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Enhancing Risk Management in an IT Service Company: A COBIT 2019 Framework Approach

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Abstract

Information technology is intended to support the operations of a company specializing in IT services, with a strong emphasis on customer satisfaction as a critical factor in its success. However, issues within the IT service management system lead to disruptions in both internal operations and client services, resulting in a buildup of service queues. To address these issues, the company's information technology governance level is evaluated using the COBIT 2019 framework. The research methodology combines a qualitative approach with data collection through interviews and literature analysis. Key performance indicators evaluated in this study include Risk Management (APO12), Configuration Management (BAI10), and Continuity Management (DSS04). The research findings indicate that the company's ability to achieve these objectives is at level 3, 3, and 2, respectively, which is lower than the expected levels of 4, 4, and 3. This suggests a one-level gap in each process. The recommendations focus on risk management related to service delays, more efficient management of IT resources, and the maintenance of sustainable service systems to prevent future delays.

Keywords: Capability Level, COBIT 2019, Information System Audit, IT Governance

Abstrak

Penggunaan teknologi informasi bertujuan untuk mendukung operasional perusahaan yang berfokus pada layanan TI, dengan penekanan kuat pada kepuasan pelanggan sebagai faktor utama dalam kesuksesan perusahaan. Namun, terdapat masalah dalam sistem manajemen layanan TI yang mengakibatkan gangguan dalam operasi internal serta pelayanan kepada klien, yang menyebabkan penumpukan antrian layanan. Dalam upaya mengatasi masalah ini, dilakukan evaluasi tingkat kapabilitas dari tata kelola teknologi informasi di perusahaan dengan menggunakan kerangka kerja COBIT 2019. Metode penelitian yang digunakan menggabungkan pendekatan kualitatif dengan pengumpulan data melalui wawancara dan analisis literatur. Indikator kinerja utama yang dievaluasi dalam studi ini mencakup Manajemen Risiko (APO12), Manajemen Konfigurasi (BAI10), dan Manajemen Kelangsungan (DSS04). Hasil penelitian menunjukkan bahwa kemampuan perusahaan dalam mencapai tujuan-tujuan ini berada pada level 3, 3, dan 2 masing-masingnya, yang kurang dari tingkat yang diharapkan, yaitu 4, 4, dan 3. Ini mengindikasikan adanya kesenjangan sebesar satu level dalam setiap proses. Rekomendasi yang diajukan berfokus pada manajemen risiko terkait dengan keterlambatan layanan, manajemen yang lebih efisien terhadap sumber daya TI, dan pemeliharaan sistem layanan yang berkelanjutan, dengan tujuan mencegah terjadinya keterlambatan di masa depan.

Kata kunci: Tingkat Kemampuan, COBIT 2019, Audit Sistem Informasi, Tata Kelola TI

INTRODUCTION

Information technology within a company must continuously adjust to evolving data needs, whether internal or external. Nearly all businesses, including certification service companies, utilize information technology to enhance the efficiency of their operational processes. Organizing IT management is essential to improve process efficiency. The advantages derived from implementing robust IT governance include realizing benefits, reducing risks, and maximizing resources. IT governance investigations serve as a means for companies, including those in service delivery, to align their IT implementation with their organizational objectives (Nachrowi et al., 2020). IT

governance evaluation plays a crucial role in assessing the progress in information technology governance and rectifying errors or anomalies in its application (Salehi et al., 2021).

In certification service companies, IT governance tasks aim to ensure the effective and efficient use of information technology resources to support the company's mission. To achieve this, service companies require a comprehensive understanding of their overall strategic direction and the most effective alignment of information technology to support it. Effective IT governance necessitates a dynamic cycle to ensure that IT governance efforts expand the company's benefits. The company implementing IT governance to support its business activities is an IT service company. Companies must consider their capacity to provide information technology services to their businesses and customers (Asmah & Kyobe, 2018). Based on the issues within the company's information technology governance, problems in the IT service management system impact the company's operations. Excessive workloads occur during specific periods, leading to disruptions in internal operations and client services, ultimately accumulating service queues and hindering client document issuance.

