Audit of Information Management System Public Health Centre Using Assessment Criteria of SPBE Application Audit Tools at Karangpucung Health Centre I

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***Abstract*— Information Management System Public Health Centre (SIMPUS) aims to improve services at Karangpucung Health Centre I in processing and reporting patient data. However, there are problem in the operation and there is no policy in handling the problem so that it inhibit the reporting process. This study aims to asses the maturity level of SIMPUS in the organization using the assessment criteria of SPBE application audit tools based on the functionality and performance domains. The main objective is to determine the condition of the SIMPUS maturity level in the organization and provide recommendation based on the findings using the selected COBIT 5 mapping. The stages are carried out with an initial initiation to identify problems, determine participants in the assessment process and filling out questionnaire, data collection is carried out through observation, interviews and filling out questionnaires, then process attribute level to calculate the level of maturity and continue by making recommendation based on existing findings. Based on the results of the calculation of the capability value of each stage that has been carried out, SIMPUS is at maturity level 2 or Managed. The recommendations given based on the findings refer to COBIT 5 domains DSS01 (Manage Operations) and DSS03 (Manage Problems) through the mapping carried out, in accordance with the findings in the operation and maintenance stages to improve the performance of SIMPUS service running in the organization**

Keywords*— *SIMPUS, Public Health Centre, Maturity Level, COBIT 5

Abstrak*—Sistem Informasi Manajemen Puskesmas (SIMPUS) bertujuan untuk meningkatkan pelayanan di Puskesmas Karangpucung I dalam mengolah data pasien dan proses pelaporan. Namun, terdapat kendala pada pengoperasian dan belum ada kebijakan dalam penanganannya sehingga menghambat proses pelaporan. Penelitian ini bertujuan untuk menilai tingkat kematangan SIMPUS di organisasi menggunakan kriteria penilaian tools audit aplikasi SPBE berdasarkan domain fungsionalitas dan kinerja. Tujuan utamanya adalah untuk mengetahui kondisi tingkat kematangan SIMPUS di organisasi serta memberikan rekomendasi berdasarkan temuan menggunakan pemetaan COBIT 5 terpilih. Tahapan dilakukan dengan inisiasi awal untuk mengidentifikasi masalah, menentukan partisipan dalam proses penilaian dan pengisian kuisioner kriteria penilaian, data collection dilakukan melalui observasi, wawancara, dan pengisian kuisioner, selanjutnya process attribute level untuk melakukan perhitungan tingkat kematangan dan dilanjutkan dengan membuat rekomendasi berdasarkan temuan yang ada. Berdasarkan hasil perhitungan nilai kapabilitas setiap tahapan yang telah dilakukan, SIMPUS berada pada tingkat kematangan 2 atau Terkelola. Rekomednasi yang diebrikan berdasarkan temuan mengacu pada COBIT 5 domain DSS01 (Manage Operations) dan DSS03 (Manage Problem) melalui pemetaan yang dilakukan, sesuai dengan temuan yang ada pada tahapan pengoperasian dan pemeliharaan untuk meningkatkan kinerja layanan SIMPUS yang berjalan di organisasi.

Kata Kunci*—*SIMPUS, Puskesmas, Tingkat Kematangan, COBIT 5

INTRODUCTION

Currently, information technology used by every field and organization aspect. The application of information technology in government is very important in supporting the effectiveness and efficiency of public service[1]. Information technology is currently a tool for supporting business processes of government organization in order to obtain relevant and accurate information[2]. One of local organization that used information management system is Public Health Centre I Karangpucung with strategic goals is to improve service through the utilization of IT in business processes to accelerate services effectively and efficiently by implementing Information Management System Public Health Centre (SIMPUS).

Information Management System Public Health Centre (SIMPUS) an application used by Public Health Centre in processing data ranging from patient registration to reporting. Input data is later used in reporting by grouping according to need such as daily visits, types of diseases, payments and other

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

reports needed[3]. SIMPUS is used as a form of e-government implementation and helps basic health services in the community[4]. However, the implementation of SIMPUS has several problems where SIMPUS does not produce the required report data, SIMPUS inaccessible and input must be done twice so this is can impact on data accuracy which can cause error when inputting data and result in a higher workload for officer. Another problem is there are no guidelines or Standard Operational Procedure when problems occur. This is inversely proportional to the strategic goals of the organization in improving services by utilizing information technology in its services, with this system management must be carried out in overcoming existing problems so that the use of information technology can provide benefits and contributions in meeting the goals to be achieved based on the vision and mission of the organization.

Audit of information system are carried out to prove that organizations or companies have carried out procedures and run properly, good IT governance can help organization in the process of achieving organization goals[5]. The assessment criteria of SPBE application audit tools is used in this research according to PermenPANRB Number 59 of 2020 concerning Monitoring and Evaluation of Electronic-Based Information System, the regulation is stipulated in article 8 paragraph 2.

SPBE application audit tools is an instrument in conducting audits on SPBE application conducted by BRIN for government agencies ranging from central, provincial to district or city. This audit tools is a web-based instrument that is used as a standard in assessing SPBE applications, in these tools also there are assessment criteria that are used as guidelines in conducting SPBE application audit. Meanwhile, COBIT (Control Objective for Information and related Technology) 5 is used in making recommendations because COBIT 5 is general, so that it can be applied as a reference for various organization ranging from commercial, non-profit, and government companies[6].

