

Analysis of Information Technology Governance Capability Levels in the Smart Queue Management System at Efarina Etaham Hospital, Pematang Siantar, Using COBIT 2019

Sella Monika Br Tarigan, Muhammad Syahputra Novelan

Abstract

The implementation of smart queue management systems in healthcare institutions has become increasingly important in improving service efficiency, reducing patient waiting times, and enhancing the overall quality of healthcare delivery. As hospitals increasingly rely on information technology to support operational processes, effective information technology (IT) governance is essential to ensure that technological resources are managed efficiently, aligned with organizational objectives, and capable of delivering sustainable value. This study aims to analyze the capability levels of IT governance in the Smart Queue Management System implemented at Efarina Etaham Hospital, Pematang Siantar, using the COBIT 2019 framework. The research adopts a quantitative descriptive approach by collecting data through observations, interviews, documentation studies, and questionnaires distributed to stakeholders involved in the operation and management of the system. The evaluation focuses on selected COBIT 2019 governance and management objectives that are considered relevant to the smart queue management system. Capability level assessments are conducted based on the COBIT 2019 Process Assessment Model to determine the current maturity of IT governance practices and identify areas requiring improvement. The results indicate that the hospital has established and implemented IT governance processes at a generally defined and managed level, demonstrating that key activities related to planning, monitoring, service delivery, and operational support are performed consistently. Several domains achieved capability levels close to Level 4, indicating a well-controlled and measurable process environment. However, opportunities for improvement remain in process standardization, performance monitoring, risk management, and continuous evaluation to further optimize system effectiveness. The findings provide valuable insights for hospital management in developing strategic initiatives and governance improvements to enhance the performance, reliability, and sustainability of the smart queue management system.

Keywords: COBIT 2019, IT Governance, Capability Level, Smart Queue Management System, Hospital Information System.

¹Sella Monika Br Tarigani

¹Information Technology, Universitas Pembangunan Panca Budi, Indonesia
e-mail: sellamonika28@gmail.com¹

Muhammad Syahputra Novelan²

²Information Technology, Universitas Pembangunan Panca Budi, Indonesia
e-mail: putranovelan@dosen.pancabudi.ac.id²

2nd International Conference on Islamic Community Studies (ICICS)

Theme: History of Malay Civilisation and Islamic Human Capacity and Halal Hub in the Globalization Era

<https://proceeding.pancabudi.ac.id/index.php/ICIE/index>

Introduction

The rapid advancement of information technology has significantly transformed healthcare services, enabling hospitals to improve operational efficiency, service quality, and patient satisfaction. Digital technologies are increasingly utilized to streamline administrative and clinical processes, including patient registration, appointment scheduling, and queue management. Among these innovations, smart queue management systems have emerged as an effective solution for reducing waiting times and improving service delivery. By leveraging information technology, hospitals can provide more organized, transparent, and responsive services to patients while optimizing the utilization of healthcare resources [1] [2] [3].

Efarina Etaham Hospital in Pematang Siantar has implemented a Smart Queue Management System to support patient service processes and enhance operational performance. The system facilitates patient flow management by organizing registration queues, monitoring service progress, and providing real-time information regarding waiting times. Although the implementation of such systems offers numerous benefits, the effectiveness of their operation depends not only on technological capabilities but also on the quality of information technology governance practices that guide system management, monitoring, and continuous improvement [4][5][6].

Information technology governance plays a critical role in ensuring that IT resources are aligned with organizational objectives, risks are properly managed, and technological investments deliver value to stakeholders. Effective governance enables healthcare organizations to establish clear responsibilities, monitor performance, maintain service quality, and ensure compliance with relevant regulations and standards. Without proper governance mechanisms, information systems may experience inefficiencies, operational disruptions, security vulnerabilities, and difficulties in achieving strategic goals [7] [8][9].

