



Enhancing Data Governance in Higher Education Using the COBIT 2019 Framework for Strategic IT Alignment

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Abstract-The rapid evolution of digital technology has increased the need for structured data governance within higher education institutions (HEIs) to ensure effective strategic IT alignment. This study examines the application of the COBIT 2019 framework as a governance mechanism to assess and enhance data governance maturity in an academic environment. A case study approach was employed at Campus X, an Indonesian higher education institution specializing in informatics and information systems. Data were collected through semi-structured interviews, questionnaires using a five-point Likert scale, and document analysis. The results indicate that the overall IT governance maturity level at Campus X is moderate, with an average score of 3.0 out of 5.0. Specifically, the APO12 (Strategic IT Alignment) domain achieved a maturity score of 2.5, while the MEA03 (Evaluation and Audit) domain recorded the lowest score at 2.0, indicating weaknesses in strategic alignment and governance evaluation processes. In contrast, the DSS03 (Service Delivery) domain demonstrated a relatively high maturity level with a score of 4.0, reflecting well-established operational practices. These findings highlight critical gaps in aligning IT initiatives with institutional objectives and in implementing systematic monitoring and evaluation mechanisms. This study contributes to the literature by demonstrating how the COBIT 2019 framework can be adapted to the context of HEIs to improve data governance maturity. Practical recommendations include increasing senior management involvement, implementing real-time monitoring tools, and strengthening formal IT governance policies. The results provide empirical evidence that structured IT governance frameworks can support more effective data-driven decision-making and strategic IT alignment in higher education.

Keywords: COBIT 2019, IT Governance, Higher Education, Data Governance, Strategic IT Alignment.

1. INTRODUCTION

The rapid advancement of information and communication technology (ICT) has profoundly transformed the operational and strategic landscape of higher education institutions (HEIs). Digital systems now play a critical role in managing academic, administrative, and financial data, as well as in supporting institutional decision-making and strategic planning [1]. In this context, effective data governance has become a key requirement to ensure that institutional objectives are consistently aligned with information technology (IT) capabilities. However, many HEIs continue to face persistent challenges, including fragmented data management, misalignment between IT initiatives and institutional strategies, and inconsistencies in governance practices [2]. These issues often result in inefficient data utilization, limited transparency, and suboptimal strategic decision-making.

To address these challenges, several studies have adopted established IT governance frameworks, particularly the Control Objectives for Information and Related Technologies (COBIT). COBIT is a globally recognized framework that provides structured guidance for aligning IT processes with organizational goals, managing risks, and improving operational performance [3]. The latest version, COBIT 2019, introduces a more flexible and design-oriented approach, enabling organizations to tailor governance systems according to their specific context and strategic priorities [4]. Previous research has demonstrated the effectiveness of COBIT 2019 in business organizations, public sector institutions, and service-oriented enterprises, particularly in improving IT governance maturity and operational efficiency [5][6]. Despite these contributions, existing studies largely focus on general IT governance or service management perspectives and place limited emphasis on data governance as a strategic asset, especially within higher education environments. HEIs exhibit unique characteristics, such as decentralized organizational structures, diverse stakeholders, and complex academic data flows, which differentiate them from corporate or governmental organizations. As a result, findings from prior studies cannot be directly generalized to the higher education context. Moreover, while several studies have assessed COBIT 2019 maturity levels in



universities, most of them emphasize overall IT governance capability without explicitly examining strategic IT alignment and data governance integration as core analytical dimensions [7][8].

Another critical issue faced by HEIs is the increasing fragmentation of data across academic, administrative, and financial units, leading to data silos that hinder unified governance and integrated decision-making [9]. This problem has been further intensified by the COVID-19 pandemic, which accelerated digital transformation and increased reliance on online systems without always being accompanied by standardized governance mechanisms [10]. Although some studies have discussed the role of IT governance frameworks during digital transformation, systematic empirical evidence on how COBIT 2019 can be applied to strengthen data governance maturity and strategic alignment in HEIs remains limited.

This study addresses these gaps by proposing and empirically evaluating the application of the COBIT 2019 framework specifically for data governance optimization in higher education institutions. Unlike prior research that primarily examines IT governance maturity in general terms, this study focuses on how COBIT 2019 can be used to identify weaknesses in strategic IT alignment and governance evaluation processes related to data management. The novelty of this research lies in its context-specific application of COBIT 2019 to HEIs, with a particular emphasis on data governance as a strategic enabler rather than merely an operational function.

