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QUALITY MANAGEMENT OF INFORMATION TECHNOLOGY GOVERNANCE COBIT 2019 FRAMEWORK EDUCATION FACTORS IN INDONESIA: A REVIEW

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Abstract

This study examines information technology (IT) governance in Indonesia's education sector using the COBIT 2019 framework through a systematic literature review (SLR) approach. COBIT 2019 is a globally recognized framework designed to help organizations manage IT effectively by integrating quality management principles to achieve strategic objectives. In the education sector, implementing robust IT governance is crucial to supporting ongoing digital transformation efforts. The SLR process involved identifying, selecting, and analyzing relevant literature to assess the implementation of COBIT 2019 in the Indonesian education sector. The findings indicate that this framework can enhance IT governance quality, particularly in risk management, resource efficiency, and operational sustainability. However, challenges persist, including limited managerial understanding, shortages of skilled human resources, and inadequate infrastructure support. To address these challenges, collaboration among the government, educational institutions, and the private sector is essential. Additionally, continuous training programs are necessary to enhance the competencies of management and IT personnel in effectively implementing COBIT 2019. The study underscores the importance of integrating technological and educational aspects to improve service quality in the education sector. Furthermore, the COBIT 2019 framework is recognized as a valuable tool for fostering collaboration among stakeholders to achieve sustainable education development in Indonesia.

Keywords: *IT Governance, COBIT 2019, Education, Quality Management, Indonesia*.

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1. INTRODUCTION

In the era of rapidly advancing digitalization, information technology (IT) has become a crucial factor in driving the development of various sectors, including education [1][2]. In Indonesia, IT plays a vital role in the education sector, facilitating access to up-to-date and continuously evolving sources of information [3][4]. As organizations increasingly recognize the importance of IT, their focus on its governance and implementation continues to grow each year [5]. To ensure the effective utilization of IT within organizations, its governance must be periodically monitored and aligned with established standards[6][7][8]. Proper governance frameworks help organizations optimize IT resources, mitigate risks, and enhance operational efficiency, ultimately supporting sustainable development in the education sector.

Evaluation is essential in the technology governance management process, particularly due to frequent shifts in policy direction and evolving functional requirements among stakeholders, executives, and relevant management entities [9]. In educational institutions, information technology plays a critical role in supporting both administrative and academic processes, enhancing efficiency and effectiveness in daily operations [10]. Therefore, implementing effective IT governance is crucial to ensuring that technology optimally supports the mission and vision of educational institutions [11][12].

The COBIT (Control Objectives for Information and Related Technology) 2019 framework is one of the most widely adopted frameworks for IT governance [13][14]. It provides a structured approach to aligning business strategy with information technology[15] while offering guidance on risk management and the assessment of IT governance quality and resource utilization [16][17][18]. COBIT 2019 is particularly relevant for implementation in the education sector, where effective IT governance is essential. In the Indonesian context, this framework

can help address sector-specific challenges and complexities related to IT governance [19][20].

This systematic literature review (SLR) aims to examine information technology governance quality management using the COBIT 2019 framework, with a specific focus on the education sector in Indonesia. The SLR approach was selected to systematically identify, analyze, and synthesize relevant studies, providing a comprehensive understanding of the implications and impacts of IT governance implementation in this context.

This review also aims to identify key factors influencing the successful implementation of IT governance in Indonesia's education sector. By analyzing the selected literature, this study seeks to provide a comprehensive understanding of the implementation, challenges, and opportunities associated with adopting the COBIT 2019 framework in this context. The findings are expected to serve as a valuable reference for policymakers, IT managers, and education practitioners in designing and implementing effective, sustainable, and institution-specific IT governance strategies in Indonesia.

This study evaluates the application of the COBIT 2019 framework in managing IT governance quality within the education sector. The assessment is structured around two key research questions (RQs) that guide the systematic literature review (SLR). The research follows the SLR methodology to systematically collect, analyze, and synthesize relevant studies. The structure of this paper includes an explanation of the SLR approach, a discussion of the findings, and a conclusion summarizing the key insights derived from the review.

2. RESEARCH METHOD

The research method follows a literature-based approach that includes several key aspects related to the proposed identification process. Data was collected through searches in Google Scholar and Scopus, followed by a systematic screening process to ensure eligibility and inclusion. The methodological approach, including these steps, is illustrated in Figure 1.

