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Evaluation of Information Technology Governance Using the COBIT Framework in Higher Education in Indonesia: A Literature Study

I Putu Sugi Almantara[1], I Nyoman Angga Prabawa[2], I Nyoman Angga Prabawa[2]
[1] Information Technology, Faculty of Engineering, Udayana University
[2] Computer Engineering, Faculty of Engineering and Planning, Warmadewa University

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ABSTRACT

IT (Information Technology) governance plays a critical role in supporting the strategic objectives and operational sustainability of Higher Education (HEIs). This study presents a systematic literature review of 20 primary studies that evaluate IT governance practice in Indonesia HEIs using the COBIT framework. The analysis focuses on three dimensions: the evaluation of governance framework, the distribution of evaluated COBIT domains, and common implementation barriers. To identify, use the Systematic Literature Review (SLR) method. The findings indicate a significant shift toward the adoption of COBIT 2019, which is favored for its design factor-based approach that enables governance systems to be tailored to institutional strategies and risk profiles. The most frequently evaluated domains are Align, Plan, dan Organize (APO), Evaluate, Direct, and Monitor (EDM), Build, Acquire, and Implement (BAI), and Deliver, Service, and Support (DSS) reflecting a strong emphasis on strategic alignment and operational stability. However, the Monitor, Evaluate, and Assess (MEA) domain remains underrepresented, suggesting a gap in continuous monitoring and performance evaluation. These findings highlight the need for HEIs to strengthen monitoring mechanisms and institutionalize governance processes to achieve sustainable IT governance maturity.

Corresponding Author:

I Nyoman Angga Prabawa
Computer Engineering, Faculty of Engineering and Planning, Warmadewa University
Email: anggaprabawa@warmadewa.ac.id

1. INTRODUCTION

Information Technology (IT) has become a fundamental pillar for Higher Education Instructions (HEIs) in Indonesia, serving as the backbone for Academic Information Systems (SIAKAD) and E-Learning platforms [1], [2], [3]. As reliance on digital services grows, the complexity of IT operations also increases, bridging significant risks such as system failures, data security breaches, and misalignment between IT and business strategies [4], [5], [6]. To mitigate these risks, many institutions have adopted the COBIT (Control Objectives for Information and Related Technologies) framework as the de facto standard to ensure that IT investments generate value and resources are optimized [7], [8], [9].

Despite the widespread adoption of the governance framework, the implementation of IT governance in Indonesian HEIs faces substantial challenges [4], [9]. A recurring problem identified in the literature is that many institutions still operate on an ad-hoc basis, where IT processes rely heavily on individual expertise rather than standardized procedures [10], [11]. Consequently, many campuses struggle to move beyond low capability levels (Level 1), facing persistent issues such as lack of formal documentation and inadequate risk management [8], [12], [13]. While numerous studies have evaluated IT governance using

COBIT 5 to assess process capability gaps, there is a growing trend of migrating towards the newer COBIT 2019 framework, which emphasizes a flexible design based on specific institutional factors [9], [14], [15].

However, existing research is largely dominated by isolated case studies that focus on specific domains within a single institution [4], [8], [9], [14]. There is a lack of comprehensive studies that map the evolutionary trend of governance framework adoption across the Indonesian higher education sector. It remains unclear how the transition from the compliance-based approach of COBIT 5 to the design-centric approach of COBIT 2019 is impacting the strategic focus of HEIs [9], [14], [16]. Furthermore, the structural barriers spanning people, processes and technology that hinder institutions from achieving higher maturity levels have not been synthesized into a unified view [4], [10], [12], [17].

This study proposes a **Systematic Literature Review (SLR)** to address this gap by analyzing 22 selected primary studies published between 2020 to 2025. The approach involves mapping the distribution of framework versions, identifying the most frequently evaluated domains and synthesizing the common barriers to implementation.

The innovation and new value of this research lie in providing a holistic map of the IT governance landscape in Indonesian higher education. Unlike previous studies that focus on single-entity evaluation, this research offers a holistic synthesis of governance trends across the higher education sector. It aggregates fragmented data to reveal the dominant framework versions, map the priority domains evaluated by institutions, and categorize the structural barriers that hinder governance maturity levels.

2. METHOD

This research employs a **Systematic Literature Review (SLR)** method to identify, evaluate and interpret all available research relevant to the evaluation of IT governance in Indonesian Higher Education Institutions (HEIs). The research procedure is carried out chronologically in four main stages: Research Questions, Literature Search, Literature Selection, and Data Analysis.