LITERATURE STUDY

A. Information System

Information system are a combination of modules that are mutually organised and come from components that are interrelated with hardware, software, humans and based on computer devices that interact and relate to each other in processing data into information used in achieving organizational goals[7].

B. Information Management System Public Health Centre (SIMPUS)

SIMPUS is an information system specifically designed as a means of supporting public health centre management in integrating and processing patient data for both service and reporting purposes. SIMPUS aims to make it easier for public health centre management to make optimal use of existing data and information. The information contained in SIMPUS is patient registration data including biodata, medical records, and patient drug prescriptions. In addition, the purpose of SIMPUS is :

1. SIMPUS as the basis for health centre level planning.
2. SIMPUS as the basis used to prepare the implementation plan for the main activities of the health centre.
3. SIMPUS can be used as a basic parameter for monitoring and evaluating the implementation of key health centre activities, both Local Area Monitoring and Health Centre Certification.
4. SIMPUS as a tool to overcome any obstacles in the implementation of public health centre activities.

C. Audit

According to [8], Audit is an examination, accountability, monitoring or evaluation, whether an organization's processes or operations have run in accordance with established standards or plans. Audits are carried out in the context of the verification process that the audit subject has been carried out in accordance with approved and accepted standards, regulations and practices[9].

D. Audit of Information System

Information system audit is the process of assessing existing evidence to determine a computer system has the ability to secure assets, maintain data and support organizational goals with existing resources effectively and efficiently[9]. Information System audit is an evaluation of the assessment of information system controls that are adequate based on asset security, data integrity, effectiveness, efficiency in order to support the achievement of organizational goals[10]. Information system audit play an important role in supporting the achievement of organizational goals. The objectives of information system audits are grouped into two main aspects of IT governance[9]:

1. Conformance
   In this objective, the information system audit focuses on obtaining conclusions from the suitability aspects, such as Confidentiality, Integrity, Availability and Compliance.
2. Performance
   In this objective, the information system audit focuses on obtaining conclusions from performance aspects in the form of Effectiveness, Efficiency and Reliability.

E. COBIT 5 (Control Objectives for Information and Related Technology 5)

COBIT 5 is a framework that used as a reference for organization in achieving organizational goals through organizational IT governance and management. With COBIT 5, it is expected to help organization in obtaining optimal value from the use of information technology while maintaining continuity between the benefits and risks generated and still utilising existing resources[10]

F. COBIT 5 Principles

COBIT 5 has Goal Cascading as a principle used in translating the needs of stakeholders into specific, actionable and adapted to the context of the enterprise or organizational goals. In its implementation, COBIT 5 has 5 main principles, namely[11]. The following figure 1 lists the five COBIT 5 principles :

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

Fig. 1. COBIT 5 Principles

1. Meeting Stakeholder Needs
   This principle creates a company to provide business value for stakeholders by leveraging IT, in accordance with organizational goals by increasing effectiveness and efficiency in the use of existing resources for the better.
2. Covering the Enterprise End-to-End
   This principle explains that COBIT 5 integrates corporate IT management with corporate governance because in the process COBIT 5 covers all aspects of the company. In addition, COBIT 5 is also based on the existing enablers of corporate IT governance and management and in accordance with the company's point of view, based on the consideration of each entity in the company that is irrelated.
3. Applying a single, integrated framework
   This principle explains that COBIT 5 is a framework that is relevant in the governance and management of organizational IT and can be aligned with other frameworks.
4. Enabling a holistic approach
   In corporate IT governance and management, a suitable and comprehensive approach is needed in order to obtain an effective and efficient system, namely by considering each interrelated component. In its application, each enabler affects other enablers so that it is a determinant of the success of COBIT 5 implementation.
5. Separating Governance From Management
   In this principle clearly distinguishes between governance and enterprise IT management both in terms of activities and existing organizational structures. Governance ensures that stakeholder need, based on conditions and options are evaluated in order to get the balance of organizational goals achieved in accordance with existing agreements. While management is planning, building, running and monitoring activities in accordance with the direction that has been made by stakeholders to obtain compant goals.

G. Process Assessment Activities COBIT 5

The series of methods carried out in the analysis of IT governance uses a series of Assessment Process Activities which are stages in the capability level assessment process for organization [12], the series consist of:

1. Initiation
   At this stage, primary data and evidence are obtained with the intention of explaining the results of the identification carried out on the object, so that the domains will be used in the assessment process can be identified.
2. Planning the Assessment
   At this stage, determining respondents as participants who will be involved and all activities that support the assessment process.
3. Briefing
   At this stage, explaining and conducting direction regarding what processes are carried out in conducting a maturity level assessment of the parties involved. These parties are respondents involved in the assessment process.
4. Data Collection
   At this stage, evidence is collected in the form of data that will be carried out in the capability level assessment process. The data can be in the form of results from observations, interviews, and questionnaires.
5. Data Validation
   At this stage, validate the data and evidence obtained to ensure that it matches the facts and conditions that exist in the object.
6. Process Attribute Level
   At this stage, existing evidence in the form of documents is identified and collected based on data that has been validated from each level from the precious stage so that it can be seen to what extent the maturity level of each process is.
7. Reporting the Result
   At this stage, reporting the result of the maturity level assessment obtained and providing recommendations that can be used as a reference for improvement.