The primary objective of this study is to evaluate the effectiveness of COBIT 2019 in enhancing IT governance maturity in HEIs, especially in optimizing data governance to support institutional strategic goals [11]. This research aims to answer the following questions: (1) How mature is data governance within the selected HEI when assessed using the COBIT 2019 framework? and (2) Which governance domains require priority improvement to achieve better strategic IT alignment? To address these questions, a single-case study was conducted at Campus X, a higher education institution in Lombok Tengah, Indonesia, specializing in informatics engineering and information systems. Campus X was selected due to its high dependence on IT systems and the presence of governance challenges related to data integration and strategic alignment [12].

This study adopts a mixed-method case study approach, combining qualitative data from interviews and document analysis with quantitative data obtained through surveys using a five-point Likert scale. Governance maturity is evaluated across key COBIT 2019 domains, namely Align, Plan, Organize (APO); Build, Acquire, Implement (BAI); Deliver, Service, Support (DSS); and Monitor, Evaluate, Assess (MEA) [13][14]. By integrating qualitative insights with quantitative maturity measurements, this study provides a comprehensive assessment of IT governance readiness in the selected HEI.

The findings of this research contribute to both theory and practice. From a theoretical perspective, this study extends the application of COBIT 2019 by demonstrating its relevance for data governance in higher education settings. From a practical perspective, the results offer actionable recommendations for HEI leaders and IT managers, particularly in improving strategic alignment, strengthening governance evaluation mechanisms, and increasing senior management involvement. Consequently, this study serves as a reference for other HEIs seeking to enhance data governance maturity through structured and standardized IT governance frameworks.

2. RESEARCH METHODOLOGY

2.1 Research Design

This study employs a qualitative case study approach to explore the application of COBIT 2019 in IT governance within higher education institutions (HEIs). This method was chosen to gain an in-depth understanding of IT governance maturity, strategic alignment, and data management effectiveness in an academic setting [15]. The study was conducted at Campus X, a higher education institution in Lombok Tengah, Indonesia, specializing in informatics engineering and information systems. Given its high reliance on IT governance, Campus X presents a relevant case for examining the effectiveness of COBIT 2019 in HEI environments [11].

A mixed-method approach was employed, integrating both qualitative and quantitative data to provide a comprehensive analysis. Qualitative data were gathered through semi-structured interviews and document analysis, while quantitative data were collected via surveys to measure IT governance maturity based on the COBIT 2019 framework [13].

2.2 Case Study Context

Campus X was selected due to its challenges in IT governance, including data fragmentation, a lack of strategic IT alignment with institutional objectives, and underdeveloped governance evaluation mechanisms [4]. Despite having IT governance policies in place, the institution lacks an integrated system that fully aligns with its operational and strategic needs. This makes Campus X an ideal subject for assessing how COBIT 2019 can improve IT governance maturity [16].





2.3 Data Collection

Data were gathered using three primary techniques: semi-structured interviews, surveys, and document analysis [17]. Semi-structured interviews were conducted with key stakeholders, including IT administrators, PDDIKTI operators, and senior management at Campus X. The interview questions focused on IT strategy, technology implementation, IT service delivery, performance monitoring, governance challenges, and the perceived benefits of COBIT 2019 [18]. Surveys were administered to assess IT governance maturity across COBIT 2019 domains, such as Align, Plan, Organize (APO); Build, Acquire, Implement (BAI); Deliver, Service, Support (DSS); and Monitor, Evaluate, Assess (MEA) [19]. Respondents included academic staff, administrative personnel, and system users, with responses measured using a 5-point Likert scale, where higher scores indicate greater IT governance maturity [12].

Document analysis was conducted to examine existing IT governance policies, including standard operating procedures (SOPs), internal audit reports, and governance frameworks. This helped assess the extent to which current policies align with COBIT 2019 principles and identify areas for improvement [5].

2.4 Data Analysis

A structured approach was adopted to ensure validity and reliability in analyzing both qualitative and quantitative data. Thematic analysis was applied to qualitative data from interviews, categorizing responses based on strategic alignment, data integration, and IT governance effectiveness [8]. Quantitative survey data were analyzed using descriptive statistics, calculating frequencies, means, and standard deviations to measure governance maturity across COBIT 2019 domains. This approach facilitated a structured assessment of Campus X's IT governance readiness and identified key strengths and weaknesses in governance implementation [20].