COBIT is the most widely adopted IT Governance framework (Smits & Hillegersberg, 2018). COBIT has been designed with established best practices in the field of IT governance in mind (Scalabrin Bianchi et al., 2021). It aids companies by aligning their IT assets and processes with their business objectives (Santos Castellanos, 2020). Previous research measured capability levels using the COBIT 2019 framework (Smits & Hillegersberg, 2017; Tantiono & Legowo, 2020). In other research, capability levels were assessed using the COBIT 2019 framework (Frogeri et al., 2019). COBIT guides effectively managing risks associated with IT processes and systems (Haes et al., 2020). Implementing COBIT in service delivery companies can lead to improved IT management, increased transparency, greater accountability, and numerous other benefits (Levstek et al., 2018a). When it comes to ensuring that a service provider's IT infrastructure meets business goals and standards, COBIT can be highly beneficial (Mubarak & Fianty, 2023). COBIT 2019 includes five processes, with EDM (Evaluate, Direct, and Monitor) being one of them, aligning with governance objectives. The other four processes are BAI (Build, Acquire, and Implement), APO (Align, Plan, and Organize), MEA (Monitor, Evaluate, and Assess), and DSS (Deliver, Service, and Support).

COBIT 2019 emphasizes the relationship between business objectives and the use of IT to create value, where the issues faced by the company are related to the lack of alignment between IT implementation and the company's business goals, which affects the company's business activities. Additionally, this framework can provide recommendations. Furthermore, a capability assessment will assess the company's ability to carry out IT processes (Saeedinezhad & Naghsh, 2019). COBIT is a well-established framework for analyzing IT governance, with the COBIT 2019 edition offering increased implementation flexibility (Sanjaya & Fianty, 2022) (Louis & Fianty, 2023). COBIT 2019 strongly emphasizes efficient IT governance, encompassing the arrangements and processes necessary for effectively managing IT in support of the business strategies model (Jaime & Barata, 2023). Additionally, COBIT 2019 underscores risk management, regulatory compliance, and information security as essential components in effective IT management (Amorim et al., 2020).

Measuring the level of capability using the COBIT 2019 framework is more appropriate for this research because maturity level assessment can be conducted once the capability level targets are achieved. The COBIT 2019 framework was selected due to the lack of alignment between IT implementation and the company's business goals (Information Systems Audit and Control Association, n.d.). Therefore, an evaluation of IT governance related to the company's issues is carried out using the COBIT 2019 framework, with a focus on risk management, to measure the capability level and provide recommendations for improvement and enhancement of capability levels that are suitable and relevant to the issues faced by the company. The evaluation aims to enhance the company's capability level, enabling it to carry out its business activities and achieve IT and business objectives.

RESEARCH METHODS

The research flow uses the Gallegos method, which encompasses all stages of IT governance evaluation from start to finish, as depicted in Figure 1.

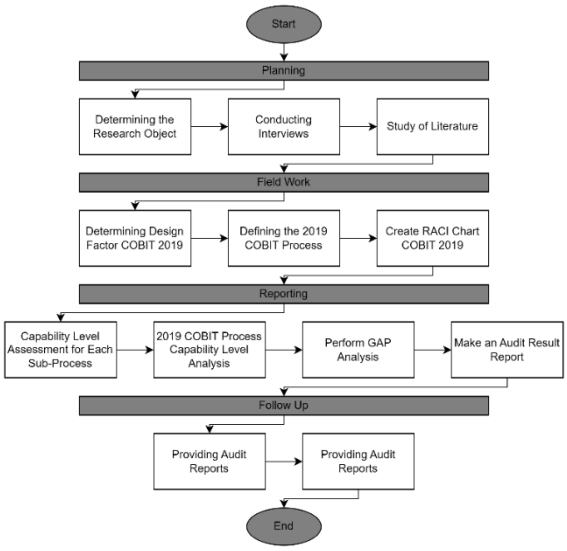

Figure 1. Research Workflow

Planning

The first stage is divided into three parts. Firstly, it involves defining the research subject, which is an IT Service Company. Secondly, the stage includes conducting interviews with the Head of IT Coordinator, sub-IT coordinator, System Developer, and Company Director referring to the results of the RACI Chart, which are individuals with roles and responsibilities for each objective generated based on RACI. (Pratama Arthananda, 2021). The input for this step involves preparing questions to be posed to the company, and the process entails interviewing the head IT coordinator at the company. The output is the identification of issues related to the company's IT governance. Finally, the third part of this stage involves a literature review. The research involves searching for references using the COBIT 2019 framework as input. The literature review process incorporates sources, including direct guidelines published by ISACA and journals related to COBIT 2019. The output is an enhanced understanding of the concept of COBIT 2019 as the framework to be utilized.