H. COBIT 5 Domains

COBIT 5 has 5 main domains and 37 sub-processes from each domain[13], as in Figure 2 :

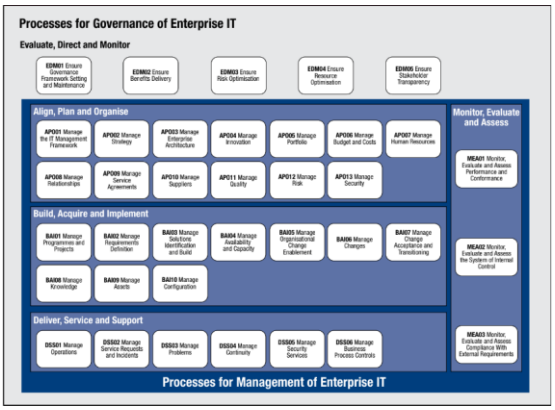

Fig. 2. COBIT 5 Domains

1. EDM (Evaluate, Direct and Monitor)
   In this domain, it is a stage to evaluate and

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

monitoring existing conditions in accordance with the needs of stakeholders so that it can be ensured that is in accordance with organizational goals. In this domain there are 5 sub-processes.

2. APO (Align, Plan and Organise)
   In this domain is a process for aligning, planning and organising within the organization. In this domain, it explains the alignment of IT so that it can be maximally utilised. In this domain there are 13 sub-processes in it.
3. BAI (Build, Acquire and Implement)
   This domain are the stages of building, designing and implementing the identification of the organization's IT need in its business processes. There are 10 sub-processes in the BAI domain.
4. DSS (Deliver, Service and Support)
   This domain focuses on the support and fulfilment of IT services to user perceptions. The DSS domain includes IT delivery responses and responses made when incidents occur, besides this domain guarantees and supports business processes to be maintained. This domain has 6 sub-processes.
5. MEA (Monitor, Evaluate and Assess)
   This domain aims to analyse by assessing compliance with existing IT governance regulations. The assessment process is carried out to determine the ability of existing system to achieve organizational goals. In the MEA domain there are 3 sub-processes.

I. RACI Chart

In determining a decision in the organization, it is necessary to group based on its importance. RACI Chart (Responsible, Accountable, Consulted and Informed) Chart is a matrix that explains the roles and responsibilities of each party in completing an organizational business process[13]. RACI Chart DSS domain as shown in Figure 3.

DSS01 RACI Chart

Key Management Practice	Board	Chief Executive Officer	Chief Financial Officer	Chief Operating Officer	Business Executives	Business Process Owners	Strategy Executive Committee	Steering (Programmes/Projects) Committee	Project Management Office	Value Management Office	Chief Risk Officer	Chief Information Security Officer	Architecture Board	Enterprise Risk Committee	Head Human Resources	Compliance	Audit	Chief Information Officer	Head Architect	Head Development	Head IT Operations	Head IT Administration	Service Manager	Information Security Manager	Business Continuity Manager	Privacy Officer
DSS01.01 Perform operational procedures.																					A		C	C	C	
DSS01.02 Manage outsourced IT services.											I							A			R					
DSS01.03 Monitor IT infrastructure.				I		C					I						C	I		C	A		C	C		
DSS01.04 Manage the environment.						I					C	A				C	C	C	I	C	R		I	R	I	
DSS01.05 Manage facilities.						I					C	A				C	C	C	I	C	R		I	R	I	

Fig. 3. RACI Chart DSS Domain.

1. Responsible with code R
   Is a party who has a jobdesk to carry out work and act as a task executor.
2. Accountable with code A
   Is the party who acts as the person in charge of problem that is being worked on. In addition, Accountable also has the authority to make decisions.
3. Consulted with code C
   Is a party who has a contribution and acts in providing opinions and input in a job.
4. Informed with code C
   Is a party who must be informed about the decisions that have been made and the actions and results that exist.

J. Electronic-Based Government System Applications (SPBE)

SPBE application is a programme in governance that utilises information technology in order to accelerate public service and create effective, efficient, open, trusted and accountable governance[14].

K. SPBE Application Audit Tools

The SPBE application audit tools is a tools in conducting an assessment of the SPBE application. This tool is owned by BRIN which is used as a standard in the audit process of SPBE implementing agencies starting from central, provincial and city or district level government agencies. The SPBE application audit tool has 3 domains, namely Governance, Management, Functionality and Performance, each of which has stages and standard indicators[15].

L. Domain SPBE Application Audit

SPBE application audit domain consist of 3 domain[15], as shown in Figure 4 :

