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Improving IT Governance Maturity at Universitas Sebelas Maret Using COBIT 2019

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Abstract

This study evaluates and improves the IT governance maturity of the Directorate of ICT at Universitas Sebelas Maret using the COBIT 2019 framework. The evaluation was driven by increasing IT complexity, resource inefficiencies, and low risk management capability. A case study approach applied COBIT 2019 domains to assess practices and identify gaps, with data gathered through interviews, observations, and document analysis. Significant deficiencies were found in six key processes. The highest gap score is APO12 (Managed Risk) at 1.89, followed by DSS04 (Managed Continuity) at 1.88, DSS01 (Managed Operations) at 1.75, APO14 (Managed Data) at 1.74, DSS05 (Managed Security) at 1.57, and the lowest is APO01 (Managed I&T Framework) at 1.27, with all domains targeting a maturity level of 3. Results indicate current maturity scores fall below expectations, highlighting the need for systematic improvement. A phased strategic plan was developed for short, medium, and long-term priorities, aligned with resources and organizational needs. The study demonstrates that structured implementation of COBIT 2019 can enhance governance alignment, improve risk control, and ensure sustainable ICT performance, providing a roadmap for future IT governance at the university.

Keywords: IT Governance, COBIT 2019, Maturity Level

1. INTRODUCTION

Information Technology (IT) has become an integral part of organizational operations, particularly in higher education institutions where academic and administrative services are increasingly digitalized [1]. Effective IT governance is essential to ensure that technology investments align with institutional goals, support strategic initiatives, and enhance service delivery across various stakeholders including students, faculty, and administrative staff [2]. In Universitas Sebelas Maret (UNS), the role of IT is very important not only for daily academic operations but also to drive digital transformation in teaching, research, and community service [3]. As the university grows in size and complexity, so does the need for a robust IT governance structure that can ensure consistency, accountability, and strategic alignment [4].

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Despite the critical role of IT, Universitas Sebelas Maret has encountered significant challenges in managing its IT infrastructure and resources. The absence of a unified IT framework has led to fragmented initiatives, resulting in overlapping services, inconsistent performance, and suboptimal resource allocation [5]. These inefficiencies are compounded by the rapid pace of technological change, which demands continuous adaptation and agility [6]. Another major issue is the lack of control over IT procurement processes [7]. Several instances have been identified where hardware and software acquisitions were not aligned with actual institutional needs, leading to redundant systems and underutilized investments [8]. This has contributed to poor cost-efficiency and unnecessary operational burdens on the IT department [9].

Security and risk management also remain critical areas of concern [10]. The absence of a formal risk management framework has left IT systems vulnerable to threats and unprepared for potential disruptions [11]. Sensitive data often lacks adequate protection, posing a risk to information integrity, availability, and confidentiality especially in academic environments where research and student data are highly valuable [12]. Data governance is another domain that requires attention [13]. Issues related to inaccurate, incomplete, or inaccessible data have undermined the quality of decision-making and hindered strategic planning [14]. Without a clear policy for data lifecycle management and quality assurance, information assets cannot be leveraged effectively to support institutional goals [15].

Operational inefficiencies have also been observed in the form of high IT operating costs and low user satisfaction [16]. This disconnect signals a pressing need for service improvement and realignment of IT operations with end-user expectations [17]. To address these challenges, a comprehensive evaluation of IT governance maturity is necessary [18]. In response to these issues, the Directorate of ICT at Universitas Sebelas Maret conduct an audit based on the COBIT 2019 framework. The goal was to assess the current maturity level of IT governance, identify key areas of weakness, and develop a strategic roadmap for continuous improvement aligned with organizational needs [19].

The evaluation revealed a misalignment between Universitas Sebelas Maret strategic direction and its IT governance practices [20]. Despite growing dependency on IT systems, there is no formal mechanism to ensure that IT initiatives support institutional objectives in a consistent and measurable way [21]. This misalignment not only weakens organizational performance but also increases exposure to operational and security risks [22]. The IT governance maturity level at Universitas Sebelas Maret is currently insufficient to address emerging challenges in data security, service continuity, and risk management [23]. Without structured policies and an integrated governance framework, the institution is unable to

monitor, control, and improve its IT performance effectively [24]. These limitations underscore the urgency of adopting a more strategic and standardized approach to IT governance [25].