Field Work

This second stage is divided into three main components. Firstly, it involves determining the Design Factors of COBIT 2019. This is accomplished by collecting data through interviews, commencing with DF1 to DF4 for the initial design and subsequently progressing to DF5 to DF10 for the final design factors. The interviews are conducted in collaboration with the Head of IT Governance Development Coordinator at the company (Information Systems Audit and Control Association., n.d.).

Secondly, it includes defining the COBIT 2019 Processes. Once the inputs are completed for DF1 to DF10 and computed using the COBIT 2019 Design Toolkit, the COBIT 2019 Processes can be established. The selected 2019 COBIT process for evaluation is one with a score exceeding 75 in the design factor measurement.

Lastly, the stage involves creating the RACI Chart for COBIT 2019. A RACI Chart is generated by identifying all parties involved in the existing IT governance process. This is carried out to ascertain the responsible parties for the COBIT 2019 sub-processes, who are then approached for interviews. The assessment results will be used to measure the level of capability and to analyze the gap between the current capability level and the target capability level. The formula that will be used to calculate the level of capability based on the data that has been obtained from the interview results:

$$CC = \frac{\sum^{Cla}}{\sum^{Po}} \times 100\%\, CC$$

CC: The value of achieving the level of capability.
Cla: Total value of governance and management.
Po: Total process of governance and management.

Reporting

Four crucial phases characterize the third stage. First, the Capability Level Assessment evaluates activities within selected processes, assigning values to each activity. The second phase involves the 2019 COBIT Process Level Capability Analysis, which calculates Capability Levels for each process. Thirdly, GAP Analysis compares achieved Capability Levels to predetermined targets for each COBIT 2019 process. Finally, the Create Audit Results Reports phase generates comprehensive audit documentation reports with valuable recommendations in accordance with the COBIT 2019 framework. These reports aim to enhance existing Capability Levels for companies in the subsequent stage.

Follow Up

The fourth stage encompasses two critical elements. Firstly, it involves delivering Audit Results Reports to the company's management, offering suggestions for corrective actions based on the Capability Level assessments within each utilized process. These reports provide insights into the company's existing Capability Levels and serve as guidance for future improvements. Secondly, the stage includes providing Improvement Plan Reports resulting from Capability Level

assessments aligned with the COBIT 2019 framework. These reports outline recommendations for necessary enhancements, specifying deadlines and assigning responsibility to the auditee. The overarching objective is to enhance the Capability Level of all COBIT 2019 processes developed thus far.

RESULTS AND DISCUSSION

The company creates a governance system blueprint, encompassing critical governance and management goals, to finalize the governance system design and achieve the COBIT 2019 objectives.

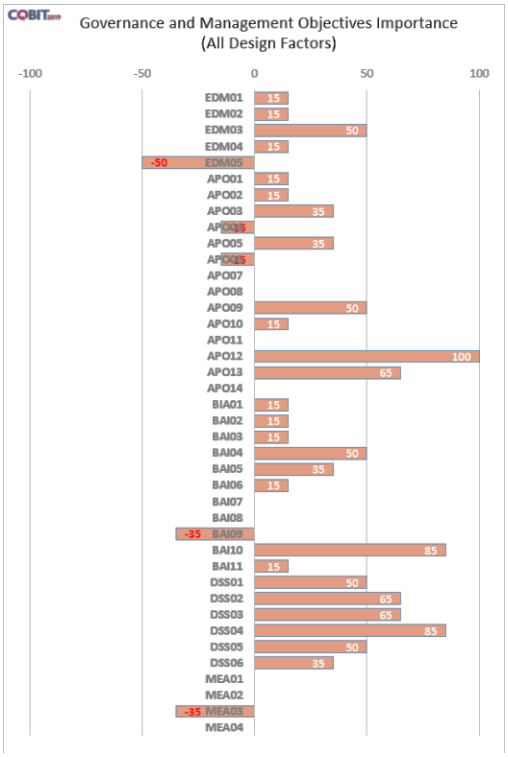

Figure 2. Design Factor Conclusions

The COBIT 2019 process is determined through the measurement of design factors. Figure 2 illustrates the outcomes of all the measured design factors, resulting in objectives aligned with the company's top priority requirements. Objective significance is rated on a scale from -100 to 100, with 100 denoting the highest importance. While all processes will undergo evaluation, not all processes are regarded as crucial and prioritized. The target capability level has been established, with objectives scoring 75 or higher considered highly important and assigned a target capability level of 4. Objectives scoring 75 or higher include APO12 (Managed Risk), BAI10 (Managed Configuration), and DSS02 (Managed Continuity).