Domain 3	**Fungsionalitas dan Kinerja**			
Tahapan 1	**Perencanaan**			
Aktivitas 1	**Persyaratan Layanan (*Business Requirement*)**			
Indikator 51	Bagaimana proses bisnis aplikasi saat ini?	Undangan/Notulensi rapat pelaksanaan kegiatan	1. SRS/Software Requirement Specification; 2. Kebijakan/Pedoman Pengembangan Aplikasi	Gambaran dan penjelasan proses bisnis aplikasi sesuai konten kebijakan
Indikator 52	Bagaimana proses pengusulan layanan/fungsi pada awal perencanaan aplikasi?	Undangan/Notulensi rapat pelaksanaan kegiatan	1. SRS/Software Requirement Specification; 2. Kebijakan/Pedoman Pengembangan Aplikasi	Sistem proposal perencanaan aplikasi sesuai konten kebijakan
Indikator 53	Jelaskan secara rinci kebutuhan dan pemetaan hak akses pengguna beserta perannya (user role management)!	Undangan/Notulensi rapat pelaksanaan kegiatan	1. SRS/Software Requirement Specification; 2. Kebijakan/Pedoman Pengembangan Aplikasi	User management module sesuai konten kebijakan
Indikator 54	Jelaskan ruang lingkup kebutuhan fungsional dan non-fungsional dari aplikasi!	Undangan/Notulensi rapat pelaksanaan kegiatan	1. SRS/Software Requirement Specification; 2. Kebijakan/Pedoman Pengembangan Aplikasi	Gambaran dan penjelasan ruang lingkup kebutuhan fungsional dan non-fungsional aplikasi sesuai konten kebijakan

Fig. 4. Assessment Criteria Funcionality and Performance Domain

1. Governance Domain
   This domain consist of 1 Stage, 3 Activities namely ICT Arrangement, ICT Governance Direction and ICT Control and is divided into 6 indicators.
2. Management Domain
   This domain consist of 3 stages which are divided into 8 activities with 43 indicators.
3. Functionality and Performance Domain
   This domain consist of 4 stages, each stage consists of 3 activities with total 62 indicators.

M. Indicator Table Assessment Maturity Level

In determining the maturity level of an application, tehre are several requirement that must be met in assessing its maturity level and described as follow Figure 5 [15] .

Nilai Kematangan

Domain	Tahapan	Nilai Kematangan				
		1	2	3	4	5
Tata Kelola	Tata Kelola					NK 3
Manajemen	1. Perencanaan TIK					NK 3
	2. Pengembangan TIK				NK 3	NK 3
	3. Pengoperasian TIK				NK 3	NK 3
	4. Pemantauan TIK				NK 3	NK 3
Fungsionalitas dan Kinerja	1. Perencanaan			NK 3	NK 3	NK 3
	2. Pengembangan	NK 1	NK 2	NK 3	NK 3	NK 3
	3. Pengoperasian	NK 1	NK 2	NK 3	NK 3	NK 3
	4. Pemeliharaan			NK 3	NK 3	NK 3

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

Fig. 5. Capability Level based on SPBE application audit tools

Maturity Level consist of 5 level [16], as in Figure 6.

Fig. 6. 5 Levels of Maturity Level

- METHODOLOGY

The research stages will explain in this section, in this research using the assessment process activities recommendation by ISACA. The following research steps carried out in Figure 7:

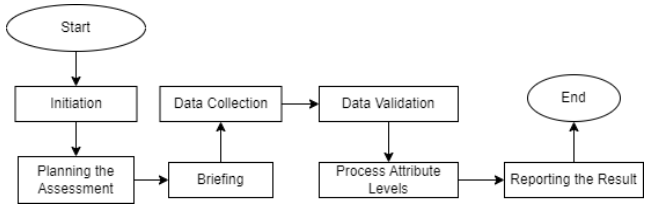

Fig. 7. Flowchart research

A. *Initiation*

The first stage, identification is carried out in the form of information on Public Health Centre Karangpucung I, the data collected is data related to the maturity level assessment. At this stage it is useful in determining the process that will be selected during research.

B. *Planning the Assessment*

The second stage is Planning the Assessment, in this stage data collection is carried out using a questionnaire whose result are developed from the selected process activities and determine the participants involved in maturity level assessment process. This questionnaire is explained in this following explanation:

1. Questionnaire
   Questions or statements based on the assessment criteria in the SPBE application audit tools. In the activity statement in this process, it is used as a statement or question so that the results can be known about the existing maturity level.
2. Purposive Sampling
   Determination of respondents based on purposive sampling techniques based on COBIT 5 RACI Chart. The role of the COBIT 5 RACI Chart table is mapped and adjusted to the IT manager in the organization.

C. *Briefing*

Third stage is Briefing, at this stage, explanations were made to participants so that they knew and understood the inputs, processes and outputs produced in the research. In this stage, the particiapnts chosen were medical record officers who run the application and the Health Resources sector at the Cilacap Regency Health Officer as the manager of the SIMPUS application.

D. *Data Collection*

Fourth stage is Data Collection, at this stage, data collection carried out. This stage intended to make it easier to find evidence of the process performance assessment carried out. The information is obtained from the results of interviews, observations dan questionnaires conducted on participants.

E. *Data Validation*

Fifth stage is Data Validation, at this stage checking is carried out based on the results of the questionnaire conducted by collecting data from the questionnaire with existing facts in the organization. Validation of existing data in the form of output documents and work products based on the selected stage process activities.

F. *Process Attribute Levels*

Sixth stage is process attribute level, at this stage calculating are carried out on all selected domain processes. This stage is carried out by looking at the existing process, has fulfilled the requirements that must be met at each level based on the provisions and results of the assessment of each existing indicator. Fulfilment based on evidence of work products and selected outputs so that assessment results can be given.