These challenges are not unique to Universitas Sebelas Maret. They reflect broader global trends in higher education institutions. Worldwide, universities face increasing pressure to modernize IT governance to keep pace with rapid technological advancements, rising cybersecurity threats, and growing demands for data-driven decision-making. Institutions that lack integrated governance frameworks often struggle with fragmented systems, inefficient resource use, and inadequate risk management similar to those observed at UNS. Furthermore, global best practices emphasize the importance of aligning IT strategies with institutional goals, ensuring that investments in technology directly support teaching, research, and community engagement. By situating UNS's challenges within this global context, it becomes evident that adopting structured frameworks like COBIT 2019 is critical not only for addressing current inefficiencies but also for achieving resilience in the increasingly digital higher education landscape [20]. This study aims to evaluate the maturity level of IT governance in the Directorate of ICT at Universitas Sebelas Maret using the COBIT 2019 framework, to identify areas of improvement, and to propose a strategic roadmap for enhancing governance capabilities through phased implementation. This research focuses on a single case study conducted within the Directorate of ICT at Universitas Sebelas Maret. It applies selected domains and processes of the COBIT 2019 framework as the primary evaluation tool. The assessment reflects the conditions as of 2024 and is limited to internal operations, governance practices, and data availability within the unit under review.

2. METHODS

The COBIT 2019 framework provides a structured methodology for enhancing IT governance maturity by aligning governance objectives with organizational priorities and stakeholder needs. Building upon earlier versions such as COBIT 5, as well as international standards and community inputs, COBIT 2019 introduces a flexible reference model composed of governance and management objectives. This study employs the COBIT 2019 framework as the methodological foundation for assessing and improving the IT governance maturity level at Universitas Sebelas Maret (UNS). COBIT 2019 was selected for its comprehensive structure, integration with global standards, and flexibility in adapting to institutional needs. The COBIT 2019 follows the model depicted in Figure 1, which illustrates the transformation from governance inputs to a tailored enterprise governance system for information and technology.

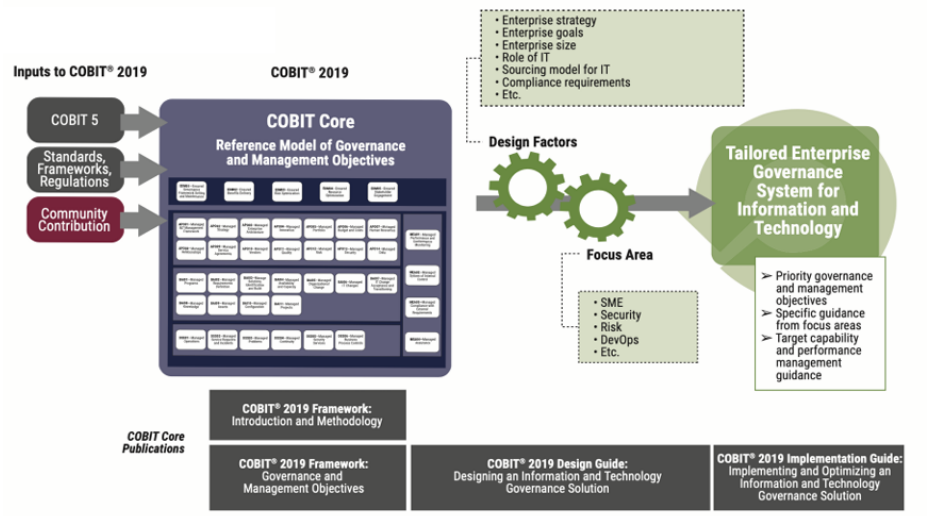

Figure 1. Process flow

These are further refined through design factor such as enterprise goals, IT role, compliance requirements, and sourcing model which help tailor the governance system to the specific context of an institution. At Universitas Sebelas Maret (UNS), the adoption of COBIT 2019 is intended to strengthen the maturity of IT governance by aligning its digital infrastructure with the university's strategic goals in education, research, and public service. Given the growing dependence on digital systems for academic and administrative functions, UNS can leverage the design factors to tailor governance structures that accommodate its enterprise size, compliance obligations, and role of IT in higher education. By applying the COBIT 2019 Design Guide and Implementation Guide, UNS can identify priority governance objectives, improve process capabilities, and establish measurable targets for continuous improvement, thus ensuring a responsive and accountable IT governance system.