To evaluate governance maturity, the study used a scoring system ranging from 0 (Incomplete) to 5 (Optimized) based on COBIT 2019's maturity model. This scale allowed for comparisons across governance domains, highlighting areas requiring targeted interventions [21].

2.5 Validity and Reliability of Data

To ensure data validity, a triangulation approach was applied by cross-referencing findings from interviews, surveys, and document analysis [22]. This method enhanced the credibility of the results by integrating multiple perspectives. Additionally, member checking was conducted, wherein interview transcripts were reviewed by respondents to confirm the accuracy and reliability of their statements [23].

The reliability of survey responses was assessed using Cronbach's Alpha, yielding a value of 0.85, indicating high internal consistency [24]. These measures ensured that the study's findings accurately reflected IT governance maturity levels at Campus X.

2.6 Implementation and Evaluation of Findings

To apply the research findings to practice, a workshop was conducted with stakeholders at Campus X, including senior management and IT personnel. The workshop aimed to discuss the IT governance maturity assessment results and propose improvements aligned with COBIT 2019 principles [25].

The recommendations put forward focused on enhancing senior management involvement, implementing real-time monitoring tools, and conducting regular IT governance training to improve compliance with IT governance standards [18]. A follow-up survey was conducted with workshop participants to evaluate the feasibility and potential impact of the recommended strategies [6].

2.7 Evaluation of Recommendations

The recommendations for improving governance maturity at Campus X were evaluated based on stakeholder feedback. A follow-up survey was conducted with participants from the workshop to assess the practicality and effectiveness of the proposed actions [6]. The results indicated a high level of support for the recommendations, particularly those related to enhancing management involvement, implementing real-time monitoring tools, and conducting regular training sessions.

Table 1. Summary of Proposed Recommendations for IT Governance Improvement at Campus X

Domain	Recommendation	Responsible Party	Frequency
APO12	Enhance senior management involvement	IT Head, Senior Mgmt	Quarterly
MEA03	Implement real-time monitoring tools	IT Team, Audit Team	Continuous
DSS03	Conduct regular IT service maintenance	IT Operations Manager	Monthly



3. RESULT AND DISCUSSION

3.1 Initial IT Governance Assessment at Campus X

The initial assessment of IT governance maturity at Campus X was conducted to explore the current implementation of the COBIT 2019 framework. This assessment involved interviews with key stakeholders, including IT management, PDDIKTI Operators, and Campus X leadership. The interviews were structured into six categories: IT strategic planning and alignment, technology development, IT services, performance monitoring, challenges, and benefits of COBIT 2019 implementation. The analysis identified key challenges at Campus X, such as the absence of formal IT policies, budget constraints that hinder infrastructure renewal, and the need for enhanced data security policies. The absence of well-documented IT policies was a significant obstacle, affecting alignment between IT strategy and institutional goals. Furthermore, budgetary issues limited the ability to upgrade IT infrastructure, leading to potential risks in IT service quality and data security. The findings from the questionnaire, distributed to academic, administrative staff, and information system users, revealed an average score of 3 out of 5 on a Likert scale. This score reflects moderate perceptions of IT governance effectiveness, management support, and compliance with IT policies. Document analysis showed that, although policy documents exist, they were not systematically documented or managed, increasing the risk of data loss and inefficiency.

Table 2. IT Governance Challenges Identified at Campus X

Challenge	Impact
Absence of Formal IT Policies	Poor alignment with strategic goals
Budget Constraints	Limited infrastructure renewal
Data Security Issues	Inadequate data protection measures

3.2 Data Governance Maturity Evaluation Using COBIT 2019

The maturity evaluation of IT governance at Campus X was conducted using the COBIT 2019 framework. The assessment covered the domains of Align, Plan, Organize (APO); Build, Acquire, Implement (BAI); Deliver, Service, Support (DSS); and Monitor, Evaluate, Assess (MEA). Each domain was assigned a maturity level ranging from 0 (Incomplete) to 5 (Optimized) based on the results of interviews and questionnaires. Key findings indicate that the APO12 (strategic IT alignment) and MEA03 (evaluation and audit) domains were assessed as the least mature, with scores of 2.5 and 2.0 respectively, indicating the need for significant improvement. The DSS03 domain, which pertains to service delivery, displayed a higher level of maturity at 4.0, indicating well-established operational practices.