The RACI Chart is a diagram used to determine the responders for each objective. The roles and responsibilities for the RACI Chart in COBIT 2019 will be tailored to the roles and responsibilities within the company. The questions provided to the responders will be structured in accordance with COBIT 2019. Responders will answer these questions by providing values based on the facts within the company. The RACI Chart that was created resulted in the identification of the Head of IT Development Coordinator within the company as the individual to be interviewed for the APO12, BAI10, and DSS04 processes.

Table 1. RACI Chart

No	Activities	Head Coor IT	Sub Coor IT	Developer	Director
1	APO12	R	A	I	C
2	BAI10	R	A	I	C
3	DSS04	R	A	I	C

Table 1 illustrates the roles and responsibilities of the Head of IT Coordinator, Sub-IT Coordinator, System Developer, and Company Director based on the objectives APO12, BAI10, and DSS04. Individuals with the "R" (responsible) role will serve as respondents in the audit document report, enabling them to answer questions related to critical management practices within the APO12, BAI10, and DSS04 objectives.

The next stage is the Capability Level assessment according to the 2019 COBIT framework reference. An interview with the company representatives is required for the results of this calculation, and the interview was conducted by the Head of IT Governance Development Coordinator, who is responsible for the selected COBIT process. After getting the value of the Capability Level, the value will be determined as a rating, which determines whether the Capability Level can be continued to the next level or not. The following is the result of the Capability Level assessment for each 2019 COBIT Sub-Process.

Table 2. APO12 Level 3 Calculation Results

Process	Score	
APO12.01	76%	
APO12.02	77,33%	
APO12.03	71,5%	
APO12.04	76%	
APO12.05	79,5%	
APO12.06	67%	
Capability Level Results	Total	447,3%
	Average	74,55%

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Table 2 displays the results of calculating APO12 at level 3, yielding a final result of 74.55%, indicating a significant degree of achievement. However, the company's IT control framework and IT business processes lack a standardized, formal, and continuous approach to quality management that aligns with enterprise requirements. This deficiency arises from the company's failure to identify quality requirements and criteria within the IT control framework and IT business processes.

Table 3. BAI10 Level 3 Calculation Results

Process	Score	
BAI10.01	78,5%	
BAI10.02	82%	
BAI10.03	80%	
BAI10.04	68%	
Capability Level Results	**Total**	308,5%
	Average	77,12%

In Table 3, the results of the BAI10 level 3 calculations yielded a final result of 77.12%, signifying a significant level of achievement. However, the company fails to identify the reporting requirements of all stakeholders, including content, frequency, and media. Consequently, the company needs to generate reports that align with these specified requirements.

Table 4. DSS04 Level 4 Calculation Results

Process	Score	
DSS04.01	80%	
DSS04.02	79,25%	
DSS04.03	81%	
DSS04.04	77,67%	
DSS04.06	85%	
DSS04.07	82,25%	
Capability Level Results	**Total**	485,17%
	Average	80,86%

Table 4 presents the results of DSS04 level 2 calculations, achieving a final result of 80.86%, indicating a substantial level of accomplishment. However, the company does not specify incident response and communication actions to be taken in the event of a disturbance, which includes establishing related roles and responsibilities, such as accountability for policy and implementation.

After calculating the results for each process within the company, the next step is to compare the obtained level results with the target levels set by the company. The company has set the following target levels: level 4 for the APO12 process, level 4 for BAI10, and level 3 for DSS04. The determination of these target levels is the responsibility of the Head of IT Governance Development Coordinator. Consequently, the company's desired targets can be compared with the results in the GAP Analysis.