G. *Reporting the Result*

Last stage is reporting the result, at this stage reporting the results of the maturity level research on the selected process is carried out. The reporting stage is carried out after obtaining the results of the maturity level of the application being audited and obtaining findings and recommendations for improvement based on these findings. Reporting research results based on audit results and providing recommendations based on COBIT 5 by aligning and adjusting to the SPBE application audit tools.

RESULT AND DISCUSSION

A. *Initiation*

Karangpucung Health Centre I has a strategic goal of improving services by utilising information technology. Based on this goal, problem identification was carried out on SIMPUS user, namely medical record officers, in addition to this stage also observing the current condition of the application. Based on the existing problems in SIMPUS related to the system that runs less smoothly so that it hampers the reporting process and need to input twice so that data duplication often occurs,

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

another problem is when a problem occurs the handling of the problem is not optimal due to lack of coordination and there is no SOP when SIMPUS experiences problems. After the initial initiation, it is necessary to asses the functionality and performance of SIMPUS, so that it can be known to what extent the maturity level of the SIMPUS based on its functionality and performance.

B. Planning the Assessment

At this stage, an assessment plan is carried out by compiling a questionnaire and identifying the participants selected in measuring the maturity level. The selected participants are employees and fields that are directly related using the application as well as those responsible for managing the SIMPUS application at Karangpucung Health Centre I and mapped into COBIT 5 unit table. The list of participants who have roles is described in Table 1.

TABLE I. CONVERSION IN COBIT 5 UNITS

No	Participants	
	Job title/Position	***Unit COBIT 5***
1.	Head of Cilacap District Health Office	Chief Executive Officer
2.	Head of Health Resources Division of the Health Office	Business Process Owner
3.	Sub-coordinator of Human Resource Management, Organizational Development and Health Information System	Head of Development & Head of IT Operations
4.	Head of TU Public Health Centre	Service Manager
5	Karangpucung Health Centre I Medical Record Staff	Head IT Administration & Chief Information Officer

C. Briefing

At this stage, the participants were explained about the SPBE application audit tools, the function of the functionality and performance domain and the stages that will be carried out during the assessment process. This stage described in Table 2.

TABLE II. BRIEFING STAGE

Briefing Stage		
Activities	***Participants***	***Method***
Interview and observation	Participants Researcher	Discussion and Question and Answer
Collecting of supporting documents for assessment	Participants Researcher	Discussion
Questionnaire analysis and calculation	Researcher	Data Analysis and Recapitulation
Reporting the Results of the assessment	Researcher	Submit the results of the maturity level assessment

D. Data Collection

At this stage, questionnaires were filled at 4 stages in accordance with the functionality and performance domains in assessment criteria of SPBE application audit tools. These stages consist of Planning, Development, Operations and Maintenance. Based on the identification carried out in accordance with the COBIT 5 unit conversion table, the participants given in filling out the questionnaires are the sub-coordinator of human resources management, organizational development and health information system as the SIMPUS developer.

TABLE III. RESULT OF COMPLETING THE ASSESSMENT CRITERIA QUESTIONNAIRE BEFORE VALIDATION

Domain **Functionality and Performance**		
Stages 1	**Planning**	
Activities 1 Business Requirement	**Status**	**Score**
Indicator 51	Implemented and Managed	2
Indicator 52	Implemented and Managed	2
Indicator 53	Implemented and Managed	2
Indicator 54	Implemented and Managed	2
Indicator 55	Implemented and Managed	2
Indicator 56	Implemented and Managed	2
Activities 2	**Software Requirement**	
Indicator 57	Implemented and Managed	2
Indicator 58	Implemented and Managed	2
Indicator 59	Implemented and Managed	2
Indicator 60	Implemented and Managed	2
Indicator 61	Implemented and Managed	2
Activities 3	**Software Design**	
Indicator 62	Implemented and Managed	2
Indicator 63	Implemented and Managed	2
Indicator 64	Implemented and Managed	2
Indicator 65	Implemented and Managed	2
Indicator 66	Implemented and Managed	2
Indicator 67	Implemented and	2

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

	Managed	
Stages 2 Development		
Activities 1	**Software Implementation**	
Indicator 68	Implemented, Managed and Defined	3
Indicator 69	Implemented, Managed and Defined	3
Indicator 70	Implemented, Managed and Defined	3
Indicator 71	Implemented, Managed and Defined	3
Indicator 72	Implemented, Managed and Defined	3
Indicator 73	Implemented, Managed and Defined	3
Indicator 74	Implemented, Managed and Defined	3
Activities 2	**Testing**	
Indicator 75	Implemented and Managed	2
Indicator 76	Implemented and Managed	2
Indicator 77	Implemented and Managed	2
Indicator 78	Implemented and Managed	2
Indicator 79	Implemented and Managed	2
Indicator 80	Implemented and Managed	2
Activities 3	**Installation**	
Indicator 81	Implemented	1
Indicator 82	Implemented, Managed and Defined	3
Indicator 83	Implemented, Managed and Defined	3
Indicator 84	Implemented, Managed and Defined	3
Indicator 85	Implemented, Managed and Defined	3
Stages 3 Operations		
Activities 1	**Software Usage**	
Indicator 86	Implemented, Managed and Defined	3
Indicator 87	Implemented, Managed and Defined	3
Indicator 88	Implemented, Managed and Defined	3
Indicator 89	Implemented, Managed and Defined	3
Activities 2	**Software Support Infrastructure**	
Indicator 90	Implemented	1
Indicator 91	Implemented	1
Indicator 92	Implemented	1
Indicator 93	Implemented, Managed and Defined	3
Indicator 94	Implemented, Managed and Defined	3
Activities 3	**Network Utility/Performance**	
Indicator 95	Implemented and Managed	2
Indicator 96	Implemented	1
Indicator 97	Implemented	1
Indicator 98	Implemented, Managed and Defined	3
Indicator 99	Implemented, Managed and Defined	3
Stage 4 Maintenance		
Activities 1	**Software Maintenance**	
Indicator 100	Implemented	1
Indicator 101	Not Implemented	0
Indicator 102	Implemented	1
Indicator 103	Implemented, Managed and Defined	3
Indicator 104	Implemented	1
Activities 2	**Software Configuration Management**	
Indicator 105	Implemented, Managed and Defined	3
Indicator 106	Implemented, Managed and Defined	3
Indicator 107	Implemented, Managed and Defined	3
Indicator 108	Implemented	1
Activities 3	**Software Support Infrastructure Maintenance**	
Indicator 109	Not Implemented	0
Indicator 110	Not Implemented	0
Indicator 111	Not Implemented	0
Indicator 112	Not Implemented	0