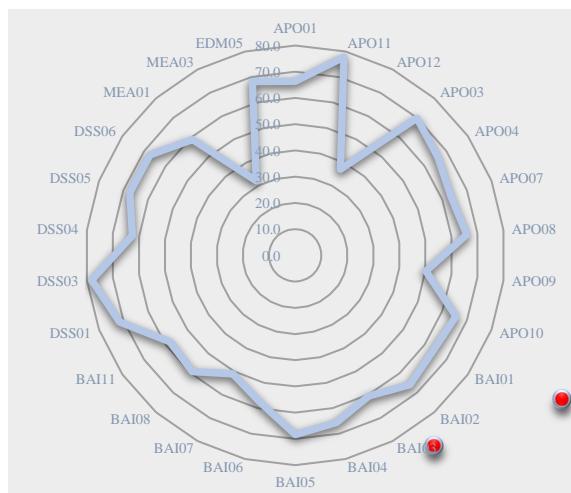


Figure 1. Maturity Levels Across COBIT Domains at Campus X

Figure 1 illustrates the maturity levels across various IT processes at Campus X, based on the COBIT 2019 framework. This evaluation identifies two domains, APO12 and MEA03, as having the lowest maturity scores, thereby highlighting significant opportunities for improvement in strategic alignment and process evaluation within Campus X's IT governance structure. APO12, which pertains to strategic IT planning and oversight, exhibits a low maturity level. This score suggests a deficiency in aligning IT strategies with organizational



objectives and a lack of sufficient management oversight. Strategic alignment is a critical factor in maximizing IT's role within an institution, as emphasized by [22]. Weak engagement from senior leadership and inadequate processes for aligning IT initiatives with strategic goals contribute to this low score.

3.3 Analysis of Poor Performance Domains

The domains APO12 (strategic IT planning and alignment) and MEA03 (evaluation and audit) were identified as having the lowest maturity scores. The results show that these areas require focused improvement to enhance overall IT governance at Campus X. APO12 relates to aligning IT strategy with institutional goals. The low maturity score in this domain highlights deficiencies in IT engagement with organizational objectives and management oversight. Effective strategic alignment has been shown to significantly influence IT governance success, as highlighted in previous studies.

Recommendations for improving APO12 include:

- a. Enhance Senior Management Involvement
 - Senior management should actively participate in IT strategy discussions to ensure alignment with institutional goals.
- b. Establish Standard Operating Procedures (SOPs)
 - Develop and implement comprehensive SOPs that clearly define roles and responsibilities related to IT oversight.
- c. Conduct Regular Training Programs
 - Implement periodic training for staff on strategic IT planning and risk management.

Table 3. Recommendations for Enhancing APO12 Domain

Recommendation	Responsible Party	Frequency
Senior Management Involvement	Head of IT, Senior Mgmt	Quarterly
SOP Development	Head of IT, Relevant Depts	Annual Review
Training Programs	Head of IT, HR Department	Semi-Annually

MEA03, which relates to evaluating and auditing IT processes, also requires significant improvements. The low maturity level suggests a lack of structured audit mechanisms to evaluate compliance and governance standards. Regular audits and robust monitoring tools are essential to achieving effective governance, as noted by [6].

Recommendations for improving MEA03 include:

- a. Strengthen Audit Protocols
 - Introduce structured, periodic audits that assess compliance and effectiveness across all IT processes.
- b. Invest in Real-Time Monitoring Tools
 - Implement monitoring systems that provide continuous evaluation of IT performance and compliance.
- c. Provide Specialized Auditor Training
 - Equip internal auditors with targeted training for comprehensive IT process evaluation.

3.4 Comparative Analysis of High and Low Maturity Domains

A comparative analysis between high and low maturity domains reveals significant disparities. Domains like DSS03 and APO11 scored significantly higher, achieving ratings of 4.0 and 3.8 respectively. In contrast, APO12 and MEA03 scored much lower, indicating gaps in strategic alignment and audit mechanisms.

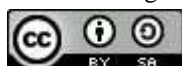
Table 4. Comparative Analysis of High and Low Scoring Domains

Domain	Maturity Score	Assessment
DSS03	4.0	Well Established
AP011	3.8	Well Established
AP012	2.5	Needs Improvement
MEA03	2.0	Needs Improvement

The higher-scoring domains indicate robust practices in areas like service delivery and strategic alignment. These successful practices can be adapted to improve performance in weaker domains. The findings emphasize the importance of leveraging cross-domain learning to enhance governance maturity across all areas.