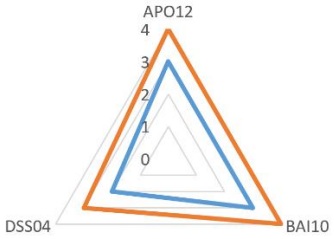

Figure 3. Radar Chart GAP Analysis

In Figure 3, it can be observed that every COBIT 2019 process falls short of reaching the desired target level. The APO12 and BAI10 processes currently stand at level 3, whereas the targeted level is 4. Similarly, the DSS04 process is at level 2, but the target level is 3. This indicates a one-level gap for each process. To attain the desired target levels, it is imperative to implement improvements based on the recommendations derived from the assessments of each existing COBIT process.

Based on the results of the previous objective assessments, several findings have been obtained from activities with a score of ≤ 50 (Partially Achieved). These findings serve to evaluate the performance of IT governance applied within the company and can serve as a reference for improvement. The findings help determine the impact experienced by the company.

Table 5. Findings from APO12, BAI10, and DSS04 processes.

Sub-Process	Findings
APO12	The company has not adopted a risk taxonomy or identified future risks. Controls and detection capabilities have not been developed. Identification of personnel, applications, infrastructure, and suppliers has not been carried out. In the worst-case scenario, information is not conveyed to decision-makers, as in the case of a server breakdown within the company. Risk oversight by organizational entities and risk response plans are non-existent.

BAI10	The company hasn't included essential Configuration Items (CIs) for effective service management and reliable asset descriptions within services. They've not formally established configuration baselines for services, applications, or infrastructure nor made formal changes when required. Additionally, they haven't cross-referenced all configuration changes with approved requests to identify unauthorized changes.
DSS04	The company hasn't identified key stakeholders or their roles in sustainability policy and scope determination. They haven't set a minimum recovery time for business processes and IT support based on acceptable disruption periods. Necessary resources for Continuity and recovery have not been documented. Roles and responsibilities for plan exercises are undefined. Furthermore, they haven't initiated awareness and training for BCP (Business Continuity Plan) and DRP (Disaster Recovery Plan). Regular testing and data refreshment have not occurred.

Table 5 displays findings from processes APO12, BAI10, and DSS04 related to activities scoring ≤ 50 that need immediate improvement. The activity of recording data related to relevant and significant IT risks in the internal and external operational environment of the company has a score of ≤ 50, primarily due to employees' lack of understanding and incomplete documentation. This situation affects the company's readiness to deal with potential IT risks. The company is committed to enhancing its configuration management by establishing a clear scope and level of detail, creating a formal configuration baseline, managing changes formally, and ensuring the safety of the CI repository. This will improve efficiency in managing the company's technology assets.

Preparing an audit report that includes improvement recommendations in line with the COBIT 2019 framework for each sub-process, along with the auditee's responses. The improvement recommendations are outlined as follows:

Table 5. COBIT 2019 Process Recommendations

Sub-Process	Recommendations
APO12.01	Creating a risk taxonomy for IT at the company, which is helpful for categorizing risk management strategies such as the risk of applications not being able to access and then categorizing them by level and providing appropriate handling methods for these problems to be resolved.
APO12.02	Estimate the frequency (or likelihood) and magnitude of losses or gains associated with I&T risk scenarios.
APO12.03	Determine and agree on which IT services and IT infrastructure resources are critical to maintaining the operation of business processes.
APO12.04	The company needs to discuss with stakeholders regarding priority cases so that a lot of administration is not needed. Everyone has been assigned to the risk taxonomy, so it won't take long for similar risks to occur.
APO12.05	Define a balanced set of project proposals designed to mitigate risks and/or enable projects that enable the company's strategic opportunities, taking into account costs, benefits, effect on risk profile and current regulations.
APO12.06	The company needs to ensure that the plan includes a company-wide escalation path.
BAI10.01	Define and agree on the scope and level of detail for configuration management.
BAI10.02	Create, review, and authorize basic service, application, or infrastructure configurations.
BAI10.03	Make, review, and formally approve changes to the configuration baseline whenever necessary and to ensure completeness and accuracy, review proposed changes to the CI against the baseline.
BAI10.04	Report unauthorized changes to change management. Identify the reporting requirements of all stakeholders, including content, frequency, and media.
DSS04.01	Identify internal and outsourced business processes and service activities essential to the company's operations or to fulfil legal and/or contractual obligations.
DSS04.02	Perform a business impact analysis to evaluate the impact of disruptions to critical business functions over time and the impact that disruptions will have on them.
DSS04.03	Define incident response and communication actions to take during a disruption.
DSS04.04	Define and agree on a realistic stakeholder exercise and validate continuity procedures.
DSS04.06	Develop competence based on practical training, including participation in exercises and tests.
DSS04.07	Back up systems, applications, data, and documentation according to a schedule.