Based on data collection table each stage got 34 total scores on planning stage, 46 total scores on development stages, 31 total scores on operations stage, and 16 total scores on maintenance stage. This total in every stages are purely answers from participants before validation.

E. Data Validation

This stage is data validation stage, filling in each question is carried out in accordance with assessments criteria for the SPBE application audit tools, verification process is carried out by aligning each answer with existing evidence in the form of

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

documents, outputs or work products. The process is carried out by providing a checklist on each answer given by the participants. Each level of answer is expressed with the status "Not Implemented" for capability level 0, "Implemented" for capability level 1, "Implemented and Managed" for capability level 2, and "Implemented, Managed and Defined" for capability level 3. The assessment status is adjusted to the available evidence and can be upgraded if the answer has met the previous criteria and based on the assessment criteria is at the level above, as well as the status can be lowered if the evidence provided does not meet the requirements at that level.

Validation data each stages, shown in below this section start from planning stage:

TABLE IV. TOTAL SCORE PLANNING STAGE AFTER VALIDATION

Status	Planning Stage						Total
	1	Indicator	2	Indicator	3	Indicator	
Not Implemented	0		0		0		
Implemented	1		1		1		
Implemented and Managed	2	6	2	5	2	6	34
Implemented, Managed and Defined	3		3		3		
Total score planning stage							34

After validation, the final total score at the planning stage is 34 out of maximum total score of 51.

TABLE V. TOTAL SCORE DEVELOPMENT STAGE AFTER VALIDATION

Status	Planning Stage						Total
	1	Indicator	2	Indicator	3	Indicator	
Not Implemented	0		0		0		
Implemented	1		1	6	1	1	7
Implemented and Managed	2		2		2		
Implemented, Managed and Defined	3	7	3		3	4	33
Total score planning stage							40

After validation at the development stage on Table 5. There are 6 indicators in activity 2 (Testing) that are decreased because based on the validation carried out there is no evidence in the policy or application development guidelines so that it need to be lowered to the "Implemented" status. After decreasing the total scores obtained at the development stage is 40 from the initial score obtained before validation, there is a difference of 6 point at this stage.

TABLE VI. TOTAL SCORE OPERATION STAGE AFTER VALIDATION

Status	Planning Stage						Total
	1	Indicator	2	Indicator	3	Indicator	
Not Implemented	0		0		0		
Implemented	1		1	3	1	2	5
Implemented and Managed	2		2		2	1	2
Implemented, Managed and Defined	3	4	3	2	3	2	24
Total score planning stage							31

Based on Table 6, after validation total score at the operations stage is 31 which means there is no difference before and after validation at this stage.

TABLE VII. TOTAL SCORE MAINTENANCE STAGE AFTER VALIDATION

Status	Planning Stage						Total
	1	Indicator	2	Indicator	3	Indicator	
Not Implemented	0	4	0		0	4	
Implemented	1		1	3	1		3
Implemented and Managed	2		2		2		
Implemented, Managed and Defined	3	1	3	1	3		6
Total score planning stage							9

Based on Table 7, after validation there are indicators that do not meet the requirements of the documents required as evidence. So that the status is reduced to "Not Implemented" for indicator 100, indicator 101, and indicator 102, "Implemented" for indicator 105 and indicator 106. That means at the maintenance stage that has been validated, the total score is 9 from the previous score of 16, there is a difference of 7 points before and after validation at the maintenance stage.

F. Process Attribute Level

Maturity level assessment is carried out at this stage after obtaining the total score of each stage that has been analysed and validated. The calculation process is carried out by dividing the total value obtained by the stage by the number of indicators in each stage so that the maturity level is obtained at the stage.

1) Capability Level Planning stage

Planning stage has 34 total score. Furthermore, at the Planning stage there are 3 activities, each of activities contains of 6 indicators in activity 1, 5 indicators in activity 2 and 6 indicators in activity 3. At this stage total score of 34 is divided by the number of indicator or questions totalling 17, so that a score 2 is obtained, which means at the palling stage the capability level is at Capability Level 2.