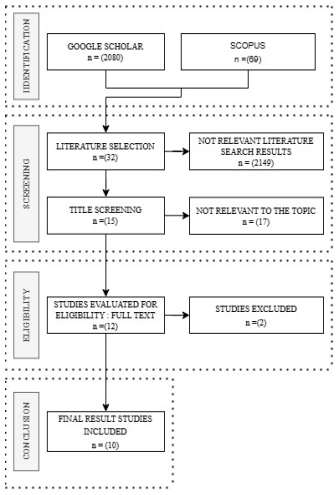

Figure 1. Identification alure

This study employs the Systematic Literature Review (SLR) approach to examine IT governance quality management in the education sector. The literature analyzed consists of journal articles focusing on this topic. Relevant journals were sourced from national publications available on the Google Scholar platform using keywords such as "IT governance management using the COBIT 2019 framework for education," "COBIT 2019," "COBIT 2019 framework," and "IT governance management."

A systematic literature review (SLR) is a rigorous method for synthesizing evidence on a particular topic, minimizing bias, and providing a comprehensive overview [21][22]. This approach is particularly valuable in interdisciplinary research, as it enables the mapping of diverse methodologies, perspectives, and analytical approaches [23][24]. The key contributions of this systematic literature review and analysis can be summarized as follows:

1. Investigation Research Questions
2. Literature Search
3. Literature Selection
4. Quality Assessment
5. Overview of open challenges and future research directions

This study expands upon existing research by providing a detailed and up-to-date review and analysis of COBIT 2019 governance quality management. By focusing on recent studies, it aims to help researchers better understand and utilize the key elements of the framework. Additionally, the review identifies current limitations, open research issues, and ongoing challenges, offering valuable insights for shaping future research directions.

2.1 Research Questions

Determining the Research Question (RQ):

1. RQ1: Which COBIT frameworks have been utilized in case studies assessing IT governance quality, particularly in the education sector?
2. RQ2: Which domains within IT governance quality are the primary focus in the education sector?

2.2 Literature Search

The literature search process was conducted to identify relevant research sources that address the research questions and provide supporting references. The search was performed using the Google Scholar and Scopus databases with the keywords "COBIT 2019," "governance quality," and "education." To ensure the relevance of the selected studies, the publication period was restricted to 2020–2024. The initial search yielded 2,149 journal articles. These results were further refined based on specific inclusion and exclusion criteria, as detailed in Table 1, which provides an overview of the selection process and categorization of the retrieved literature.

Table 1. Literature Search Results

Database	Number of Files
Google Scholar	2080
Scopus	69
Total	2149

2.3 Literature Selection

Inclusion and exclusion criteria will be used to select the selected literature or journals. This will be done so that the literature or journals are in accordance with the needs and can be used in this SLR research. The inclusion criteria will be as follows

Inclusion criteria:

a. The research used was obtained from the Google Scholar database.
b. The research has a COBIT scope with case studies of activities in education.
c. The research mentions and explains the COBIT domains used.
d. Research using Indonesian and international languages.

Exclusion criteria

a. Research is a final assignment that has not been published.
b. The research does not explain the COBIT domain used.

From the literature selection based on the inclusion and exclusion criteria above, 40 journal files were obtained with details in Table 2 below:

Table 2. Literature Selection

Database	Number of Files
Google Scholar	32
Scopus	6
Total	38

2.4 Quality Assessment

The data and journals retrieved from the literature will be systematically evaluated using predefined quality assessment criteria, which may include the following:

a. QA: Does the journal contain domains that focus on education related to information technology governance quality management using the COBIT 2019 framework?
b. QR: Does the journal state what domains are used?

3. RESULT AND DISCUSSION

3. 1 Domain Scope

Data analysis was conducted to gain a comprehensive understanding of the selected references. Specifically, the literature review focuses on research outcomes related to the quality of IT governance within the education sector. The findings are summarized in Table 3, which provides a detailed analysis of the domain scope. This table includes the following key elements: the name of the educational institution or context, the scope of COBIT 2019 framework application, and the capability maturity levels calculated in each study. This structured approach allows for a systematic comparison and evaluation of the research findings across the selected studies.

Table 3. Domain Scope Analysis

No	Journal Education	COBIT 2019 research scope	Capability Level
1	Universitas XYZ [22]	APO03	2
		APO09	2
		APO12	2
		APO13	2
		APO14	2
		BAI03	2
		BAI06	2
		DSS04	2
2	Universitas Muria Kudus [11]	EDM04	3
		APO01	3
		APO02	3
		APO07	3
		APO11	3
		APO12	3
		APO14	3
		DSS01	3
		DSS05	3
		MEA01	3
		MEA02	3
3	STMIK Pringsewu [15]	APO07	2
		DSS05	2
4	Universitas Mandiri [25]	MEA01	2
		MEA02	2
		MEA03	2
		MEA04	2
5	Perguruan Tinggi XYZ [26]	DSS02	2
		BAI01	3
		MEA01	3
		MEA02	3
		MEA03	3
		MEA04	2
6	Universitas Tanjungpura [3]	APO08	5
		APO09	1
		APO11	2
7	Institusi Pendidikan Tinggi XYZ [27]	EDM01	0
		EDM02	0
		EDM04	1
		APO01	0
		APO02	0
		APO04	0
		APO07	0
		BAI01	0
		BAI02	0
8	STMIK Palcomtech [28]	EDM02	-
		EDM03	-
		APO04	-
		APO08	-
		APO09	-
		APO12	-
		APO13	-
		BAI01	-
		BAI02	-
		BAI03	-

