Evaluative study of clinical management information system with cobit 4.1 approach in dokterku taman gading jember clinic

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Abstract. Utilization of a management information system in a clinic includes helping doctors in diagnosing based on evidence-base. The result of initial observation showed that this application is considered as the main resource that has strategic value to be able to manage information effectively and efficiently to achieve organizational goals. An evaluation is needed to measure maturity level of the implementation of the clinical management information system using the COBIT 4.1 framework. From the results of the study, this application has run in accordance with the business objectives of the organization in general. It can be seen from the maturity level calculation results which measures at level 3 (Defined), showing the condition in which the organization has formal and written standard procedures that have been socialized to all management and employees to be obeyed and run in daily activities.

1. Introduction

The role of technology for communication in business processes by companies or organizations in the form of services is increasingly felt the benefits that ultimately encourage the use of information technology with a guarantee of good service management into a basic need. On the other hand, the government as a regulator provides benchmarks for company implementation policies related to service and security management [1] especially for public service providers. By combining several service management and security standards that can be measured their achievement and readiness in an assessment index to help organizations know the level of service security management maturity in their organizations [2] in this case the Clinical Management information system at Dokterku Clinic.

The use of the clinical management information system application at Dokterku Taman Gading Clinic is expected to be able to improve health services to patients. With a clinical management information system, medical records and patient administration are carried out electronically. This will affect the faster patient registration services, patient examinations, drug services and cashier services. With the existence of valid data, the doctor will be very helpful in establishing the diagnosis based on evidence base. From the initial observations, this clinical management information system application has never been evaluated, whether it has been running in accordance with the expectations of the users or still needs further development. Clinical management information system application is considered as the main resource that has strategic value to be able to manage information effectively and efficiently

to achieve organizational goals. This evaluation is intended to measure the maturity level of the implementation of the clinical management information system using the COBIT 4.1 framework [3]. The maturity models are based on the premise that people, organizations, functional areas, processes, etc., evolve through a process of development and growth towards a more advanced maturity accomplishing several stages [4].

In measuring the level of maturity, it is necessary to know in advance the business objectives that are in line with the information technology objectives of the clinic [4]. From the results of interviews and discussions with clinical management it is known that business objectives that are relevant to the object of research are number 4 business goals, namely service improvement and customer orientation, and aligned information technology goals are number 3 goals (certainty of end user satisfaction with offers and levels service) and 23 (guarantee that information technology services are available as needed). With the knowledge of information technology objectives, researchers chose sub domain AI4 (Enable operation and use / operate and use it), DS4 (Ensure continuous service / Ensure service availability), ME1 (Monitor and valuate IT Performance / Monitor and IT Performance Evaluation), ME2 (Monitor and Evaluate Internal Control / Provision for IT management).

2. Working Methodelogy

The research concept framework is a sequence of research implementation as shown in Figure 1.

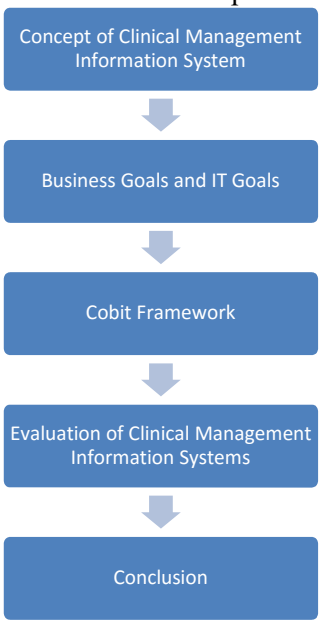

Figure 1. Methodelogy

The clinical management information system is a desktop-based application to assist in the management process of patient medical records and administration, which includes patient registration, medical records (patient examination records, diagnoses, actions, laboratories, prescriptions), cashiers, staffing and finance. This application has been integrated from one part to another [1] [2]. Determination of business objectives and IT objectives is intended to make it easier to determine the cobit domains and sub domains that correspond to each other. Business objectives that are relevant to the object of research are number 4 business goals, namely service improvement and customer orientation, and aligned information technology goals are number 3 goals (certainty of end-user satisfaction with offers and service levels) and 23 (assurance that information technology services available as needed) [4]. Within the cobit framework 4.1 there are 4 domains and 34 sub domains (IT processes). Sub domains selected in this study are sub domains that are relevant to business objectives and IT objectives, including, AI4, DS4, ME1, ME2 [6] [7]. From the selection of sub domains, a list of questions is made according to the control objectives of each sub domain. This list of questions will direct the value of maturity from the

application of clinical management information systems [1]. The conclusion is the final result of the study which shows the maturity level of the clinical management information system [2].