The maturity assessment revealed six key processes with the largest performance gaps: APO12 (Managed Risk) with a gap score of 1.89, DSS04 (Managed Continuity) at 1.88, DSS01 (Managed Operations) at 1.75, APO14 (Managed Data) at 1.74, DSS05 (Managed Security) at 1.57, and APO01 (Managed I&T Framework) at 1.27. All domains had a target maturity level of 3, indicating a substantial need for improvement. These results guided the identification of design factors such as institutional strategy and goals, organizational size and complexity, role and sourcing model of IT, and regulatory requirements. The design factors ensured that the governance improvement plan was tailored to UNS's specific operational context. Based on the gap analysis and design factors, several focus areas were prioritized, including risk management, service continuity, information

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security, and data governance. This prioritization ensured that the governance system addresses the most pressing issues identified in the assessment. The integration of design factors and focus areas produced a customized governance system for UNS, comprising priority governance and management objectives, detailed guidance from relevant focus areas, and target capability levels with corresponding performance measurement indicators.

2.1. Research Approach

This study adopts a case study approach focused on the Directorate of ICT at Universitas Sebelas Maret. The primary goal is to evaluate the maturity level of IT governance using the COBIT 2019 framework. COBIT 2019 was selected due to its comprehensive and flexible nature, allowing organizations to assess and improve their governance capabilities based on industry standards while tailoring the approach to specific organizational needs. The research approach process flow shows in Figure 2.

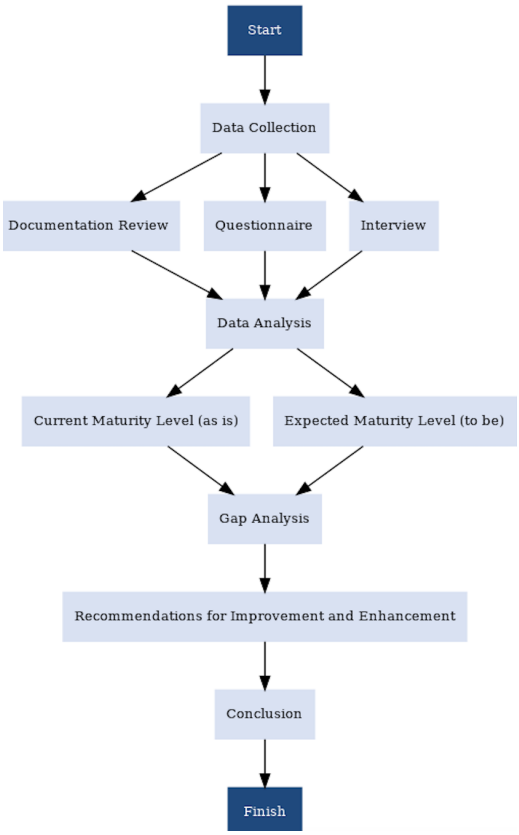

Figure 2. Process flow

2.2. COBIT 2019 Overview

COBIT 2019 is a globally recognized framework for the governance and management of enterprise information and technology. It emphasizes several core principles, including the clear separation between governance and management, an end-to-end governance system that covers all enterprise functions, and the flexibility to adapt to diverse organizational contexts. The framework is structured into five key domains:

1) EDM (Evaluate, Direct, Monitor): focuses on governance-level responsibilities,
2) APO (Align, Plan, Organize): addresses planning and organizing IT resources,
3) BAI (Build, Acquire, Implement): deals with the implementation and acquisition of solutions,
4) DSS (Deliver, Service, Support): manages service delivery and support, and
5) MEA (Monitor, Evaluate, Assess): ensures performance measurement and compliance.

Each domain contains specific processes that serve as a basis for evaluating and improving IT governance capabilities.

COBIT 2019 was chosen over other IT governance frameworks because it offers a comprehensive, adaptable, and business-oriented approach [3] that is particularly suited to the needs of higher education institutions like Universitas Sebelas Maret. Unlike more narrowly focused standards such as ISO/IEC 27001 (which primarily addresses information security management) or ITIL (which centers on IT service management), COBIT 2019 provides an integrated governance and management framework that covers a full spectrum of IT-related processes, from strategic alignment and value delivery to risk optimization and performance measurement.

One of COBIT 2019 key strengths is its clear separation between governance and management objectives [14], enabling institutions to address strategic oversight and operational execution distinctly while maintaining alignment [17]. The framework also incorporates design factors such as enterprise goals, regulatory requirements, and organizational context which make it highly customizable to the university's unique environment [20]. Furthermore, its maturity and capability models allow for measurable assessments, enabling benchmarking over time and facilitating a structured improvement roadmap.