2) Capability Level Development stage

Total score at development stage are 40. At this stage there are 18 indicators which are divided into 3 activities with details of 7 indicators in activity 1, 6 indicators in activity 2 and 5 indicators in activity 3. So that the capability level assessment obtained a score of 2,22. Which means the development stage is at Capability Level 2.

3) Capability Level Operations Stage

After the calculation, total score at operations stage is 31, then score is divided by 14 indicators with details of 4 indicators in activity 1, 5 indicators in activity 2, and 5 indicators in activity 3 so this stage get a score of 2,21 which means operation stage at Capability Level 2 based on the assessment results.

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

4) Capability Level Maintenance Stage

After the calculation is carried out at the maintenance stage, a score of 9 is obtained, the scores is divided by 13 indicators which are divided into 5 indicators in activity 1, 4 indicators in activity 2 and 4 indicators in activity 3. The result obtained after total score is divided by the number of existing indicators is 0,69, which means that maintenance stage is at Capability Level 0.

G. Reporting the Results

- Maturity Level

After assessing the capability level at each stage by calculating the level obtained on each indicator in the existing stages, it is known that the capability level at each stage is shown in Table 8 :

TABLE VIII. CAPABILITY LEVEL EACH STAGE

Maturity Level Functionality and Performance Domain		
Stage	**Level**	**Capability Score**
Planning	2	2
Development	2	2,22
Operations	2	2,21
Maintenance	0	0,69

Based on Tabel 8,

1) Planning stage gets score of 2, which means it is at Capability Level 2.

2) Development Stage gets score of 2,22 and this stage at Capability Level 2.

3) Operation stage get results with a score of 2,21 and enter into Capability Level 2.

4) Maintenance stage, the results are in the form of a score 0,69 meaning that this stage is at Capability Level 0.

Based on the provisions and requirements in determining the maturity level in the SPBE application audit tool, it means that SIMPUS is at Maturity Level 2 or "Managed" with requirements that have been met, namely at the Development and Operations Stages at maturity level 2.

- Gap Analysis

An analysis of the capability level obtained from the stages that have been calculated in the functionality and performance domains is carried out. Based on the results of the interview, the expected capability level is capability level 3. So that the gap required in echieving the expected capability level is known. The gap results from each stage are shown in Table 9.

TABLE IX. GAP ANALYSIS

Stage	**Current Capability Level**	**Expected Capability Level**	**Gap**
Planning	2	3	1
Development	2,22	3	0,78
Operation	2,21	3	0,79
Maintenance	0,69	3	2,31

- Findings

Based on the results of the calculation of the capability level that has been carried out, further analysis of the existing findings is carried out, the findings can be in the form of output, work products or documentary evidence. Analysis of findings is carried out on activities that contain indicators that do not have documentary evidence, outputs, or work products and tehir implementation is limited to meeting/invitations. The results of the findings along with the status and information on the finding indicator are explained as follows.

a) Findings in Operations Stage

TABLE X. FINDINGS ON OPERATION STAGE

Stage Operations			
Activities 1	**Indicators**	**Status**	**Description**
	Indicator 90	Implemented	Minutes/Meeting invitation
	Indicator 92	Implemented	Minutes/Meeting invitation
Activities 3	Indicator 97	Implemented	Minutes/Meeting invitation

Based on Table 10, after analysing and validating activity 1 and activity 3 in SIMPUS management when incidents or problem occur in the operations of the application, there is no evidence of work product or output in its operation, to deal with existing problems only through meeting minutes or meeting invitations.

b) Findings in Maintenance Stage

TABLE XI. FINDINGS ON OPERATION STAGE

Maintenance Stage			
Activities 1	**Indicator**	**Status**	**Description**
	Indicator 100	Not Implemented	-
	Indicator 101	Not Implemented	-
	Indicator 102	Not Implemented	-
	Indicator 104	Not Implemented	-
Activities 3			
	Indicator 109	Not Implemented	-
	Indicator 110	Not Implemented	-
	Indcator 111	Not Implemented	-
	Indicator 112	Not Implemented	-

Based on Table 11, after analysis and strengthened by the absence of evidence, finding were obtained where there were no documents, output or work products carried out in the maintenance stage of Activity 1 with 4 indicators and Activity 3 with 4 indicators also.

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

- Recommendation

Next, the process providing recommendations for improvement is carried out to the stages that need to be improved. In providing recommendations based on these findings, it is focused on the stages of operation and maintenance due to applications that have been and are running. The process of providing recommendation is given based on the best practice output in the selected COBIT 5 domain.

1) Mapping COBIT 5

Before determining the selected domain, a Goal Cascading analysis was carried out, which at this stage determined the organizational's goals (EG), IT Goals (IT-Related Goals) and IT processes so as to produce the selected domain. The optimisation of business process functionality in the Internal Balance Scorecard (BSC) describes the "Primary" relationship based on organization's objective, namely on the realisation of benefits and optimising existing resources.

After obtaining the Enterprise Goals and mapped back into IT Related Goals of COBIT 5, the process determining IT-Related goals is carried out by referring to goals that have a strong relationship or "Primary" which is IT-RG 01 Alignment of IT and business strategy, IT-RG 07Delivery of IT Service in line with business requirements, IT-RG 08 Adequate use of applications, information and technology solutions, IT-RG 09 IT Agility, and IT-RG 12 Enablement and support of business processes by integrating application and technology into business processes. After obtaining the IT-Related Goals, further mapping is carried out to the domains in COBIT 5 where the selected domain is a domain that has a close relationship with the P "Primary" symbol so that the results of the COBIT 5 domain mapping are obtained.

