JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

IDENTIFICATION OF CAPABILITY LEVELS OF MEDIS CARE INFORMATION SYSTEM USING COBIT 2019

Ardian Pamungkas [1*], Nouvel Izza Fardana[1], Aris Puji Widodo[1], Kusworo Adi[1]
[1]Information Systems, Universitas Diponegoro
email: *ardian.pamungkas98@gmail.com

Abstract: In the health sector, information technology was initially used for exchanging information between patients and doctors, health services, and exchanging health documents. The aim of applying information technology to the health sector is to increase the effectiveness and efficiency of the performance of doctors and clinic staff. This research uses COBIT 2019 as a framework for evaluating information technology governance. Primary data is collected directly from the research subjects through observation and interviews, while secondary data is sourced from other materials, such as documents or websites related to the research subject. This research focuses on Risk Profile and I&T Related Issues, with domains: APO11 – Managed Quality, and APO13 – Managed Security. Through interviews and evaluation, each priority objective was found to be at capability level 2 with ratings of 100% and 86% respectively. There are no significant gaps between the current capability levels; both are at level 2.

Keywords: auditing; COBIT 2019; telemedicine

Abstrak: Di sektor kesehatan, teknologi informasi awalnya digunakan untuk pertukaran informasi antara pasien dan dokter, layanan kesehatan, dan pertukaran dokumen kesehatan. Tujuan penerapan teknologi informasi di sektor kesehatan adalah untuk meningkatkan efektivitas dan efisiensi kinerja dokter dan staf klinik. Penelitian ini menggunakan COBIT 2019 sebagai kerangka kerja untuk mengevaluasi tata kelola teknologi informasi. Data primer dikumpulkan langsung dari subjek penelitian dengan melakukan pengamatan dan interaksi langsung, sementara data sekunder diperoleh dari sumber lain. didapatkan dari jurnal atau situs website yang berkaitan dengan subjek penelitian. Penelitian ini berfokus pada Risk Profile dan I&T Related Issues, dengan domain : APO11 – Managed Quality, dan APO13 – Managed Security. Melalui wawancara dan evaluasi, setiap tujuan prioritas ditemukan berada pada level kapabilitas 2 dengan nilai masing-masing 100% dan 86%. Tidak ada kesenjangan signifikan antara tingkat kapabilitas saat ini; keduanya berada pada level 2.

Kata kunci: audit; COBIT 2019; telemedis

INTRODUCTION

Technological gains is very important for human life [1]. In the health sector, information technology was initially used for exchanging information between patients and doctors, health services, and exchanging health documents [1]. E-health is a public service in the form of an Information Technology application that is integrated with various functional components and supports the health sector, apart from that it also acts as a knowledge base. [2]. E-

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

health aims to address digital era challenges by enabling online consumer interaction [3].

The aim of applying information technology to the health sector is to increase the effectiveness and efficiency of the performance of doctors and clinic staff [4]. Effective governance management is essential for optimal use of information technology and resource management in line with established objectives. [5].

Information Technology Governa nce is one part of organizational governance which is tasked with ensuring that the implementation of information technology is in accordance with the organization's strategy and goals [6]. Regular evaluation is necessary to ensure effective governance, so that errors can be detected and corrected quickly if necessary [7]. There are many frameworks used to evaluate technology governance, such as COBIT, ISO, ITIL, TOGAF and others [8].

In previous study [9] conducted an analysis of the security level of an academic information system based on the ISO 27002:2003 standard using the Capability Maturity Model Integration (CMMI). The final result showed that the maturity level of the academic information system (SIA) was at the "Managed and Measurable" level, with a maturity level score of 4.458.

In previous study [10] discussed the assessment of the maturity level of the Information System in a State Hospital in Jakarta using the Healthcare Information System Maturity Model (HISMM). The method used was an evaluation of the hospital's maturity across six dimensions: Data Analysis, Strategy, People, Electronic Medical Records, Information Security, and IT Infrastructure. The final result showed that the hospital had reached maturity level 4.