2.3. Data Collection Techniques

Data collection was conducted through a combination of qualitative and quantitative methods. Direct observation of IT business processes and document

analysis was carried out to understand existing workflows, policies, and procedures. Interviews were conducted using a stratified sampling approach to ensure representation from all relevant stakeholder groups involved in IT governance. The identified actors in the COBIT 2019 context at UNS include the Rector (policy and strategic direction), Vice Rector for Planning and Information Systems (governance oversight), Head of Directorate of ICT (execution and coordination), System Administrators (technical operations), and Staff. A survey or structured questionnaire was distributed to IT staff and users to measure perceptions, satisfaction, and awareness regarding IT governance practices in Universitas Sebelas Maret.

2.4. Assessment Model

The assessment was based on COBIT 2019's capability level model, which rates the maturity of each process on a scale from 0 (incomplete) to 5 (optimizing). The evaluation focused on priority processes identified during the initial review, particularly those related to risk management, data governance, service continuity, and security. A gap analysis was then conducted by comparing the current maturity scores against the target levels expected for a university-scale institution. The results of this analysis provided the foundation for developing a strategic roadmap to bridge the identified gaps.

3. RESULTS AND DISCUSSION

3.1. Audit Findings per Domain

The audit revealed a range of critical issues across six COBIT 2019 processes, each representing a key area of IT governance. The number of findings and their associated critical aspects are summarized in Table 1.

Table 1. Summary of audit findings per cobit process

Domain	Process	Number of Findings	Critical Aspects
APO01	Managed I&T Framework	7	Absence of formal IT governance structure
APO12	Managed Risk	6	Lack of risk identification and mitigation processes
APO14	Managed Data	8	Poor data quality management and ownership
DSS01	Managed Operations	5	Service availability and reliability issues
DSS04	Managed Continuity	8	No documented BCP/DRP, high vulnerability

Domain	Process	Number of Findings	Critical Aspects
DSS05	Managed Security	7	Inadequate security policies and data classification

The findings indicate that most of the deficiencies are rooted in the absence of structured policies, insufficient staff capacity, and inadequate tools or systems to support governance efforts. Processes related to data management, service continuity, and information security showed the highest number of findings, signaling areas that are most at risk and require immediate attention. The lack of a centralized IT governance framework (APO01) has led to inconsistent implementation of controls, fragmented planning, and reactive decision-making. Meanwhile, the absence of a risk management culture (APO12) increases the organization's exposure to operational and cyber threats. DSS04 and DSS05 demonstrate the critical need for continuity planning and security policy enforcement to ensure system resilience and data protection. The gap analysis was performed by comparing the current capability levels with the target maturity expectations. The result is shown in Table 2.

Table 2. Gap scores per domain

Domain	Process	Current Level	Target Level	Gap Score
APO12	Managed Risk	1.11	3.00	1.89
DSS04	Managed Continuity	1.12	3.00	1.88
DSS01	Managed Operations	1.25	3.00	1.75
APO14	Managed Data	1.26	3.00	1.74
DSS05	Managed Security	1.43	3.00	1.57
APO01	Managed I&T Framework	1.73	3.00	1.27

Based on these scores, the processes with the highest maturity gaps are Managed Risk (APO12), Managed Continuity (DSS04), and Managed Security (DSS05). The gaps score analysis in COBIT 2019 shows in Figure 3.

These domains were identified as strategic priorities because their improvement is crucial to enhancing the overall resilience, integrity, and stability of IT governance at Universitas Sebelas Maret. Addressing these gaps requires not only technical improvements but also changes in organizational mindset, including the introduction of formal policies, structured risk assessment practices, and the development of a sustainable IT governance culture. To close the gap in risk management (APO12), Universitas Sebelas Maret should set up a clear risk management framework following ISO 31000 or NIST SP 800-37 and COBIT 2019. This includes keeping a risk register, running regular risk assessments, tracking Key Risk Indicators (KRIs), and running simulations to test preparedness. For continuity planning (DSS04), the university needs a Business Continuity Plan (BCP) and Disaster Recovery Plan (DRP) with clear recovery targets (RTOs and

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RPOs). Regular backup tests, continuity drills, and a backup IT system—such as cloud failover—will help keep services running during disruptions. In security management (DSS05), best practices include using layered security (firewalls, intrusion detection, and endpoint protection), adopting an Information Security Management System (ISO/IEC 27001), limiting system access with role-based controls, and enabling multi-factor authentication. Regular vulnerability testing and ongoing cybersecurity training will further strengthen protection. By applying these steps, UNS can raise its IT governance maturity, improve resilience, and align with global higher education standards.