2.1 Research Questions

Determining the Research Question (RQ):

1. RQ1: Which COBIT domains are most frequently evaluated in assessing IT governance quality within educational institutions and what contextual factors drive their prioritization?
2. RQ2: What key human, process and technological constraints hinder the effective implementation of IT governance in the education sector?
3. RQ3: How do IT governance evaluation approaches differ across COBIT 4.1, COBIT 5 and COBIT 2019 in educational institution case studies?

2.2 Data Acquisition

The data acquisition process was primarily conducted using Google Scholar database. This platform was selected due to its comprehensive coverage of Indonesian academic publications, ensuring a wide catchment of relevant local studies. To guarantee the relevance of findings to current technology and governance standards, the search was restricted to articles published within the last five years between 2020-2025. The search strings used were a combination of keywords: “COBIT”, “Audit”, “Tata Kelola Teknologi Informasi”, “Perguruan Tinggi”, “Universitas” and “Politeknik”.

2.3 Selection Procedure

To ensure the scientific validity of the review, a rigorous selection protocol was applied to screen the initial search results. This procedure acts as the research algorithm to filter out noise and irrelevant data. The selection process is defined by the following Inclusion and Exclusion criteria:

1. Inclusion Criteria:
   - The study must be a primary research article based on case study
   - The object of the study must be a Higher Education Institution (University, Institute, Polytechnic, or Academy) in Indonesia
   - The paper must utilize the **COBIT Framework** (version 4.1, 5, or 2019)
   - The output must explicitly state the **Maturity Level** or **Capability Level** as a quantitative score
2. Exclusion Criteria:

A. Studies conducted on non-HEI organizations like a High Schools or Companies, such as the study by *Felicia et al.* (2024) and *Utama et al.* (2023), were excluded to maintain domain specificity [18], [19].
B. Secondary studies or correlational studies that do not perform a direct audit process, such as *Prasetya & Muhammad* (2025) and *David et al.* (2023), were removed to avoid data redundancy [20], [21].
C. Studies that only measure "User Satisfaction" without calculating the governance maturity level, such as *Saragih & Indriyani* (2024), were excluded to ensure metric consistency [22].

Based on this procedure, a total of 20 primary papers were selected as the final dataset for analysis.

2.4 Data Analysis

The selected data were analyzed using a quantitative descriptive approach. The extraction process focused on four key variables:

1. The COBIT version used,
2. The specific domains evaluated (APO, BAI, DSS, MEA, EDM),
3. The resulting maturity/capability level
4. The reported barriers or challenges

The data were then synthesized to identify trends in framework adoption and common governance gaps across the identified institutions.

3. RESULTS AND DISCUSSION

This section presents the findings from the 20 primary studies selected through the systematic review process. To maximise clarity and analytical coherence in the literature review, the most appropriate grouping strategy adopted is to classify the studies based on the COBIT framework version, followed by the year of publication. This approach is justified for several reasons.

First, methodological differences exist across COBIT versions. COBIT 4.1, COBIT 5, and COBIT 2019 employ distinct audit and governance methodologies. COBIT 2019 introduces Design Factors, whereas COBIT 5 focuses on the Process Assessment Model. Grouping studies solely by publication year would likely confuse readers due to differences in terminology, assessment metrics, and evaluation logic.

Second, version-based classification allows for a clearer understanding of the evolution of IT governance practices in higher education institutions. This structure highlights the transition from a primarily process-oriented management approach in COBIT 4.1 and COBIT 5 toward a design-oriented and flexible governance system emphasized in COBIT 2019.

Finally, this strategy ensures terminological consistency, particularly with respect to domain nomenclature, which differs across framework versions, such as PO or AI in COBIT 4.1 than APO or BAI in COBIT 5 or COBIT 2019. Such grouping facilitates readability and accurate interpretation of domain codes. The following table presents the data extraction results, organized according to the COBIT framework version, followed by the year of publication.