		BAI06	-
		DSS05	
		MEA03	
9	XYZ di Kota Pekanbaru [1]	APO04	2
		APO07	2
		BAI02	2
		BAI02	3
		BAI03	2
		BAI11	2
		DSS01	2
		DSS04	2
		DSS05	2
10	KAMPUS XYZ [12]	EMD01	3
		EMD03	1
		EMD04	1
		APO04	3
		APO07	2
		BAI05	3
		BAI09	3
		MEA04	1
11	IT Governance for DevOps in an e-Marketplace [29]	APO03	2
		APO04	2
		BAI04	3
		BAI06	3
		BAI11	4
		DSS03	2
12	Gorontalo Province Communication and Statistics Service [30]	EDM03	4
		EDM05	4
		APO01	4
		APO03	4
		APO07	4
		APO08	4
		APO12	4
		APO13	4
		BAI01	4
		BAI02	4
		BAI03	4
		BAI05	4
		BAI06	4
		BAI07	4
		BAI10	4
		BAI11	4
		DSS01	4
		DSS02	4
		DSS03	4
		DSS04	4
		DSS05	4
		MEA03	4
		MEA04	4
13	evaluate the readiness of cybersecurity frameworks to meet the challenges posed by large language models (LLM) [31]	EDM01	-
		EDM02	-
		APO01	-
		APO11	-
		APO12	-
		APO13	-
		BAI01	-
		BAI02	-
		DSS04	-
		DSS05	-

3. 2 Distribution of Research Years

In the analysis of related studies, a total of 2,149 relevant studies were initially identified. Following a rigorous review process, 38 studies met the predefined inclusion and exclusion criteria, which were designed quantitatively to ensure methodological consistency. Among these 38 published studies, 10 specifically addressed the domain scope of IT governance management within the education sector. To provide a deeper understanding of the research trends, the distribution of these studies by year is presented in detail. The search results, grouped by year, are illustrated in Figure 2, highlighting the evolving interest in this domain over time..

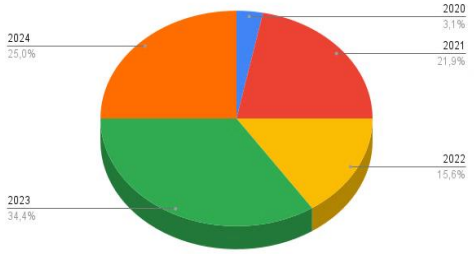

Figure 2. Identification Research Year

3. 3 Calculation Topic of levels

Numerous studies have been conducted on general case studies related to IT governance. Additionally, research has explored various factors influencing IT governance, including maturity levels, capability levels, and the COBIT 2019 framework. Figure 3 illustrates the distribution of topics, detailing the number of research units associated with each factor.

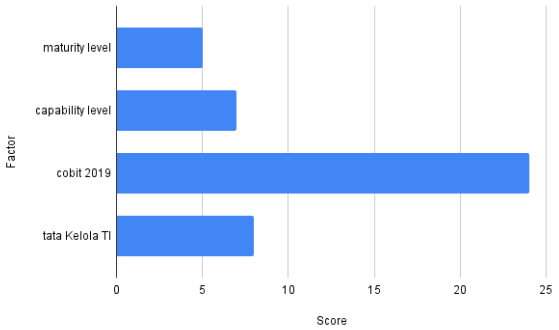

Figure 3. topics

The graph illustrates the frequency distribution of the primary factors that are the focus of research related to information technology (IT) governance, specifically utilizing the COBIT 2019 framework. Among these factors, the COBIT 2019 framework stands out with the highest frequency, being referenced over 20 times more than other factors. This notable prevalence underscores the significance of the COBIT 2019 framework as a central element in IT

governance research, particularly in its role in supporting risk management, enhancing operational efficiency, and achieving strategic objectives.

3. 4 Identification of Data Collection

The analysis of data collection methods in IT governance, based on the COBIT 2019 framework, reveals that the questionnaire method is the most frequently employed, followed by interviews, while the mixed method is utilized the least. This trend indicates that the survey approach, particularly through questionnaires, is preferred for IT governance evaluations due to its convenience in reaching a broad range of respondents and its capacity for structured data collection. In contrast, interviews are employed to gather more in-depth qualitative insights. Although mixed methods are used less frequently, they offer a valuable balance between quantitative and qualitative data. This diversity in data collection methods reflects the flexibility of the COBIT 2019 framework in supporting data-driven decision-making tailored to the specific needs of organizations.