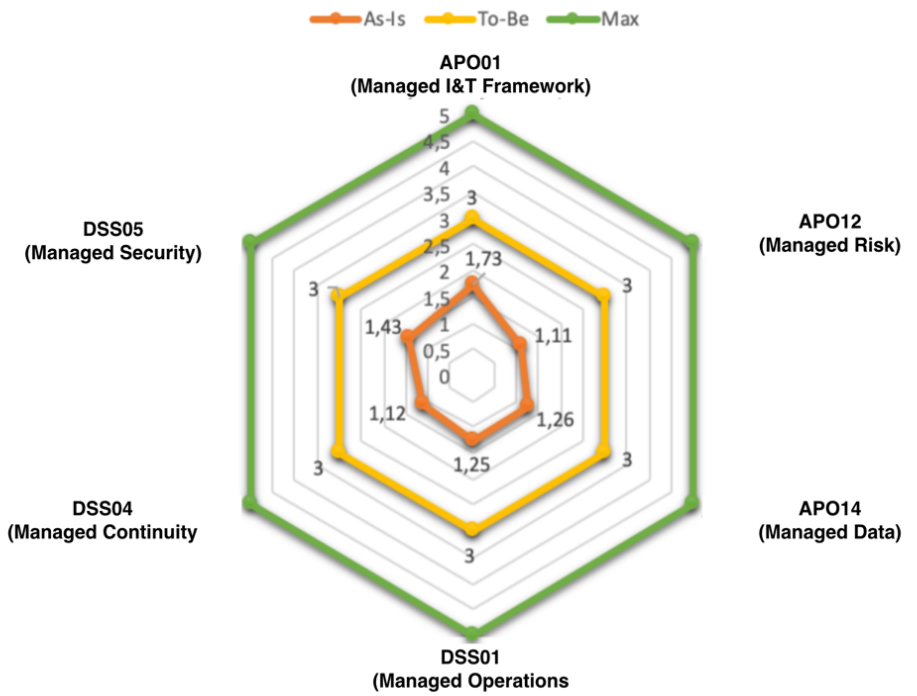

Figure 3. Gap Analysis Score in COBIT 2019

3.2. Strategic Recommendations

To address the gaps identified, strategic recommendations were formulated across three implementation timeframes: short-term, medium-term, and long-term. These plans are aligned with the available resources and organizational capacity of Universitas Sebelas Maret.

Table 3. Short-term recommendations (0–6 months)

Domain	Recommendation	Resource Needs
APO12	Establish IT risk management policy and team	3–4 staff, risk management tools, consultant
DSS04	Develop Business Continuity Plan (BCP) and DRP	2–3 staff, BCP/DRP consultant, backup tools
DSS05	Initiate security management system, classify data	3–4 staff, security consultant, training
APO01	Draft IT Master Plan, prepare IT resources	2–3 staff, audit consultant, training

Table 4. Medium-term recommendations (6–12 months)

Domain	Recommendation	Resource Needs
APO12	Periodic risk assessment and monitoring system	1–2 staff, risk management tools
DSS04	BCP/DRP testing, develop disaster recovery site	2–3 staff, backup infrastructure
DSS01	Develop SOPs, implement 24/7 monitoring	4–5 staff, monitoring tools
APO14	Establish data management policy, implement data lifecycle	1–2 staff, data governance tools

Table 5. Long-term recommendations (12–24 months)

Domain	Recommendation	Resource Needs
DSS01	Build monitoring dashboard, performance reporting	2–4 staff, dashboard and reporting tools
APO14	Implement data quality and metadata management	1–2 staff, data monitoring systems
DSS05	Deploy endpoint protection, security monitoring	Security tools, monitoring system
APO01	Conduct regular IT audits, develop IT KPIs	2–3 staff, evaluation tools

These recommendations are designed not only to improve specific COBIT processes but also to strengthen the organizational capability to maintain continuous improvement in governance maturity over time.