Table 1. Summary of Selected Studies

No	Object of Study	Domain(s)	Capability/ Maturity Level	Conclusion
COBIT 2019				
1	PUSTIK STMIK Lombok	APO04, APO10, BAI02, DSS01, DSS05, EDM01	Level 3	Processes are standardized (Level 3), but that 6 domains need to be upgraded to a predictive (Level 4) or optimized level (Level 5) with any recommendation and expected outcome
2	Institut XYZ (Biro Administrasi Akademik)	BAI08	Level 2	Knowledge management is Level 2. A culture of knowledge sharing and efficient application use is needed to achieve the target level (Level 4)
3	Universitas Nurdin Hamzah	BAI03, BAI06	BAI03: Level 3 BAI06: Level 4	Generally achieved (largely achieved), but requires the involvement of independent testers and the determination of change priorities
4	Universitas XY	APO02, APO03,	APO02: Level 2 APO03: Level 3	The focus of the research is governance design. Priority processes for domains which had design factors

		APO04, APO07, BAI01, BAI05, BAI06, BAI07, BAI08	APO04: Level 4 APO07: Level 1 BAI01: Level 2 BAI05: Level 2 BAI06: Level 0 BAI07: Level 0 BAI08: Level 2	importance score 0 or more and be crucial in institution implementing
5	Educational Institutions	- (only defining Enterprise Goals and Design Factor)	-	Security and risk management need to be improved. Business process implementation must be evaluated for regulatory compliance
6	Perguruan Tinggi XYZ	APO12	Level 2	Risk Management is “Managed” or Level 2 but not yet optimal and have a gap to achieve Target Level 4. Systematic risk data recording is needed
7	Polytechnic XYZ	EDM02, EDM04, APO08, APO11, APO13, BAI01, BAI02, BAI03, BAI04, BAI05, BAI06, BAI07, BAI08, BAI10, BAI11, DSS03, DSS06	Level 2	Process Capability is still at Level 2. Improvements in enterprise architecture and change management are needed to achieve Smart Campus
8	XYZ College	DSS02, BAI01, MEA01, MEA02, MEA03, MEA04	DSS02: Level 2 BAI01: Level 3 MEA01: Level 3 MEA02: Level 3 MEA03: Level 3 MEA04: Level 2	Infrastructure is adequate, but governance procedures are not yet standardized. Periodic evaluation and improvements in incident handling are needed.
9	Institusi XYZ	BAI03, BAI07, BAI10, DSS01, DSS05	Level 1	A major gap was found. All priority processes are still at Level 1, while the target is Level 3 & 4
10	XYZ University	APO03, APO08 APO09, APO11, APO12, APO13, APO14, BAI03, BAI06, DSS04, DSS05	Level 2	Most processes are still at Level 2 (Managed). Architectural readiness and business relationships need to be improved.
11	XYZ-edu	EDM01, EDM02, EDM04, APO01, APO02, APO04, APO07, BAI01,	Level 0	Very low maturity level (Level 0) compared to Level 2 target. Lack of documentation, SOPs, and basic IT skills

		BAI02		
COBIT 5				
12	Institut Teknologi & Bisnis (ITB) Semarang	PO7, A12, A13, A14, DS4, DS7 (COBIT 4.1 domain codes are used in COBIT 5)	Level 4	The SIAKAD process is very good or Fully Achieved. The system has high performance and is secure, only requiring continuous monitoring
13	UIN Sumatera Utara	DSS01, DSS02, DSS04, DSS06, MEA01	Level 4	The majority of processes are predictable (Level 4), except for continuity management (DSS04) which is still at Level 3. Business Continuity improvements are needed
14	UIN Sumatera Utara	EDM04, APO04, BAI05	Level 3	Maturity level at Level 3 (Defined). Needs increased innovation and organizational change management to reach Level 4
15	STMIK Bina Nusantara Jaya Lubuklinggau	APO11, MEA01	Level 3	Current conditions (Level 3) are still below the service quality management system is required
16	Perguran Tinggi XX	APO13, DSS05	APO13: Level 1, DSS05: Level 2	Low system security (Level 1-2). SOPs, maintenance documentation, and updated antivirus software are essential
17	Yayasan Perguruan Tinggi (Widya Dharma Pontianak)	EDM01, EDM02, EDM04, APO01, APO02, APO04, APO05, APO07, BAI01, BAI02	Level 1	IT governance is still ad-hoc (Level 1) with a gap from the target (Level 3). Many procedures are not documented and socialization is lacking
COBIT 4.1				
18	Pendidikan Tinggi Vokasi di Bandung	A12	Level 2	Software procurement remains sporadic and intuitive, with little user involvement in determining application features.
19	9 Polytechnics in Bandung	PO1	Level 2 (Repeatable but Intuitive)	IT strategic planning is not yet a best practice. IT relies on specific individuals and assignments are ad-hoc
20	Universitas Negeri Malang (E-learning)	PO1-PO10	Level 1	The implementation of e-learning is still in its early stages and has not yet been organized with standard procedures. A clear development roadmap is needed

The analysis focuses on three key dimensions, such as the evolution of governance frameworks, the evaluated domains, and the synthesis of common implementation barriers.