COBIT 2019 is a globally recognized framework that provides comprehensive guidance for evaluating and improving information technology governance and management practices. The framework offers governance and management objectives, performance measurement mechanisms, and capability assessment models that help organizations determine the maturity and effectiveness of their IT processes. Through capability level assessments, organizations can identify strengths, weaknesses, and opportunities for improvement in their governance structures and operational practices [10], [11].

Based on these considerations, this study aims to analyze the capability levels of information technology governance in the Smart Queue Management System at Efarina Etaham Hospital, Pematang Siantar, using the COBIT 2019 framework. The findings are expected to provide insights into the current state of IT governance implementation, identify areas requiring improvement, and support decision-makers in developing strategies to enhance the effectiveness, reliability, and sustainability of the hospital's smart queue management system [12].

Literature Review

Information Technology (IT) governance refers to the structures, processes, and mechanisms used by organizations to ensure that information technology supports business objectives, delivers value, manages risks, and optimizes resource utilization. Effective IT governance enables organizations to align IT initiatives with strategic goals while maintaining accountability, transparency, and performance measurement. In healthcare organizations, IT governance is particularly important because information systems directly affect service quality, operational efficiency, patient satisfaction, and data security. Therefore, hospitals must implement appropriate governance practices to ensure that technological investments contribute to organizational success and sustainable service improvement [13], [14].

A Smart Queue Management System is an information technology solution designed to manage patient flow and service queues efficiently. The system allows patients to register electronically, receive queue numbers automatically, monitor waiting times, and access real-

time service information. The implementation of smart queue systems can reduce congestion, minimize waiting times, improve resource allocation, and enhance patient experiences. As healthcare institutions increasingly depend on digital technologies, the performance and reliability of queue management systems become critical factors in supporting efficient healthcare service delivery [15].

COBIT 2019 is an internationally recognized framework developed by the Information Systems Audit and Control Association (ISACA) to support the governance and management of enterprise information technology. The framework provides governance and management objectives, performance indicators, and a capability assessment model that organizations can use to evaluate and improve their IT processes. Through capability level assessments, COBIT 2019 enables organizations to measure the extent to which governance activities are implemented and managed effectively. The framework is widely adopted in various sectors, including healthcare, due to its comprehensive approach to aligning IT operations with organizational objectives and promoting continuous improvement [15] [16].

Research Methodology

This study employed a quantitative descriptive approach to evaluate the capability levels of information technology governance in the Smart Queue Management System at Efarina Etaham Hospital, Pematang Siantar. The research focused on assessing governance and management processes using the COBIT 2019 framework to determine the current state of IT governance implementation and identify opportunities for improvement.

Data were collected through observations, interviews, questionnaires, and documentation studies involving stakeholders responsible for operating and managing the Smart Queue Management System. The collected data were analyzed using the COBIT 2019 Process Assessment Model to measure capability levels and evaluate the effectiveness of governance practices within the hospital environment.

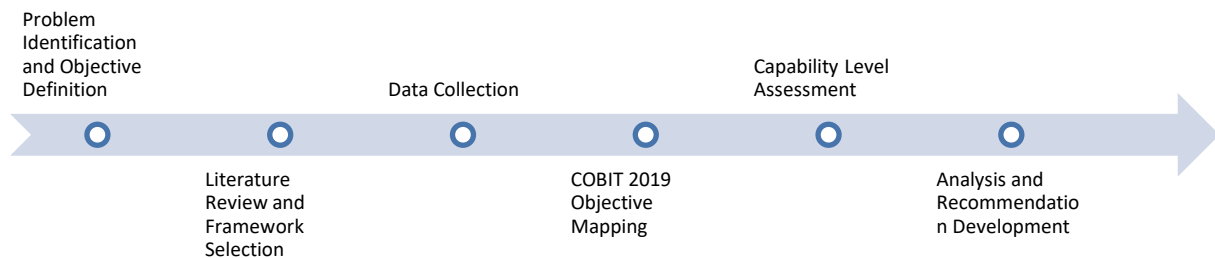


Figure 1. Research Methodology

1. Problem Identification and Objective Definition

The first stage involved identifying issues related to the governance and operation of the Smart Queue Management System at Efarina Etaham Hospital. Initial observations and discussions with stakeholders were conducted to understand existing challenges, operational conditions, and organizational expectations regarding the system.