3.5 Practical Implications and Stakeholder Engagement

The involvement of key stakeholders at Campus X, including senior management and IT personnel, played a crucial role in understanding and improving IT governance maturity. A workshop was conducted to disseminate findings and engage stakeholders in discussions about improving governance practices. Participants provided valuable insights into how to practically implement the recommendations. Stakeholder feedback highlighted the





importance of real-time monitoring tools for improving IT governance. Real-time data monitoring and structured audit processes were identified as critical for maintaining compliance and improving overall performance. Engagement from senior management was also considered a key factor in achieving successful IT governance outcomes.

Table 5. Governance Maturity Levels Across COBIT Domains at Campus X

Table with 3 columns: COBIT Domain, Maturity Level, Description. Rows include APO12 (2.5), MEA03 (2.0), DSS03 (4.0), APO11 (3.8), and BAI05 (3.5).

- a. APO12, This domain focuses on strategic alignment between IT and institutional objectives. The current score indicates gaps that require management engagement and clearer SOPs.
b. MEA03, Pertains to the evaluation and auditing of IT processes. The low score reflects a lack of structured audit processes.
c. DSS03, High maturity score reflects robust operational practices in IT service delivery.
d. APO11 and BAI05, Demonstrates well-established practices in strategic IT planning and implementation.

3.6 Summary of Recommendations and Action Plan

Based on the findings, several recommendations have been developed to improve IT governance maturity at Campus X. Table 6 provides a summary of the recommended actions, responsible parties, and the frequency of implementation.

Table 6. Summary of IT Governance Improvement Recommendations

Table with 4 columns: Domain, Recommendation, Responsible Party, Frequency. Rows include APO12 (Increase senior management involvement), MEA03 (Implement real-time monitoring tools), DSS03 (Conduct regular IT service maintenance), APO11 (Optimize project management approaches), and BAI06 (Develop detailed change management policies).

The recommendations focus on enhancing strategic alignment, strengthening audit mechanisms, and leveraging existing strengths to improve underperforming areas. A combination of increased management involvement, structured policies, regular audits, and targeted training will contribute to higher IT governance maturity.

3.7 Implications for Higher Education IT Governance

The findings of this study provide valuable insights for HEIs seeking to optimize IT governance maturity using COBIT 2019. The results indicate that strategic misalignment and governance evaluation deficiencies are common challenges in academic institutions. Addressing these gaps requires a combination of policy reinforcement, technological improvements, and leadership engagement [8].

Additionally, this study reinforces the applicability of COBIT 2019 in HEI settings, demonstrating that structured governance frameworks can enhance decision-making, IT integration, and risk management [5]. Future studies should explore multi-institutional analyses to validate governance improvement strategies, ensuring broader applicability across different higher education ecosystems [13].

4. CONCLUSION

This study evaluated IT governance maturity at Campus X using the COBIT 2019 framework, with a particular focus on strategic alignment, IT service effectiveness, and governance evaluation mechanisms. The findings reveal that operational IT governance is relatively mature, as reflected in the DSS03 domain, which achieved a score of 4.0. In contrast, strategic alignment (APO12: 2.5) and governance evaluation and audit processes (MEA03: 2.0) remain underdeveloped, indicating persistent challenges in aligning IT initiatives with institutional objectives and in implementing systematic monitoring and evaluation practices. From a practical perspective, these findings provide clear guidance for higher education institutions seeking to strengthen IT governance. The proposed strategies—enhancing senior management involvement, implementing real-time IT performance monitoring





systems, and conducting regular training and governance audits—offer actionable steps that can be directly adopted by institutional leaders and IT managers. By applying these strategies, HEIs can improve decision-making quality, strengthen data integration across organizational units, and ensure that IT investments more effectively support institutional strategic goals. This study contributes to the body of knowledge on IT governance in higher education by demonstrating the applicability of COBIT 2019 as a comprehensive framework for assessing and improving data governance maturity. The results also serve as a practical reference for other HEIs facing similar governance challenges, particularly in environments characterized by decentralized data management and increasing digital transformation. Future research is recommended to extend this study through multi-institutional comparative analyses to enhance the generalizability of the findings. In addition, longitudinal studies could examine the long-term effects of COBIT 2019–based governance improvements, particularly in relation to operational efficiency, data quality, and user satisfaction within academic IT environments.

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