3.1. Evolution of Governance Framework

The analysis reveals a significant shift in the adaptation of IT governance frameworks within Indonesian Higher Education Institutions (HEIs). As illustrated in Figure 1, COBIT 2019 has become the dominant framework, accounting for 50% or 11 studies of the research conducted between 2020 and 2025. This indicates a strategic transition from the compliance based approach of COBIT 5 (36.4%) and the legacy COBIT 4.1 (13.6%) towards a more flexible, design centric methodology offered by the latest version.

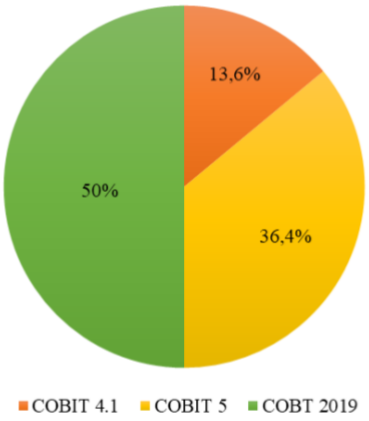

Figure 1. Distribution of COBIT Used in Indonesia HEIs 2020-2025

The preference for COBIT 2019 is driven by it's Design Feature, which allows institutions to tailor the governance system according to their specific strategy, such as prioritizing cost efficiency or innovation [9], [15], [16], [23]. A few studies demonstrate that HEIs are now using these design toolkits to map their risk profiles before conducting audits, ensuring that the governance system is relevant to their organizational goals [13], [14], [24]. Conversely, institutions using COBIT 5 primarily focus on the *Process Assessment Model* (PAM) to measure capability gaps in existing operations without a preliminary design phase [4], [11].

3.2. Focus Domains and Strategic Alignment

The frequency analysis of evaluated domains, as shown in Figure 2, highlights the operational and strategic priorities of Indonesian HEIs.

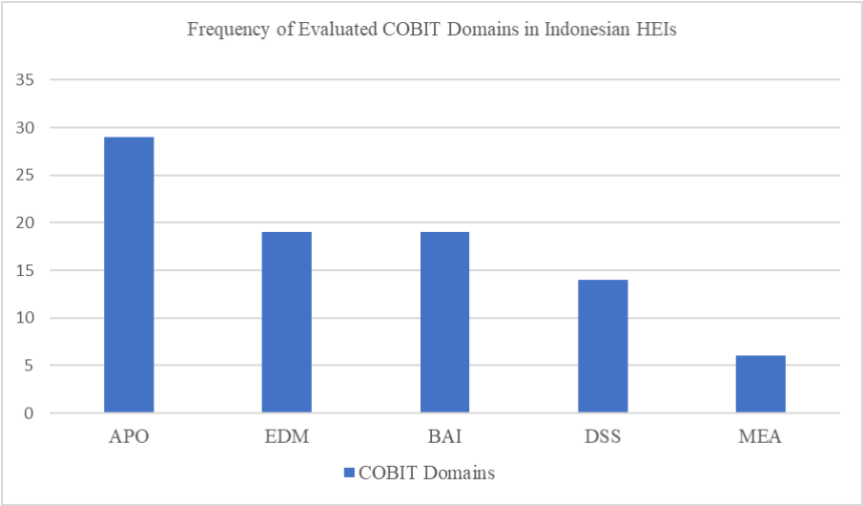

Figure 2. The Frequency of COBIT Domains

1. Strategic Planning Dominance (APO & EDM)
   The Align, Plan and Organize (APO) domain appears most frequently (29 occurrences), followed closely by Evaluate, Direct and Monitor (EDM) with 19 occurrences. This high frequency suggests that HEIs are currently prioritizing the alignment of IT strategy with academic goals [4], [14], [16]. Some research highlights that institutions are heavily investing efforts in Managed Risk (APO12) and Governance Framework Setting (EDM01) to mitigate the risk of IT investment failure [11], [13], [15].