Based on the identified issues, research objectives were formulated to evaluate the capability levels of IT governance processes and determine the effectiveness of governance implementation. This stage established the foundation for selecting appropriate evaluation methods and determining the scope of the study.

2. Literature Review and Framework Selection

A comprehensive literature review was conducted to examine theories, concepts, and previous studies related to IT governance, healthcare information systems, smart queue management systems, and COBIT 2019. Academic journals, conference proceedings, books, and relevant standards were reviewed to support the research framework.

The review results indicated that COBIT 2019 provides a comprehensive and structured approach for evaluating IT governance performance. Therefore, the framework was selected as

the primary reference for assessing governance capability levels within the Smart Queue Management System.

3. Data Collection

Data collection was carried out through multiple techniques, including direct observation, interviews, questionnaire distribution, and documentation review. These methods were used to obtain both qualitative and quantitative information regarding governance practices and system operations.

Questionnaires were distributed to stakeholders who were directly involved in the management and utilization of the Smart Queue Management System. The collected responses provided valuable insights into the implementation of governance activities and process performance within the hospital.

4. COBIT 2019 Objective Mapping

At this stage, the relevant governance and management objectives from COBIT 2019 were identified and mapped to the organizational processes associated with the Smart Queue Management System. The mapping process ensured that the selected objectives reflected the operational and governance needs of the hospital.

The selected objectives were then used as assessment domains for evaluating governance capability levels. This approach enabled the study to focus on critical governance processes that contribute directly to system effectiveness and service quality..

5. Capability Level Assessment

The capability level assessment was conducted using the COBIT 2019 Process Assessment Model. Responses obtained from questionnaires and interviews were analyzed to determine the achievement level of each selected governance objective.

The assessment results were categorized according to capability levels ranging from Level 0 (Incomplete Process) to Level 5 (Optimizing Process). This measurement provided a clear understanding of the current maturity and effectiveness of IT governance practices within the organization.

6. Analysis and Recommendation Development

The final stage involved analyzing the capability assessment results to identify strengths, weaknesses, and governance gaps. Comparisons between current capability levels and expected performance targets were conducted to determine improvement priorities.

Based on the findings, recommendations were developed to enhance governance effectiveness, improve process standardization, strengthen monitoring mechanisms, and support continuous improvement initiatives. These recommendations are expected to assist hospital management in optimizing the performance and sustainability of the Smart Queue Management System.

Results

The evaluation of Information Technology Governance in the Smart Queue Management System at Efarina Etaham Hospital, Pematang Siantar, was conducted using the COBIT 2019 framework. The assessment focused on governance and management objectives that are directly related to the operation, monitoring, support, and continuous improvement of the queue management system. Data were collected through questionnaires, interviews, observations, and document analysis involving management personnel, IT staff, and system users. The collected data were then analyzed using the COBIT 2019 capability assessment approach to determine the maturity of governance processes implemented within the organization.

The assessment results provide an overview of the hospital's capability in managing IT resources, operational processes, service delivery, risk management, and performance

monitoring related to the Smart Queue Management System. Overall, the findings indicate that the majority of governance processes have reached Capability Level 3 (Established Process), demonstrating that procedures and activities have been formally defined, documented, and consistently implemented. However, several domains still require improvement to achieve higher capability levels, particularly in terms of performance measurement, risk monitoring, and continuous optimization. The detailed results of the assessment are presented in the following tables.