Table 6 contains recommendations for each APO12, BAI10, and DSS04 sub-processes. These recommendations are intended to enhance the Capability Level of the 2019 COBIT processes within the company. The goal of the APO12 and BAI10 processes, which were previously at level 3, is to elevate them to level 4. As for the DSS04 process, which was at level 2, the objective is to raise it to level 3.

Fieldwork encompasses two primary components: Providing Audit Results Reports and Providing Improvement Plan Reports. The audit results are conveyed to the company's management, offering suggestions for rectifying IT governance issues encountered by the organization. Notably, the APO12 and BAI10 processes have achieved a 'Largely Achieved' status at Capability Level 3, while the DSS04 process has reached the same level at Capability Level 2. This is quantified by the APO12 process achieving a 74.55% result, BAI10 achieving a 77.12% result, and the DSS04 process scoring an 80.86%.

On the other hand, the provision of Improvement Plan Reports stems from Capability Level assessments within the COBIT 2019 framework. These reports furnish recommendations for necessary improvements, accompanied by stipulated deadlines and the designated responsible individual (PIC), who acts as the auditee. The ultimate objective is to bolster the Capability Level of the COBIT 2019 processes within the company. Specifically, for the APO12 and BAI10 processes, previously at level 3, the aspiration is to advance them to level 4. As for the DSS04 process, previously at level 2, the aim is to elevate it to level 3.

CONCLUSIONS AND SUGGESTIONS

Conclusion

COBIT processes selected: APO12 - Managed Risk, BAI10 - Managed Configuration, and DSS04 - Managed Continuity. APO12 achieved Capability Level 3 with a score of 74.55%, BAI10 reached Capability Level 3 with 77.12%, and DSS04 attained Capability Level 2 with 80.66%. Despite the target Capability Level for APO12 and BAI10 being four and for DSS04 being 3, none of these processes met their respective targets. The analysis reveals a one-level gap for each process, which can be addressed with improvement recommendations. The findings and their impact on the company point out deficiencies in risk management, configuration management, sustainability planning, and disaster recovery. These include issues with risk taxonomy, control, and detection capabilities. Configuration items and baseline data are lacking, roles and responsibilities are unclear, and disaster recovery readiness is inadequate. The recommendations focus on risk management related to creating a risk taxonomy for IT within the company. It is helpful for categorizing risk management strategies such as accessibility issues with applications, categorizing them by levels, and suggesting appropriate solutions. The company will make, review, and formally approve changes to the configuration baseline as needed, ensuring completeness and accuracy by reviewing proposed changes to CIs against the baseline. The company already has improvement recommendations and recommendations for enhancing capability levels that can serve as references, enabling IT use to align with the company's business objectives.

Suggestion

To enhance the company's IT governance, it is recommended first to identify and establish quality requirements, followed by implementing a suitable IT governance framework, such as COBIT 2019. Subsequently, the company should evaluate the current capability levels of relevant IT processes and compare them to predefined targets. A continuous improvement plan should be developed to bridge the gaps and close the one-level discrepancy, focusing on the DSS04 process. Regular monitoring, stakeholder engagement, training, and compliance checks are essential to this improvement journey. The involvement of all stakeholders, from senior management to IT staff, and independent audits will ensure a well-rounded approach to achieving the desired IT governance capability levels.