3.3. Implementation Roadmap

The implementation roadmap is divided into three clear phases. The short-term phase (0–6 months) focuses on laying the foundation establishing baseline policies, forming dedicated teams, and initiating training programs. This phase is critical for building momentum and ensuring organizational buy-in. The medium-term phase (6–12 months) emphasizes the development and deployment of systems that support operational resilience, including BCP/DRP execution, data policy

development, and enhanced service operations. These efforts ensure that IT functions can meet the university's demands more reliably. The long-term phase (12–24 months) involves institutionalizing continuous improvement mechanisms, such as performance monitoring dashboards, routine audits, and proactive security infrastructure. This phase is essential for ensuring sustainability and adaptability of the governance framework over time. This staged approach allows the university to adjust its pace of implementation based on available human resources and budgetary constraints. By prioritizing critical processes first and expanding progressively, Universitas Sebelas Maret can achieve meaningful improvements without overwhelming existing capacities.

3.4. Discussion

The audit results reveal a significant mismatch between IT operational practices and strategic governance expectations. The identified gaps indicate that the university's IT governance is still in its formative stages, with many processes lacking structure, documentation, and monitoring mechanisms. This is reflective of broader institutional challenges faced by public universities undergoing digital transformation. The application of the COBIT 2019 framework has proven highly relevant in this context. The clear separation between governance and management, coupled with a flexible and process-oriented structure, allows institutions like Universitas Sebelas Maret to pinpoint specific weaknesses and address them in a prioritized and structured manner. Moreover, COBIT 2019 provides a maturity model that helps visualize progress and benchmark performance over time. From a managerial and policy standpoint, the findings imply an urgent need for top-level commitment to IT governance. Which is realized through IT Governance Standard in Universitas Sebelas Maret shows in Figure 4.

Leadership involvement is essential not only to allocate resources but also to foster a culture of accountability, data stewardship, and continuous improvement. Formalizing governance roles and integrating them into the institution's strategic planning process will enhance the effectiveness of IT investments and service delivery. From a managerial and policy perspective, the findings underscore an urgent need for strong top-level commitment to IT governance. As illustrated in Figure 4, this is operationalized through the IT Governance Standard at Universitas Sebelas Maret, which formalizes roles, responsibilities, and performance expectations. Leadership engagement is critical not only to ensure adequate allocation of financial and human resources but also to cultivate a culture of accountability, data stewardship, and continuous improvement. Embedding governance roles into the university's strategic planning process will enhance the long-term sustainability of IT initiatives, optimize the return on technology investments, and improve service delivery to stakeholders.

Figure 4. IT Governance Standard in Universitas Sebelas Maret

Although this study provides valuable insights into the IT governance maturity of the Directorate of ICT at Universitas Sebelas Maret using the COBIT 2019 framework, several limitations should be noted. First, the assessment relied heavily on qualitative data obtained from interviews, questionnaires, and document reviews, which may be subject to respondent bias or incomplete disclosure of operational issues. Second, the scope of the evaluation was limited to selected COBIT 2019 domains identified as having the highest gap scores, meaning that other potentially relevant domains were not assessed in depth. Third, the findings represent a snapshot in time and may not fully reflect changes in governance practices that occur after the audit period, especially given the dynamic nature of IT operations and organizational priorities. Finally, the improvement roadmap proposed in this study is based on current resource availability and organizational readiness, which may limit the speed and scale of its implementation if institutional or external conditions change.

4. CONCLUSION

Based on the audit conducted using the COBIT 2019 framework, it is concluded that the IT governance maturity level at the Directorate of ICT, Universitas Sebelas Maret is still below the optimal standard, particularly in the areas of risk management, service continuity, and information security. This highlights the urgent need for a structured and strategic improvement plan. In formulating the plan, several key considerations must be addressed, including prioritizing domains with the highest gap scores, recognizing dependencies between recommended

process domains, managing the complexity of implementation, and aligning initiatives with available resources. The improvement plan should be implemented in three stages: short-term (0–6 months) focusing on drafting and establishing governance frameworks, policies, basic procedures, and preparing necessary resources; medium-term (6–12 months) focusing on system development, improving service quality, and forming technical teams; and long-term (12–48 months) emphasizing regular evaluation activities and ongoing development. It is recommended that Universitas Sebelas Maret start with short-term initiatives such as policy formulation, governance role definition, and basic training, then move to medium- and long-term actions including system development, BCP/DRP simulations, and the implementation of monitoring tools. Strengthening institutional commitment and ensuring adequate resource allocation will be essential to sustaining these improvements and achieving IT governance maturity that aligns with organizational goals and global best practices.

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