In previous study [11] on ISO 27001 implementation and evaluation in information security management at PT Indonesia Game used a mixed-method approach, analyzing maturity levels and conducting ISMS audits based on ISO 27001:2013. The results showed a 97.45% maturity level, categorized as "Optimized." Most clauses achieved 100% compliance, except for Annex 7, which scored 84.44% due to documentation issues. The study recommended improving document archiving and aligning procedures with policies for smoother audits.

In previous study [12] examined IT service management at XYZ Hospital in Semarang using the ITIL V3 Framework. Interviews and surveys with employees managing the hospital information management system (SIMRS XYZ) revealed that service operations are at maturity levels 4 (managed) and 5 (optimized), with a 0.56 difference. The study highlights the need for improvements in IT service management to meet organizational goals and enhance service quality, focusing on incident management, problem management, request fulfillment, and access management. Recommendations for achieving the desired maturity level are provided.

This research employs COBIT 2019 to evaluate information technology governance, building on COBIT 5 to align IT governance with organizational strategy [13]. The goal is to enhance the efficiency of IT governance assessments by recognizing intersecting activities.

METHODS

Research Data

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

This study uses the COBIT 2019 framework to broadcast the level of capability of the Medis Care application. The level of capability is measured on a scale from Level 0 to Level 5. Data collection was carried out through a questionnaire with users of the Medis Care application regarding the implementation of the system.

Research Flow

In this study, the research flow is presented in Figure 1. The initial stage involves identifying issues related to the capability level assessment of the medical care information system. Following the problem identification, a literature review is conducted, focusing on relevant journals and books to support the research. The next stage is the determination of domains from COBIT 2019. Design factors provided by the COBIT 2019 framework to identify objectives with a high level of importance, focusing on Risk Profile and I&T Related Issues, through interviews with the owners of the medical care information system. Based on the calculations of the design factors, objectives with a high level of importance are identified

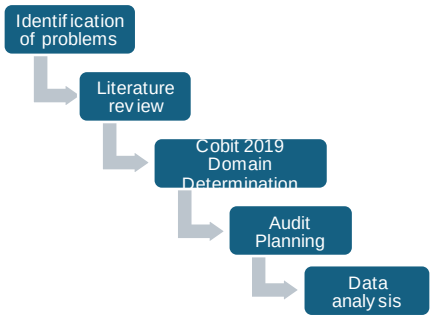

Figure 1. Research Flow [14]

Subsequently, interviews are conducted with the selected respondents. The results of these interviews will be utilized for the final stage, which is data analysis. In this stage, the level of capability will be calculated, analyze the gaps, and provide recommendations. The data obtained from the interviews will be processed and analyzed to determine the capability levels of the processes under investigation.

The final process involves assessing the achievement level of each capability in each domain using the NPFL criteria: Note, Partially, Fully, and Largely [14].

The percentage information for each evaluation criterion is as follows: Fully (F) - Capability level achieved is more than 85%; Largely (L) - Capability level achieved is between 50% and 85%; Partially (P) - Capability level achieved is between 15% and 50%; Note (N) - Capability level achieved is less than 15% [15].

RESULTS AND DISCUSSION

Domain Selection

The selection of domains in this study utilizes the Toolkit Design Factor, focusing on Design Factor 3: Risk Profile and Design Factor 4: I&T Related Issues.

Design Factor 3: Risk Profile identifies all I&T-related risks faced by the organization through a risk profile designed by this factor.

There are four types of risks categorized as very high risk. The first type is Logical Attack, the second is Third Party/Supplier Incidents, the third is Non-compliance, and the last type of risk is Data & Information Management. These are illustrated in figure

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

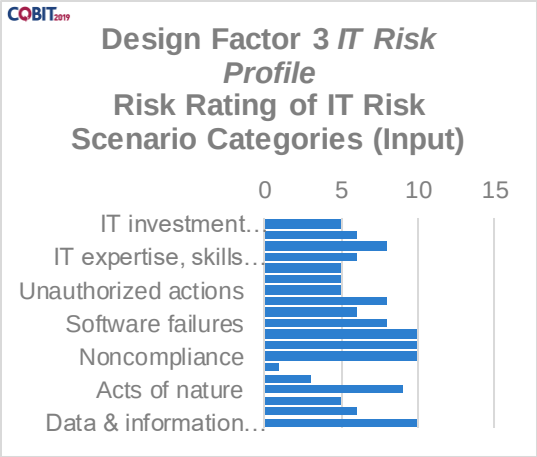

Figure 2. Design Factor 3 Results [16]