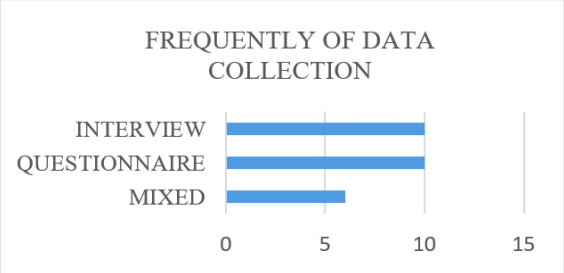

Figure 4. Frequently of Data Collection

3.5 Analysis of findings

This journal presents the findings from the application of the COBIT 2019 framework to IT governance within the education sector in Indonesia, offering significant insights. The research indicates that COBIT 2019 can effectively enhance risk management, resource efficiency, and operational sustainability in educational institutions. However, several challenges persist, including a lack of management understanding of the framework and a shortage of trained human resources. Additionally, inadequate IT infrastructure poses a barrier to optimal implementation. The findings underscore the necessity for collaboration among government entities, educational institutions, and the private sector to address these challenges. By adopting an integrated approach and providing continuous training, educational institutions can leverage the benefits of COBIT 2019 to enhance the quality of educational services, strengthen information security, and foster innovation in the digital age. This study offers practical guidance for policymakers and practitioners aiming to improve IT governance.

3. 5 Research recommendations and motivation

The maturity level is essential for assessing the operational effectiveness of an organization. Generally, a higher maturity level correlates with a more robust IT governance process [32]. To enhance IT maturity, particularly in the area of developer development [29], it is crucial for developers to possess a thorough understanding of how the topic is interpreted, as well as the epistemology and methodology that underpin the interpretation of the relevant measures. Furthermore, recent validations of each domain utilized in assessing capability values are vital for ensuring the accuracy and reliability of these evaluations.

Research should primarily focus on a series of well-defined frameworks rather than attempting to cover a broad domain. This includes specific design factors, principles, detailed domains, and the inclusion of the system's purpose domains. To measure variations effectively, a six-point Likert scale questionnaire can be employed, drawing on indicators from previous research or interviews conducted on the same subject. This approach allows for a more precise assessment of differences over time.

Some researchers fail to address the transparency of the objects utilized in their studies. This lack of transparency often results in repetitive research, primarily focusing on the application of domains within management practices. The absence of object transparency is a prevalent issue in IT governance approaches, necessitating further evaluation in subsequent reviews. To enhance future research, it is recommended to investigate the role of user knowledge through experimental studies. Such studies should aim to bridge the gap between theoretical frameworks and practical applications, employing mixed methods for data collection as outlined in Creswell's theory. This approach will provide a more comprehensive understanding of the subject matter [1][2].

The knowledge-based institutional strategy [33], aimed at university students, emphasizes the importance of segmenting students who play a significant role in technology. This approach can enhance the accuracy of questionnaire validation. However, some researchers tend to focus on irrelevant objects, which limits their ability to evaluate IT strategic decisions effectively. It is crucial to understand how IT and business priorities are determined to allocate the appropriate IT resources [34]. To address these challenges, it is essential to develop a customized Information Technology Governance (ITG) strategy for higher education. The strategic model should not only study the implementation of ITG but also assess its impact, providing actionable recommendations [35]. Furthermore, the core model recommendations for ITG can be effectively implemented to enhance governance practices within educational institutions [30].

4. CONCLUSION

The systematic literature review focuses on evaluating the implementation of COBIT 2019 within the educational context. The findings indicate that COBIT 2019 offers a comprehensive approach to enhancing IT governance, aiming to align technological needs with organizational objectives, particularly in educational institutions. The COBIT 2019 framework has demonstrated its effectiveness in guiding and ensuring alignment between IT strategy and educational institution goals. This includes key areas such as risk management, efficiency improvement, and strengthening operational processes.

Several key challenges persist in Indonesian education, including limited management knowledge of the frameworks employed, insufficient training for IT personnel, and inadequate infrastructure within the education sector. However, with an appropriate implementation strategy, COBIT 2019 has the potential to address these obstacles effectively. Doing so can enhance IT management efficiency, strengthen data security, and ensure compliance with educational regulations.

This study emphasizes the critical importance of human resource development and continuous training in supporting the implementation of the COBIT 2019 framework. To effectively overcome existing obstacles and maximize the potential of this framework, collaboration among the government, educational institutions, and the private sector is essential. The optimal implementation of COBIT 2019 can serve as a strategic solution for the education sector in Indonesia, fostering innovation and sustainability in the digital era. These findings offer practical guidance for policymakers and practitioners aiming to enhance the quality of IT governance within educational institutions.

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