Inf. Syst. Res. Cent. Univ. Minn.*, vol. 11, no. 1, pp. 59–71, Mar. 1987, doi: 10.2307/248826.
- [2] Richardus Eko Indrajit, "Metodologi Penyusunan Rencana Induk (Master Plan) Sistem dan Teknologi Informasi Organisasi," *Inst. Teknol. Bdg.*, vol. 2005, no. 1, 2005, [Online]. Available: <https://qjournal.id/jurnal/paper/0001600139/Metodologi-Penyusunan-Rencana-Induk-Master-Plan-Sistem-dan-Teknologi-Informasi-Organisasi>.
- [3] N. Goldsmith, "Linking IT Planning to Business Strategy," *Long Range Plan. Pergamon Press Plc*, vol. 24, no. 6, pp. 66–77, 1991, doi: [https://doi.org/10.1016/0024-6301\(91\)90045-P](https://doi.org/10.1016/0024-6301(91)90045-P).
- [4] T. A. Byrd, V. Sambamurthy, and R. W. Zmud, "An Examination of IT Planning in a Large, Diversified Public Organization," *Decis. Sci.*, vol. 26, no. 1, pp. 49–73, Jan. 1995, doi: 10.1111/j.1540-5915.1995.tb00837.x.
- [5] A. H. Segars, V. Grover, and J. T. C. Teng, "Strategic Information Systems Planning: Planning System Dimensions, Internal Coalignment, and Implications for Planning Effectiveness," *Decis. Sci.*, vol. 29, no. 2, pp. 303–341, Mar. 1998, doi: 10.1111/j.1540-5915.1998.tb01579.x.
- [6] J. R. Evans and A. Mathur, "The value of online surveys," *Internet Res.*, vol. 15, no. 2, pp. 195–219, Apr. 2005, doi: 10.1108/10662240510590360.
- [7] C. M. Johnson, "A survey of current research on online communities of practice," *Internet High. Educ.*, vol. 4, no. 1, pp. 45–60, Jan. 2001, doi: 10.1016/S1096-7516(01)00047-1.
- [8] S. C. Tan et al., "Evaluation of implementation of the IT Masterplan 3 and its impact on Singapore schools: Instrumentation and baseline study," 2011.
- [9] M. Karamouz, B. Zahraie, and R. Kerachian, "Development of a master plan for water pollution control using MCDM techniques: a case study," *Water Int.*, vol. 28, no. 4, pp. 478–490, 2003.

- [10] J. Sandars and S. Schroter, "Web 2.0 technologies for undergraduate and postgraduate medical education: an online survey," *Postgrad. Med. J.*, vol. 83, no. 986, pp. 759–762, Dec. 2007, doi: 10.1136/pgmj.2007.063123.
- [11] D. M. Korniewicz, T. Clark, and Y. David, "A National Online Survey on the Effectiveness of Clinical Alarms," *Am. J. Crit. Care*, vol. 17, no. 1, pp. 36–41, Jan. 2008, doi: 10.4037/ajcc2008.17.1.36.
- [12] O. Király et al., "The Mediating Effect of Gaming Motivation Between Psychiatric Symptoms and Problematic Online Gaming: An Online Survey," *J. Med. Internet Res.*, vol. 17, no. 4, p. e88, Apr. 2015, doi: 10.2196/jmir.3515.
- [13] H. Kalantari D., E. Kalantari D., and S. Maleki, "E-survey (surveys based on e-mail & web)," *Procedia Comput. Sci.*, vol. 3, pp. 935–941, 2011, doi: 10.1016/j.procs.2010.12.153.
- [14] W. Budiaji, "Skala Pengukuran dan Jumlah Respon Skala Likert," doi: 10.31227/osf.io/k7bgy.
- [15] G. Booch, J. Rumbaugh, and I. Jacobson, *Unified Modeling Language User Guide, The (2Nd Edition) (Addison-Wesley Object Technology Series)*. Addison-Wesley Professional, 2005.
- [16] S. Karouw, "Analisa Dan Perancangan Aplikasi Dormitory Management Menggunakan Unified Software Development Process," *J. Tek. Inform. Univ. SAM RATULANGI*, vol. 2, no. 1, 2013, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/informatika/article/view/1980>.
- [17] B. Selic, "Using UML for modeling complex real-time systems," in *Languages, Compilers, and Tools for Embedded Systems*, 1998, pp. 250–260.
- [18] A. Nugroho, *Rekayasa Perangkat Lunak Berorientasi Objek dengan Metode USDP*. Penerbit Andi, 2010.
- [19] T. Wahyuningrum and D. Dwi Januarita, "Implementasi dan Pengujian Web E-commerce untuk Produk Unggulan Desa," *J. Komput. Terap. Vol 1 No 1 2015 J. Komput. Terap.*, May 2015, [Online]. Available: <https://jurnal.pcr.ac.id/index.php/jkt/article/view?path=>.
- [20] S. Said, E. Setyaningsih, and H. Harmastuti, "PERANCANGAN SISTEM PENGAMBILAN KARTU UJIAN ONLINE MENGGUNAKAN FRAMEWORK CODEIGNITER (STUDI KASUS INSTITUT SAINS & TEKNOLOGI AKPRIND YOGYAKARTA)," *J. Teknol. Technoscientia*, vol. 10, no. 1, 2018.

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.