The figure 2 shows the risk ratings for various IT risk scenario categories in the COBIT 2019 framework. The categories evaluated include IT investment, IT skills, unauthorized acts, software failures, non-compliance, natural disasters, and data risks. Each category is rated on a scale of 0–15, where some categories, such as unauthorized acts, non-compliance, and data risks, have higher risk ratings, indicating areas that require more attention in IT risk management.

After determining Design Factor 3, the next step is to identify Design Factor 4: I&T Related Issues. In Figure 2, the issues related to I&T for the medical care information system are presented. Design Factor 4 highlights two categories of issues: No Issue (This category indicates the absence of any problems or issues affecting the company); Normal Issue (This category encompasses issues that have occurred or are currently occurring within the company but do not have a significant impact on its operations).

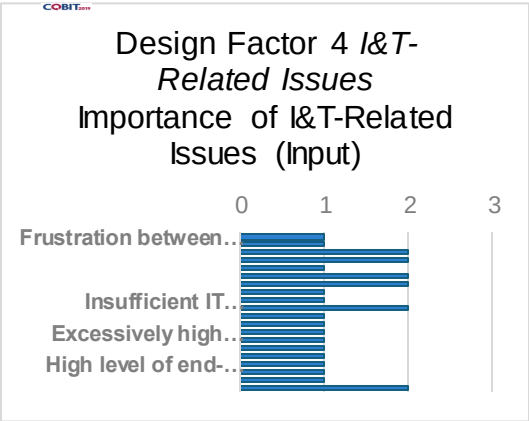

Figure 3. Design Factor 4 Results [16]

Determining Priority Objectives

The results of the design factor focusing on Risk Profile and I&T consist of two main objectives with a value of 85, based on and aligned with the company's situation. There are two main objectives: APO11—Managed Quality, APO13—Managed Security.

These can be observed in the presentation in Figure 4.

Design Factors:	Risk Profile	I&T-Related Issues	Initial Scope: Governance/ Management Objectives Score
Weight	1	1	
EDM01	-5	-5	-25
EDM02	0	0	0
EDM03	5	0	10
EDM04	5	0	10
EDM05	0	0	0
APO01	10	0	25
APO02	5	5	25
APO03	15	5	50
APO04	-25	10	-35
APO05	-10	0	-25
APO06	-10	5	-10
APO07	-20	0	-50
APO08	15	-5	25
APO09	25	15	100
APO10	10	15	60
APO11	20	15	85
APO12	20	5	60
APO13	25	10	85
APO14	20	0	50
BAI01	-5	5	0
BAI02	5	-5	0
BAI03	15	5	50
BAI04	-10	25	35
BAI05	5	0	10
BAI06	10	10	50
BAI07	10	10	50
BAI08	0	-10	-25

Figure 4. Governance and Management Objectives Importance Result [16]

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

Audit Planning

Measuring the level of application capability within the COBIT 2019 framework is a crucial process for assessing how well applications support business objectives and fulfill IT governance requirements. In this process, interview questions are designed based on the activity levels established in each domain, specifically APO11 and APO13.

APO11 Level 2 Activity

Based on the interview results regarding the priority objectives of APO11 at level 2, the obtained data is presented table 1.

Table 1. APO11 Level 2 Activity [16]

Activity	Is Activity Performed?
meetings between the quality management team, IT department and stakeholders to formulate quality management procedures that comply with the requirements of the I&T control framework	Y
Create a platform to share practical experiences and lessons learned during business processes or product development.	Y

Next, the calculation of the capability level at level 2 for the priority objectives of APO11 is conducted, and the percentage obtained is 100% with a Full Achieved rating. Thus, it can be concluded that the APO11 objectives have achieved a capability level rating at level 2.

APO11 Level 3 Activity

Based on the interview results regarding the priority objectives of APO11 at level 3, the obtained data is presented table 2.

