

Measuring ERP System Readiness with COBIT 2019 at IT Vendor Industry

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ABSTRACT

The application of information technology that supports company business activities in IT services can be assessed for its IT governance capabilities using the COBIT 2019 framework, including security aspects. This research aims to determine the company's IT governance capabilities in the Managed Risk (APO12), Managed Security (APO13), and Managed Configuration (BAI10) domains to overcome security risks and provide recommendations for achieving a higher level of capability. This qualitative research uses data obtained through interviews and literature studies. Based on the results of capability measurements, the company received a score at level 2 to target levels 3 and 4, which indicates a gap of 1 to 2 levels. Recommendations include improving risk understanding, security awareness, security controls, and configuration management. Additionally, recommendations for ERP modules such as risk management, information security management, project management, configuration management, and quality management are proposed to address the identified issues.

ABSTRAK

Penerapan teknologi informasi yang mendukung kegiatan bisnis perusahaan di bidang layanan TI dapat dinilai kapabilitas tata kelola TI-nya dengan menggunakan kerangka kerja COBIT 2019, termasuk pada aspek keamanan. Penelitian ini bertujuan untuk menilai kapabilitas tata kelola TI perusahaan pada domain Managed Risk (APO12), Managed Security (APO13), dan Managed Configuration (BAI10) untuk mengatasi risiko keamanan serta memberikan rekomendasi untuk mencapai level kapabilitas yang lebih tinggi. Penelitian kualitatif ini menggunakan data yang diperoleh melalui wawancara dan studi literatur. Berdasarkan hasil pengukuran kapabilitas, perusahaan mendapat skor di level 2 dengan tujuan menargetkan level 3 dan 4, yang mengindikasikan adanya gap 1 hingga 2 level. Rekomendasi yang diberikan meliputi peningkatan pemahaman risiko, kesadaran keamanan, kontrol keamanan, dan konfigurasi manajemen. Selain itu, rekomendasi untuk modul ERP seperti manajemen risiko, manajemen keamanan informasi, manajemen proyek, manajemen konfigurasi, dan manajemen kualitas diusulkan untuk mengatasi masalah yang teridentifikasi.

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INTRODUCTION

Currently, the role of information technology (IT) in organizational operations is very significant. This IT role is due to a shift in the function and relevance of IT in the organization, where IT not only acts as a tool but also as the main driver in achieving business goals. Leaders and management in organizations need to be aware of their roles and responsibilities in directing IT implementation to maintain consistency with organizational goals (Br Damanik, 2021). When IT governance in an organization is ineffective, it can cause business losses such as higher-than-expected costs, non-optimal use of IT, and failure of IT to provide benefits to the organization. Therefore, organizations must conduct audits to improve IT governance (Putra et al., 2020)(Adawiyah & Atrinawati, 2020).

Since its establishment in 2018, this IT company has provided a wide range of high-quality IT services and products, such as high-speed internet services, access control and entrance control solutions, surveillance cameras, IT support services, software development, attendance machines, and various other IT services. The company focuses on providing technology-related services to companies that require expertise in this area (PT Jakarta System Integrators, 2023). However, the company faces several challenges that hinder the achievement of its vision and mission. These include poor integration with the company's key business processes, which can hinder risk management, lack of monitoring and evaluation systems leading to a lack of understanding of the effectiveness of actions taken, lack of awareness of information security throughout the organization, ineffective or inconsistent application of security controls, limited human and financial resources to manage security risks, non-compliance with applicable information security standards, and lack of regular information security monitoring and evaluation, as well as lack of documentation and maintenance of configuration repositories, inadequate control over configuration items, lack of regular reporting on status and configuration (PIERITSZ, 2021)(Dharma et al., 2021)(Zalfanda Helza, 2023).

The scope of this research includes assessing the current state of IT governance within the company, identifying gaps and areas for improvement, and evaluating the company's readiness for ERP system implementation. These problems have hindered the company's IT/IS development and employee performance. Therefore, an Enterprise Resource Planning (ERP) system is needed to improve company performance by integrating various business functions into one centralized system. With an ERP system, companies can reap several benefits. Business process integration enables better coordination between departments (Butarbutar et al., 2023) (Andika & Diana, 2021). Before assessing the company's governance capacity in handling IT resources, the company's goal is to prevent future problems and ensure efficient use of IT and the company's readiness for ERP system implementation. To achieve this, the researcher used the COBIT-2019 framework, an internationally recognized standard for IT governance. The researcher anticipates wider adoption of this framework in management practice, as it serves as a tool and standard for evaluating the level of IT resource management capabilities and readiness to implement an effective ERP system in enterprise organizations (Mardiana et al., 2022) (Margaretha & Nababan, 2020).

RESEARCH METHODS

The approach used to implement IT governance in the company uses the COBIT-2019 framework and a qualitative approach. This framework requires collecting data about IT conditions and requirements within the company to assess the level of IT governance capabilities. (Syuhada, 2021). This research method uses the 2019 version of the COBIT framework, which is the latest version updated by ISACA, using a qualitative approach. The data collected is related to IT conditions and needs in the company to analyze the level of IT governance capabilities. This process involves a series of essential steps that must be considered carefully, from topic selection, data collection, and data analysis to making appropriate conclusions and recommendations (Fianty & Brian, 2023).