3. Result

Description of Detailed Control Objectives is needed as a control tool for each IT process so that its maturity can be measured.

Table 2. Level of IT Governance Maturity (Source: ITGI, 2007)

Maturiry Index	Index level
0 - 0.49	*0 – Non-Existent*
0.50 – 1.49	*1 – Initial/Ad Hoc*
1.50 – 2.49	*2 – Repeatable But Intutitive*
2.50 – 3.49	*3 – Defined Process*
3.50 – 4.49	*4 – Managed and Measureabel*
4.50 – 5.00	*5 - Optimized*

Non-existent, is a condition where the organization does not care about the importance of IT to be managed properly. Ad-hoc, is a condition where organizations reactively implement IT implementation and implementation in accordance with the sudden needs that exist without going through prior planning. Repeatable, is a condition where the organization has a repetitive pattern of IT governance, but its activities have not been formally defined and well documented so that it has not been consistently carried out. Defined, is a condition in which an organization has formal and written standard procedures that have been socialized to all levels of management and employees to be obeyed and carried out in daily activities. Managed, is a condition in which the organization has a number of quantitative indicators and measures that are objective objectives of the performance of each IT system implementation. Optimized, is a condition where organizations are considered to have implemented IT governance in accordance with "best practice".

1.1. Maturity Level Calculation Recapitulation Results

The results of the recapitulation of the calculation of the maturity of each control objective are as follows.

Table 2. Calculation of the maturity of each control objective

Number	Domain	Process	Control Objective	Maturity Level
1	PO	PO8	1	4,00
			2	3,50
			3	3,00
			4	4,00
			5	4,00
			6	3,50
		PO10	1	2,86
			2	3,00
			3	2,50
			4	3,00
			5	3,00
			6	1,67
			7	3,00
			8	3,25

2	AI	AI4	1	2,69
			2	1,60
			3	5,00
			4	2,00
3	DS	DS4	1	2,00
			2	5,00
			3	3,00
			4	2,50
			5	3,75
			6	4,00
			7	3,33
			8	5,00
			9	5,00
			10	5,00
4	ME	ME1	1	2,33
			2	3,00
			3	2,67
			4	4,00
			5	2,33
			6	3,00
5		ME2	1	3,00
			2	2,00
			3	2,00
			4	3,00

From the table, it can be concluded that the maturity level is as follows. There are five control objectives at level 5 (Optimized), namely the condition in which the Dokterku Taman Gading Clinic is considered to have implemented IT governance in accordance with "best practice". The Control Objectives are as follows.

- AI4.3 (Knowledge transfer to end users), meaning that management understands the importance of training needs to the user and is well planned in its entirety.
- DS4.2 (IT continuity plans), meaning that management understands the importance of sustainable service needs, understands the importance of IT infrastructure needs and understands the importance of being responsible for the smooth running of the IT process.
- DS4.8 (IT services recovery and resumption), meaning that management understands the importance of IT maintenance on a regular basis based on changes that occur in IT and business environment.
- DS4.9 (Offsite backup storage), meaning that backup data has been done automatically and scheduled into cloud storage.
- DS4.10 (Post-resumption review), meaning that management understands the importance of sustainable IT practices.
- There are three control objectives at level 4 (Managed), namely the condition in which the organization has a number of quantitative indicators and measures that are the objective objectives of the performance of each IT system implementation.
- DS4.6 (IT continuity plan training), meaning that management understands the importance of training in making IT plans on an ongoing basis.