Table 2. APO11 Level 3 Activity [16]

Activity	Is Activity Performed?
Conducting a review of organizational roles and responsibilities to identify gaps and overlaps in quality management.	Y
Organize discussion forums with upper management and key stakeholders.	N
Organize joint sessions with business management, IT, and stakeholders to define needs and expectations.	Y
Organize regular meetings between the project management and medical care application development teams.	N
Conduct a thorough audit of key processes and solutions to identify system strengths and weaknesses.	N
Conduct a comprehensive analysis of the benefits and costs involved	Y
Plan and conduct regular and formal quality training programs	Y

Next, the calculation of the capability level at level 3 for the priority objectives of APO11 is conducted, and the percentage obtained is 57% with a Largely Achieved rating. Thus, it can be concluded that the APO11 objectives

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

have not yet achieved a capability level rating at level 3.

APO13 Level 2 Activity

Based on the interview results regarding the priority objectives of APO13 at level 2, the obtained data is presented in the following table 3.

Table 3. APO13 Level 2 Activity [16]

Activity	Is Activity Performed?
Hold a meeting with the information security department	Y
Conduct cross-departmental analysis to understand security management approaches	Y
Submit proposals to management to obtain support to operate the ISMS	Y
Organize meetings with the team responsible for drafting the ISMS applicability statement.	Y
Create a document on the roles and responsibilities of the information security management team.	N
Presentations with stakeholders regarding the ISMS approach	Y
Meeting to define the scope of the ISMS	Y

Next, the calculation of the capability level at level 2 for the priority objectives of APO13 is conducted, and the percentage obtained is 86% with a Full Achieved rating. Thus, it can be concluded that the APO13 objectives have achieved a capability level rating at level2.

APO13 Level 3 Activity

Based on the interview results regarding the priority objectives of APO13 at level 3, the obtained data is presented in the following table 4.

Table 4. APO11 Level 3 Activity [16]

Activity	Is Activity Performed?
Regular meetings between the information security team, senior management, and stakeholders.	Y
Conduct a comprehensive audit to identify all components related to information security risk management.	Y
Form a project team to develop a proposal for implementing an information security risk treatment plan.	N
Participate in design meetings to provide information security input on practices from the risk treatment plan.	N
Conduct information security and privacy training for all organization members.	N
Hold cross-departmental meetings to ensure effective integration of information security.	N

Next, the calculation of the capability level at level 3 for the priority objectives of APO13 is conducted, and the percentage obtained is 33% with a Partially Achieved rating. Thus, it can be concluded that the APO13 objectives have not yet achieved a capability level rating at level 3.

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. X No 4, September 2024, hlm. 781 – 788 ISSN 2550-0201 (Online)
DOI: http://dx.doi.org/10.33330/jurteksi.v10i4.3257
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

From the evaluation of each priority objective of APO11 and APO13, no gaps were identified because the obtained capability levels are in line with expectations. Therefore, the recommenda tion for each objective is to continue the activities that have been carried out by medical care up to this point.

CONCLUSION

After filling out the design factors in the COBIT 2019 toolkit, which in this study focuses on Risk Profile and I&T Related Issues, the results yielded two priority objectives: APO11 – Managed Quality, and APO13 – Managed Security. Through interviews and evaluation, each priority objective was found to be at capability level 2 with ratings of 100% and 86% respectively. There are no significant gaps between the current capability levels; both are at level 2.

BIBLIOGRAPHY

[1] A. Nurkholis and E. Saputra, "E-Health Berbasis Mobile Untuk Meningkatkan Layanan Klinik," 2021.

[2] T. H. Tebeje and J. Klein, "Applications of e-health to support person-centered health care at the time of COVID-19 pandemic," *Telemedicine and e-Health*, vol. 27, no. 2, pp. 150–158, 2021.

[3] G. G. Sari and W. Wirman, "Telemedicine sebagai Media Konsultasi Kesehatan di Masa Pandemic COVID 19 di Indonesia," *Jurnal Komunikasi*, vol. 15, no. 1, pp. 43–54, Jun. 2021, doi: 10.21107/ilkom.v15i1.10181.