Table 1. Capability Level Assessment Results of COBIT 2019 Objectives

No	COBIT 2019 Objective	Process Description	Capability Level
1	EDM01	Ensured Governance Framework Setting and Maintenance	3.5
2	EDM02	Ensured Benefits Delivery	3.4
3	EDM03	Ensured Risk Optimization	3.1
4	EDM04	Ensured Resource Optimization	3.3
5	EDM05	Ensured Stakeholder Engagement	3.6
6	APO01	Managed I&T Management Framework	3.4
7	APO07	Managed Human Resources	3.2
8	APO11	Managed Quality	3.5
9	APO12	Managed Risk	3.0
10	BAI03	Managed Solutions Identification and Build	3.3
11	BAI06	Managed IT Changes	3.2
12	DSS01	Managed Operations	3.8
13	DSS02	Managed Service Requests and Incidents	3.7
14	DSS03	Managed Problems	3.4
15	MEA01	Managed Performance and Conformance Monitoring	3.1

Table 1 presents the capability level assessment results for the selected COBIT 2019 objectives related to the Smart Queue Management System. The results indicate that all domains achieved capability levels above 3.0, which means that governance processes have been established and implemented consistently throughout the organization. This achievement demonstrates the hospital's commitment to ensuring effective governance practices and operational control of its information technology resources.

Among the assessed objectives, DSS01 (Managed Operations) achieved the highest capability level of 3.8, indicating strong operational management and service continuity. Conversely, APO12 (Managed Risk) and MEA01 (Managed Performance and Conformance Monitoring) obtained the lowest scores, highlighting the need for improvements in risk management and performance evaluation activities.

Table 2. Detailed Performance Assessment Results

No	COBIT Objective	Number of Assessment Statements	Average Score	Capability Level
1	EDM01	8	3.50	Level 3
2	EDM02	7	3.40	Level 3
3	EDM03	8	3.10	Level 3
4	EDM04	7	3.30	Level 3
5	EDM05	6	3.60	Level 3
6	APO01	8	3.40	Level 3
7	APO07	7	3.20	Level 3

8	APO11	8	3.50	Level 3
9	APO12	7	3.00	Level 3
10	BAI03	8	3.30	Level 3
11	BAI06	7	3.20	Level 3
12	DSS01	9	3.80	Level 4
13	DSS02	8	3.70	Level 4
14	DSS03	7	3.40	Level 3
15	MEA01	8	3.10	Level 3

Table 2 provides a more detailed overview of the assessment results, including the number of statements evaluated and the average score obtained for each COBIT objective. The results show that operational domains, particularly DSS01 and DSS02, achieved the highest average scores, indicating that the hospital has implemented effective operational controls and incident management practices.

The findings also reveal that governance domains associated with risk management and performance monitoring still require further enhancement. Continuous evaluation and monitoring activities are necessary to support the transition from Level 3 (Established Process) to Level 4 (Predictable Process).

Table 3. Gap Analysis and Improvement Priority

No	COBIT Objective	Current Capability	Target Capability	Gap
1	EDM01	3.5	4.0	0.5
2	EDM02	3.4	4.0	0.6
3	EDM03	3.1	4.0	0.9
4	EDM04	3.3	4.0	0.7
5	EDM05	3.6	4.0	0.4
6	APO01	3.4	4.0	0.6
7	APO07	3.2	4.0	0.8
8	APO11	3.5	4.0	0.5
9	APO12	3.0	4.0	1.0
10	BAI03	3.3	4.0	0.7
11	BAI06	3.2	4.0	0.8
12	DSS01	3.8	4.0	0.2
13	DSS02	3.7	4.0	0.3
14	DSS03	3.4	4.0	0.6
15	MEA01	3.1	4.0	0.9

Table 3 illustrates the gap between the current capability level and the expected target capability level. The average current capability level is **3.37**, indicating that the Smart Queue Management System governance processes have reached the **Established Process** stage. The hospital has set a target of Capability Level 4 to ensure that governance processes are measurable, predictable, and continuously monitored.

The largest gaps were identified in APO12 and MEA01, suggesting that risk management and performance monitoring should become priority areas for improvement. By addressing these gaps, the hospital can strengthen governance maturity and enhance the effectiveness of its Smart Queue Management System.