- ME1.4 (Performance Assessment), meaning that management periodically reviews performance, analyzes irregularities and initiates corrective actions to improve IT services.
- DS4.5 (Testing of the IT continuity plan), meaning that management understands the need for testing of the smooth running of the IT process.
- There are nine control objectives at level 3 (Defined), namely the condition in which the organization has formal and written standard procedures that have been socialized to all levels of management and employees to be obeyed and carried out in daily activities.
- AI4.1 (Planning for operational solutions), meaning that management can understand the need for documentation, user manuals that can be understood by parts of the company.
- DS4.3 (Critical IT resources), meaning that management can specifically make the work environment respond to disruptions to IT services.
- DS4.4 (Maintenance of the IT continuity plan), meaning that management can define the need for maintenance of a sustainable IT plan.
- DS4.7 (Distribution of the IT continuity plan), meaning that management can identify the causes of IT service inconsistencies.
- ME1.2 (Definition and Collection of Data Monitoring), meaning that management can understand the importance of valid data reporting in order to measure the level of progress against the target.
- ME1.3 (Monitoring Method), meaning that management can identify performance, analyze deviations and initiate corrective actions as a solution.
- ME1.6 (Remedial Actions), meaning that management can identify corrective actions based on performance monitoring and track the results of actions taken.
- ME2.1 (Monitoring of Internal Control Framework), meaning that management can define the extent to which the Company continues to monitor, improve information technology control to meet organizational objectives.
- ME2.4 (Control Self-assessment), meaning that management understands and always strives to fulfill the completeness of internal control over the IT process.
- There are seven control objectives at level 2 (Repeatable), namely the condition in which the organization has a repetitive pattern of IT governance, but its activities have not been formally defined and well documented so that it has not been consistently done.
- AI4.2 (Knowledge transfer to business management), meaning that management can understand the importance of training programs as a means of knowledge transfer.
- AI4.4 (Knowledge transfer operations and support staff). meaning that the use of material and training programs has not been documented.
- DS4.1 (IT continuity framework), meaning that management can understand the risks that may arise due to IT operations, but do not have reporting standards.
- ME1.1 (Monitoring Approach), meaning that management can identify general monitoring frameworks and approaches to determine the scope of IT but have not been consistently implemented.
- ME1.5 (Board and Executive Reporting), meaning that management can identify the extent to which the Company reports to senior management, but in its implementation it is still not well scheduled.
- ME2.2 (Supervisory Review), meaning that management can define the extent to which the Company monitors and evaluates the efficiency and effectiveness of information technology controls for internal managerial, but not well documented.
- ME2.3 (Control Exceptions), meaning that management can identify the root cause of the underlying control error and report it to the person responsible, but there is no standard documentation.

The results of the questionnaire processing also show the maturity level of each selected IT process shown in the table below.

Table 3. Selected IT Process Maturity Levels

Domain	Process	Scope	Maturity Level	Condition
AI	AI4	Enable operation and use	2,822	Defined Process
DS	DS4	Ensure continuous service	3,858	Managed
ME	ME1	Monitor and Evaluate IT Performance	2,889	Defined Process
ME	ME2	Monitor and Evaluate Internal Control	2,500	Defined Process
Maturity Level			3,017	Defined Process

4. Conclusion

AI4 (Activate operation and use) 2,822 maturity level is at level 3 (Specified Process). There is a documented operational standard so that it is easily accessible, understood and accepted by users. S4 (Ensure continuous service) 3,858 maturities are at level 4 (Managed and Measured). the existence of a process and tool to measure the performance, capacity and use of a system that matches the business objectives of the health clinic. this measurement is in the form of a statistical pattern and shows clarity so that the user can understand it. ME1 (Monitor and Evaluate IT Performance) 2,889 maturities are at level 3 (Defined Process). The process of evaluating and monitoring IT performance is always carried out by management but still in each process so that it has not been integrated. ME2 (Monitor and Internal Control Evaluation) 2.5 maturity is at level 3 (Defined Process). there is internal monitoring and evaluation but still does not provide recommendations so that there will be better changes. From the results of the maturity level evaluation of the AI4 sub domain about operations and usage, ongoing services, supervision and evaluation of IT performance and internal controls, it can be concluded that the clinical management information system is in line with the business goals, namely level 3.

5. Acknowledgement

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