REFERENCES

Amorim, A., Mira da Silva, M., Pereira, R., & Gonçalves, M. (2020). Using agile methodologies for adopting COBIT. *Information Systems*, *101*, 101496. https://doi.org/10.1016/j.is.2020.101496

Asmah, A., & Kyobe, M. (2018). *Towards an Integrative Theoretical Model For Examining IT Governance Audits*. https://doi.org/10.1145/3209415.3209423

Frogeri, R., Pardini, D., Cardoso, A., Prado, L., Pelloso Piurcosky, F., & Portugal Júnior, P. (2019). IT Governance in SMEs: The State of Art. *International Journal of IT/Business Alignment and Governance*, *10*, 55–73. https://doi.org/10.4018/IJITBAG.2019010104

Haes, S., Grembergen, W., Joshi, A., & Huygh, T. (2020). *Enterprise Governance of IT, Alignment, and Value* (pp. 1–13). https://doi.org/10.1007/978-3-030-25918-1_1

Information Systems Audit and Control Association. (n.d.). *COBIT® 2019 Framework : introduction and methodology*.

Information Systems Audit and Control Association. (n.d.). *COBIT 2019 Design guide designing an information and technology governance solution*.

Jaime, L., & Barata, J. (2023). How can FLOSS Support COBIT 2019? Coverage Analysis and a Conceptual Framework. *Procedia Computer Science*, *219*, 680–687. https://doi.org/10.1016/j.procs.2023.01.339

Levstek, A., Hovelja, T., & Pucihar, A. (2018). IT Governance Mechanisms and Contingency Factors: Towards an Adaptive IT Governance Model. *Organizacija*, *51*, 286–310. https://doi.org/10.2478/orga-2018-0024

Louis, A. A., & Fianty, M. I. (2023). Evaluation Human Resources Information System Using COBIT 5 Framework in Technology Insurance Company. *G-Tech: Jurnal Teknologi Terapan*, *7*(2), 674–682. https://doi.org/10.33379/gtech.v7i2.2393

Mubarak, R. F., & Fianty, M. I. (2023). Leveraging COBIT 2019 to Implement IT Governance in Mineral Mining Company. *Journal of Information Systems and Informatics*, *5*(3), 1058–1071. https://doi.org/10.51519/journalisi.v5i3.545

Nachrowi, E., Nurhadryani, Y., & Sukoco, H. (2020). Evaluation of Governance and Management of Information Technology Services Using Cobit 2019 and ITIL 4. *Jurnal RESTI (Rekayasa Sistem Dan Teknologi Informasi)*, *4*, 764–774. https://doi.org/10.29207/resti.v4i4.2265

Pratama Arthananda, K. (2021). The Role of COBIT5 as a Reference for Quality Service Quality Improvement Case Study: Private Bank in Indonesia. *Ultima Infosys : Jurnal Ilmu Sistem Informasi*, *12*(2).

Saeedinezhad, S., & Naghsh, A. (2019). *Management of IT Services in the Field of Pre-Hospital Emergency Management with the Combined Approach of COBIT Maturity Model and ITIL Framework: A Conceptual Model*.

Salehi, F., Abdollahbeigi, B., & Sajjady, S. (2021). *Impact of Effective IT Governance on Organizational Performance and Economic Growth in Canada*. *3*, 14–19.

Sanjaya, D., & Fianty, M. I. (2022). Measurement of Capability Level Using COBIT 5 Framework (Case Study: PT Andalan Bunda Bijak). *Ultima Infosys : Jurnal Ilmu Sistem Informasi*, *13*(2).

Santos Castellanos, W. (2020). Impact of Information Technology (IT) Governance on Business-IT Alignment. *Cuadernos de Gestión*, *2020-12–10*. https://doi.org/10.5295/cdg.180995ws

Scalabrin Bianchi, I., Sousa, R., & Pereira, R. (2021). Information Technology Governance for Higher Education Institutions: A Multi-Country Study. *Informatics*, *8*, 26. https://doi.org/10.3390/informatics8020026

Smits, D., & Hillegersberg, J. (2017). The development of a hard and soft IT governance assessment instrument. *Procedia Computer Science*, *121*, 47–54. https://doi.org/10.1016/j.procs.2017.11.008

Smits, D., & Hillegersberg, J. (2018). The continuing mismatch between IT governance maturity theory and practice: a new approach. *Procedia Computer Science*, *138*, 549–560. https://doi.org/10.1016/j.procs.2018.10.075

Tantiono, A., & Legowo, D. (2020). Information System Governance in Higher Education Foundation using COBIT 5 Framework. *International Journal of Recent Technology and Engineering (IJRTE)*, *8*, 2798–2811. https://doi.org/10.35940/ijrte.F8192.038620