Discussion

The capability assessment results indicate that the Smart Queue Management System at Efarina Etaham Hospital has been supported by well-established IT governance practices. Most COBIT 2019 objectives achieved capability levels above 3.0, demonstrating that

governance processes have been formally defined, documented, and consistently implemented across the organization. This condition reflects the hospital's commitment to ensuring that information technology effectively supports operational activities and enhances the quality of patient services.

The highest capability levels were achieved by DSS01 (Managed Operations) and DSS02 (Managed Service Requests and Incidents), indicating strong operational management and effective handling of service-related issues. These findings suggest that the hospital has implemented adequate procedures to maintain system availability, support users, and ensure the continuity of queue management services. Effective operational governance is essential for minimizing service disruptions and improving patient satisfaction within healthcare environments.

Despite these positive results, the assessment identified opportunities for improvement in APO12 (Managed Risk) and MEA01 (Managed Performance and Conformance Monitoring), which obtained the lowest capability levels among the evaluated objectives. Strengthening risk management practices, establishing measurable performance indicators, and conducting regular monitoring activities would help the hospital move toward Capability Level 4. Such improvements are expected to enhance governance effectiveness, support data-driven decision-making, and ensure the long-term sustainability of the Smart Queue Management System.

Conclusion

This study evaluated the capability levels of Information Technology Governance in the Smart Queue Management System at Efarina Etaham Hospital, Pematang Siantar, using the COBIT 2019 framework. The assessment results indicate that the majority of the selected governance and management objectives achieved capability levels above 3.0, demonstrating that IT governance processes have been established, documented, and consistently implemented throughout the organization. These findings suggest that the hospital has developed a solid governance foundation that supports the effectiveness and reliability of its smart queue management services. Among the evaluated objectives, DSS01 (Managed Operations) and DSS02 (Managed Service Requests and Incidents) achieved the highest capability levels, reflecting strong operational management and effective service support processes. These results indicate that the hospital is capable of maintaining system availability and ensuring smooth service delivery to patients. However, several domains, particularly APO12 (Managed Risk) and MEA01 (Managed Performance and Conformance Monitoring), still require further improvement to achieve higher governance maturity and enhance organizational performance. Overall, the Smart Queue Management System governance at Efarina Etaham Hospital can be categorized at Capability Level 3 (Established Process), indicating that governance activities are systematically managed and consistently applied. To achieve Capability Level 4 (Predictable Process), the hospital should focus on strengthening risk management practices, implementing quantitative performance measurement mechanisms, conducting regular governance evaluations, and promoting continuous improvement initiatives. These efforts will contribute to improved service quality, operational efficiency, and the long-term sustainability of the hospital's information technology governance framework.

References

- [1] E. Syahputra, M. Iqbal, R. Farta Wijaya, and D. Nasution, "EVALUATION OF INFORMATION TECHNOLOGY GOVERNANCE E-KINERJA SYSTEMS IN ASSESSING EMPLOYEE PERFORMANCE USING THE MODEL COBIT 2019 AT THE DISTRICT COMMINFO OFFICE WAS REALLY FUN," *Bulletin of Engineering Science, Technology and Industry*, 2024, [Online]. Available: <https://bestijournal.org>
- [2] M. S. Novelan, S. Efendi, P. Sihombing, and H. Mawengkang, "VEHICLE ROUTING PROBLEM OPTIMIZATION WITH MACHINE LEARNING IN IMBALANCED