[4] U. Faddillah, N. O. Syamsiah, and I. Purwandani, "Pemodelan Enterprise Arsitektur Sistem Informasi Penjualan Obat Menggunakan Kerangka TOGAF ADM," *Indonesian Journal on Software Engineering (IJSE)*, vol. 5, no. 1, pp. 114–122, 2019.

[5] Ilham Akbar Sodik and D. M. K. Nugraheni, "Implementation Cobit 2019 For Evaluation Of Health Clinic Information System Governance In Central Java," *Jurnal Teknik Informatika (Jutif)*, vol. 3, no. 6, pp. 1549–1556, Dec. 2022, doi: 10.20884/1.jutif.2022.3.6.361.

[6] A. Andrianti and L. Y. Astri, "Tata Kelola Keamanan Teknologi Informasi Menggunakan Framework COBIT 5 Fokus Proses DSS05 (Studi Pada RS Bhayangkara Jambi)," *Indonesian Journal of Computer Science*, vol. 9, no. 2, pp. 86–95, 2020.

[7] M. Saleh, I. Yusuf, and H. Sujaini, "Penerapan Framework COBIT 2019 pada Audit Teknologi Informasi di Politeknik Sambas," *JEPIN (Jurnal Edukasi dan Penelitian Informatika)*, vol. 7, no. 2, pp. 204–209, 2021.

[8] F. Febriani and A. D. Manuputty, "Evaluasi Tata Kelola Guna Meningkatkan Kinerja Manajemen Teknologi Informasi Menggunakan Framework COBIT 5," *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 7, no. 1, 2021.

[9] R. Umar, I. Riadi, and E. Handoyo, "Analysis Security of SIA Based DSS05 on COBIT 5 Using Capability Maturity Model

Integration (CMMI)," *Scientific Journal of Informatics*, vol. 6, no. 2, pp. 2407–7658, 2019, [Online]. Available: http://journal.unnes.ac.id/nju/index.php/sji

[10] M. Lubis, I. I. Putri, and B. M. Izzati, "Information Systems Maturity Level Assessment using the HISMM Framework: Case Study of State Hospital in Jakarta," in *2022 International Conference on Science and Technology, ICOSTECH 2022*, Institute of Electrical and Electronics Engineers Inc., 2022. doi: 10.1109/ICOSTECH54296.2022.9829143.

[11] E. Riana, M. E. S. Sulistyawati, and O. P. Putra, "Analisis Tingkat Kematangan (Maturity Level) Dan PDCA (Plan-Do-Check-Act) Dalam Penerapan Audit Sistem Manajemen Keamanan Informasi Pada PT Indonesia Game Menggunakan Metode ISO 27001:2013," *Journal of Information System Research (JOSH)*, vol. 4, no. 2, pp. 632–640, Jan. 2023, doi: 10.47065/josh.v4i2.2552.

[12] V. Widya Larasati, S. Murtini, and R. Raharjanti, "ITIL Framework 3: Analysis of Management Information Technology Services at XYZ Hospital in Semarang." [Online]. Available: https://ajmesc.com/index.php/ajmesc

[13] U. F. Vista, W. A. Bambang Soedijono, and F. W. Wibowo, "Audit Tata Kelola Keamanan Data Teknologi Informasi Menggunakan COBIT 4.1 Pada PT. KLM.," *Respati*, vol. 14, no. 3, 2019.

[14] J. Yuan Mambu *et al.*, "Jurnal Informasi dan Teknologi Identifikasi Level Kapabilitas IT Governance Menggunakan Framework Cobit 2019 Pada PT Icon+," vol. 5, no. 2, 2023, doi: 10.37034/jidt.v5i1.322.

[15] I. Nyoman, S. Saputra, and B. Yuwono, "Pengukuran Tingkat Kapabilitas Dan Perbaikan Tata Kelola Teknologi Informasi Berdasarkan Kerangka Kerja Cobit 5 Dan Itil V3 2011: Studi Kasus Pt. Xyz," *INSERT: Information System and Emerging Technology Journal*, vol. 2, no. 1.

[16] ISACA, "COBIT 2019 Governance and Management Objectives." Accessed: May 26, 2024. [Online]. Available: https://www.isaca.org/resources/cobit