2. System Development and Implementation (BAI)
   The Build, Acquire, and Implement (BAI) domain is equally prominent, appearing 19 times in the reviewed literature. This high frequency reflects the current state of many Indonesian HEI's that are aggressively undergoing digital transformation [2], [6], [9], [17]. The focus on BAIK indicates that institutions are heavily invested in realizing their IT strategies by identifying requirements,

acquiring solutions, managing organizational change to implement new systems, such as upgrading Academic Information Systems or Learning Management Systems [1], [14]. This proves that the capability to deliver new solutions is prioritized just as highly as strategic governance.

3. Operational Stability (DSS)
   The Deliver, Service and Support (DSS) domain remains critical (13 occurrences), particularly DSS01 and DSS05. This focus is driven by the urgent need to maintain the availability and security of Academic Information Systems (SIAKAD) and E-Learning platforms, which are susceptible to technical disruptions and security threats [2], [4], [9], [19].
4. The Monitoring Gap (MEA)
   A significant finding is the low frequency of the Monitor, Evaluate and Assess (MEA) domain (6 occurrences). This indicates a gap in the check phase of the Plan, Do, Check, Act (PDCA) cycle, where many institutions fail to establish routine performance monitoring mechanisms, resulting in governance practices that are often reactive rather than continuous [12], [14], [25].

3.3 Maturity Levels and Implementation Barriers

Synthesizing the capability level findings, the majority of Indonesian higher education institutions (HEIs) operate at Level 2 (Managed) to Level 3 (Established), indicating that while processes are already implemented and partially standardized, they are not yet fully optimized or consistently measured. Only a limited number of more mature institutions particularly in their e-learning services have reached Level 4 (Predictable), where processes are quantitatively managed and performance is more stable.

Despite this progress, the literature consistently highlights three key structural barriers that hinder advancement to higher maturity levels. From the people perspective, governance processes often rely heavily on specific individuals, creating a "hero culture" in which critical knowledge is not systematically documented [10], [12]. As a result, when key personnel leave, institutional knowledge is lost. This issue is compounded by a shortage of certified IT professionals, which frequently leads to excessive workloads and staff burnout [14], [16]. From the process perspective, many institutions lack formalized Standard Operating Procedures (SOPs). Although IT operations may function adequately in practice, they often fail to meet audit and compliance standards because activities are carried out based on habit or individual experience rather than structured and documented procedures [9], [10], [11]. Finally, from the technology perspective, integration remains a significant challenge. Many institutions still operate in technical silos, leading to data duplication across systems particularly between academic and financial units which ultimately hinders data consistency and limits the effectiveness of strategic decision-making [11], [14], [16].

4. CONCLUSIONS AND SUGGESTIONS

4.1 Conclusions

Based on the systematic review of 20 primary studies on IT governance evaluation in Indonesian higher education institutions, three key conclusions can be drawn. First, there is a clear framework transition, with approximately 50% of recent studies adopting COBIT 2019. This trend reflects a shift toward more flexible and design-driven governance approaches that align with institutional strategies, gradually replacing the more rigid, compliance-oriented nature of legacy frameworks such as COBIT 4.1. Second, a strategic focus versus execution gap is evident. While institutions tend to emphasize strategic planning (APO domain) and governance direction (EDM domain), the execution phase often lacks effective monitoring and evaluation. The relatively low adoption of the MEA (Monitor, Evaluate, Assess) domain indicates that the "check" phase within the governance cycle is frequently overlooked, resulting in inconsistent performance and limited continuous improvement. Third, the findings highlight a persistent maturity barrier, where most institutions remain at Level 2 (Managed) to Level 3 (Established). The main obstacle to achieving higher maturity is not technological limitation, but rather a "formalization gap." In many cases, processes are carried out intuitively by key individuals without being supported by standardized documentation such as Standard Operating Procedures (SOPs). This condition makes governance practices fragile, difficult to sustain, and highly dependent on specific personnel.

4.2 Suggestions

Identifying the limitations of the current literature, this study proposes several directions for future research. First, in terms of comparative analysis, future researchers are encouraged to broaden the scope by examining differences between Public Universities (PTN) and Private Universities (PTS) across various geographical clusters. Such comparisons would provide deeper insight into whether factors such as institutional scale and accreditation status significantly influence IT governance maturity levels.

Second, regarding automated audit integration, there is a pressing need to develop audit modules that are directly embedded within Academic Information Systems (SIAKAD). By integrating governance assessment mechanisms into operational systems, institutions could enable real-time monitoring and automatic calculation of maturity levels, thereby reducing dependence on manual and periodic audit processes.

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