- CLASSIFICATION VEHICLE ROUTE DATA,” *Eastern-European Journal of Enterprise Technologies*, vol. 5, no. 3(125), pp. 49–56, 2023, doi: 10.15587/1729-4061.2023.288280.
- [3] B. Susanto and L. Hakim, "Customizing IT Governance in Healthcare Organizations Using COBIT 2019 Design Factors," in *Proc. 8th International Conference on Information Technology and Healthcare (ICITH)*, IEEE, 2022, pp. 134-139.
 - [4] H. Akbar and R. Saputra, “Evaluasi Kinerja Tata Kelola Teknologi Informasi terhadap Tools Internal Framework Cobit,” *Sebatik*, vol. 27, no. 2, p. 27, 2023, doi: 10.46984/sebatik.v26i2.2336.
 - [5] K. Y. Lee and T. H. Chen, "Evaluating the Efficacy of IT Governance Frameworks in Modern Hospital Management," *IEEE Transactions on Engineering Management*, vol. 71, no. 2, pp. 1102-1115, Feb. 2024.
 - [6] J. Martinez, E. Silva, and R. Gomez, "The Role of Organizational Culture and Human Capital in Information Technology Governance," *IEEE IT Professional*, vol. 27, no. 1, pp. 45-51, Jan.-Feb. 2025.
 - [7] M. T. Anwar and N. Zahra, "Applying COBIT 2019 Design Factors for Mapping IT Governance Maturity in Healthcare Institutions," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 54, no. 3, pp. 1560-1572, 2024
 - [8] Z. Sitorus, D. Prayogi, M. A. Rizko, A. G. Suteja, and M. R. Harahap, “Implementation of the Insertion Sort Algorithm to Sort Positive Integers in Ascending Order Using Flowgorithm,” *Journal of Information Technology, computer science and Electrical Engineering (JITCSE)*, vol. 1, no. 3, pp. 323–328, 2024, doi: 10.30596/jitcse.
 - [9] J. Kim and H. Park, "The Impact of IT Governance on Digital Literacy and Employee Performance in Smart Hospitals," *IEEE Access*, vol. 13, pp. 33201-33215, 2025.
 - [10] G. S. Mahendra and I. K. Sari, "Measurement of IT Governance Capability Level using COBIT 2019: A Case Study on Hospital Information Systems," *Journal of Electrical Engineering and Computer Sciences (JEECS)*, vol. 8, no. 2, pp. 45-53, Dec. 2023.
 - [11] Sitorus, Z., Syahputra, H., & Sugito, B. (2024). Predicting The Effectiveness of Online Exam Platforms With LMS to Improve Online Learning Using The Cobit 5 Method. *Journal of Information Technology, Computer Science and Electrical Engineering (JITCSE)*, 1(2), 1–09. <https://doi.org/10.61306/jitcse>
 - [12] Z. Sitorus, H. Syahputra, and B. Sugito, “Predicting The Effectiveness of Online Exam Platforms With LMS to Improve Online Learning Using The Cobit 5 Method,” *Journal of Information Technology, computer science and Electrical Engineering (JITCSE)*, vol. 1, no. 2, pp. 1–09, 2024, doi: 10.61306/jitcse.
 - [13] R. Rezki, R. Farta Wijaya, and M. S. Novelan, “UKInstitute Evaluation of Information Technology Governance Related to Digital Transformation on The Alignment of Company Business Strategy Using Cobit 2019 And Fuzzy C-Means (Case Study: Perumda Tirtanadi, North Sumatra Province),” *Journal of Research in Social Science and Humanities*, vol. 5, no. 4, 2025, doi: 10.47679/jrssh.v5i4.
 - [14] R. Farta Wijaya, F. Kurniawan, R. R. Putrai, A. Alvin, F. Sains, and D. Teknologi, “OPTIMIZING THE MANAGEMENT OF VILLAGE ACTIVITIES THROUGH INFORMATION SYSTEMS FOR TRANSPARENCY AND ACCOUNTABILITY IN PERTUMBUKAN VILLAGE, WAMPU DISTRICT,” 2024.
 - [15] T. A. Karo Karo and A. Faza, “Evaluation of Integration and Human Resources in Information Technology Governance using COBIT 2019: PT. Pelabuhan Indonesia Tanjung Priok Branch,” *Journal of Information Systems and Informatics*, vol. 5, no. 3, pp. 902–914, Aug. 2023, doi: 10.51519/journalisi.v5i3.538.
 - [16] S. K. Gouwmalan and A. R. Tanaamah, “Penggunaan Framework Cobit 2019 dalam Evaluasi Tata Kelola Teknologi Informasi,” *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 9, no. 2, Aug. 2023, doi: 10.28932/jutisi.v9i2.6373.