After obtaining the mapping of IT-RG with the COBIT 5 domain, the DSS domain was chosen, DSS domain is suitable for use so that selected domain processes are determined, namely DSS01 (Manage Operations) and DSS03 (Manage Problems) because in the DSS01 domain where the purpose of the process is to coordinate and implement operational procedures in the provision of information technology services including the implementation of standard operating procedures and the implementation of monitoring processes. In addition, DSS03 domain was chosen because in this domain it has the process objective of identifying and classifying problems and the root causes of problems and providing timely resolutions in preventing recurring events [13].

2) Recommendation in Operations Stage

Refer to the COBIT 5 domain DSS03(Manage Problems) some recommendation that can be given to these activities are to creation of documents containing:

a) In accordance with indicator 90 and referring to the DSS03 domain, identifying problems with work products in the sub domain can be done by taking steps to classify problem where it is necessary to determine the priority level of the problem and identifying the root cause of problem by accessing existing data, then identifying related groups such as hardware, network connections, applications and supporting software after it is known that a list of problems that have occurred along with their status is made so that the resolution of each problem that will and has occurred is known.

b) In accordance with indicator 92, where in this indicator manager has not documented the procedure for resolving problems in the absence of the guidelines in problem solving, this document is interrelated so that when a problem occurs the manager can see a record of the existing problem list so that it can be handled quickly and when the problem that arises is a new problem there are guidelines for identifying problems based on existing guidelines.

c) In accordance with indicator 97 where the manager need to be pro-active in carrying out problem management by creating documentation and records containing monitoring report on any existing problems, this document related to the results of monitoring changes in problems and in the documentation process it is necessary to identifying sources that can trigger problems on an ongoing basis. Provide records of activities in handling problems that occur independently not only based on reports received.

3) Recommendation in Maintenance Stage

Refer to the COBIT 5 domain DSS01 recommendation that can be given where this domain focuses on implementing operational procedures in IT delivery. Recommendations that can be given are:

a) In accordance with indicator 100 in the scope of the application maintenance process, it is necessary to create a document containing the scope of application maintenance, ensuring that application operations do not experience problems, planning independent audits of application operation to ensure that application functions and performance can be carried out properly, in the document given the scope of application monitoring both monitoring current status and the scope of monitoring device maintenance in the form of updating application versions and databases, checking the feasibility of computers and components, network performance, servers and other system support hardware and software.

b) Based on indicator 101, recommendation can be given in the form of making documents on the allocation of Human Resources who carry out the application maintenance process and their responsibilities so that the application maintenance process can be maintained and sustainable. Monitoring IT infrastructure as a means of supporting application by keeping an operation log so that it can easily review and inspect operations and other activities within the scope of supporting operations.

c) In accordance with indicator 102 in the application maintenance schedule and documentation, it is necessary to make an application maintenance schedule, in application maintenance can be done after backing up data because backing up data is done in one week or one month. This document can later be used as one with the application maintenance scope document.

d) In indicator 104 in the application maintenance monitoring documentation process, a form can be provided to record staff who carry out monitoring along with the time and date and report on the results of the application

p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :

maintenance process.

e) In accordance with indicator 109 where the equipment maintenance procedures and records have not been implemented, the manager needs to make SOPs in managing application support equipment.

f) In accordance with indicator 110 in the maintenance process, reports need to be made based on the standards that have been made, namely application maintenance and supporting hardware. In making this identification, you can create a detailed document regarding the names of assets, prices, year of purchase, vendors, and asset eligibility.

g) Based on indicator 111 in carrying out maintenance records of components and spare parts, the manager needs to establish a policy where each SIMPUS user unit conducts documentation related to records of purchasing application support equipment so that it is easy to identify equipment.

h) In accordance with indicator 112, the manager needs to make SOPs in planning and scheduling spare parts replacement, with the existence of these policies it is also useful in supporting the running of the application, where supporting infrastructure must be maintained. The scheduling process can be done once a year by identifying the time of purchase of components so that their feasibility can be known. The parties responsible for the maintenance process of supporting infrastructure need to make SOPs in reporting equipment replacement.

CONCLUSION

Based on the results of the assessment carried out on the Information Management System Public Health Centre (SIMPUS) through the process of problem identification, data collection by observation, interviews and filling out questionnaires with validation of the questionnaire results carried out in accordance with the assessment criteria of the SPBE application audit tools that the current condition shows that it is at Maturity Level 2 or "Managed". With details of the capability level at the maintenance, planning and operation stages being at capability level 2 and the maintenance stage being at capability level 0. Based on the existing findings, recommendations are made using COBIT 5. The process of providing recommendations by mapping the Enterprise Goals which are then translated into IT-Related Goals so that the selected domains are obtained, namely the DSS01 (Manage Operations) and DSS03 (Manage Problems) domains which are still related to the findings obtained in handling problems that occur in the operation and maintenance of applications.

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p-ISSN 2301-7988, e-ISSN 2581-0588
DOI : 10.32736/sisfokom.xx.xx, Copyright ©2020
Submitted : , Revised : , Accepted : , Published :