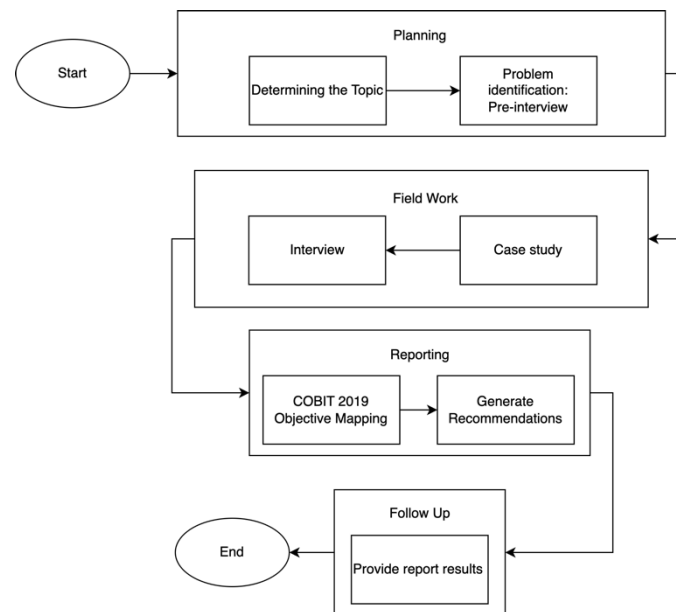


Figure 1. Research flow

Figure 1. is the research flow that will be carried out in this study with the following details: In the first stage, the research object was determined: PT Jakarta System Integrators. Subsequently, pre-interviews were conducted to obtain permission and gain a general overview of the problem areas in the company (Ardyanti et al., 2023). The necessary data was collected in the next step, and literature studies were conducted to delve into the research topic and object. Subsequently, interviews with company representatives were conducted to determine the COBIT 2019 domains that would be the focus of this research (Kojongian & Ayub, 2021). In the third stage, a report was prepared based on the collected data. The data was then analysed to draw conclusions and evaluations, which were then presented in the form of recommendations to address the problems faced by the company (M. D. Firmansyah, 2021). In this final stage, the report was presented to PT Jakarta System Integrators to serve as a reference or recommendation for the necessary improvements and a guide for the next audit (Nasiri, 2023).

COBIT provides guidance and documentation for IT governance and management, assisting auditors, management, and users in addressing business risks, controls, and technical issues (Syuhada, 2021). COBIT 2019, as a development of COBIT 5, helps organizations identify IT risks and guides designing adequate controls. In addition, COBIT 2019 measures the performance and effectiveness of using IT in achieving business goals. With COBIT 2019, organizations can ensure IT is used effectively, efficiently, and securely according to business needs (Steuperaert, 2019)(Wikan Aditya et al., 2024).

Data was collected through two techniques, namely literature studies and interviews. Literature studies were conducted to deepen understanding of capability measurement using COBIT 2019. At the same time, interviews with the company aim to identify problems faced by the company and measure governance through audit documents. There are 2 data analysis techniques used in COBIT 2019: Capability Level Analysis: This analysis method relies on responses from interviewees concerning the evaluations they received during interviews about all chosen COBIT-2019 functions.

This evaluation will consider the scale used to decide whether the COBIT-2019 process proceeds or advances to the next level. The following is the measuring scale. (ISACA, 2018a):

1. N – Not Achieved (0% to 15%)
Companies have little or no evidence of achieving the attributes assessed in the defined process.
2. P – Partially Achieved (>15% to 50%)

The company presents some evidence of the approach and some evidence of achieving the attributes assessed in the process, where the unpredictability aspect of attribute achievement is defined.

3. L – Largely Achieved (>50% to 85%)

The company demonstrates evidence of a systematic approach for significantly achieving the assessed attributes in the defined process but still exhibits some weaknesses in the assessment process.

4. F – Fully Achieved (>85% to 100%)

The company provides complete and systematic evidence for the full achievement of the assessed attributes in the defined process and has no significant weaknesses in these attributes in the assessment process.

Gap Analysis: The analysis compares the company's anticipated capability scores with the actual calculated scores. The findings suggest the company should enhance its practices to achieve the desired level. Additionally, the company aims to ensure the ongoing security of its information system and mitigate potential future risks (Kurniawan & Wella, 2023).

RESULTS AND DISCUSSION

Problem Identification

The company has never evaluated the governance of IT resource management. Along with the development of information that continues to grow through continuous innovation, the company increasingly realizes the need to assess the governance of existing IT resource management. This evaluation aims to ensure that IT governance aligns with the company's overall vision and mission and contributes effectively to achieving its strategic goals. With this evaluation, the company is expected to identify areas that require improvement in IT governance.

COBIT 2019 Objective Mapping

Based on the COBIT 2019 Design Toolkit, two main stages need to be performed to determine the objectives to be measured. The first stage involves determining the scope of governance, which is done by measuring design factor 1 (corporate strategy) to design factor 4 (IT-related issues). The next stage is to refine the scope of the governance system by measuring design factor 5 (Threat landscape) to design factor 11 (Enterprise size) (ISACA, 2018b).

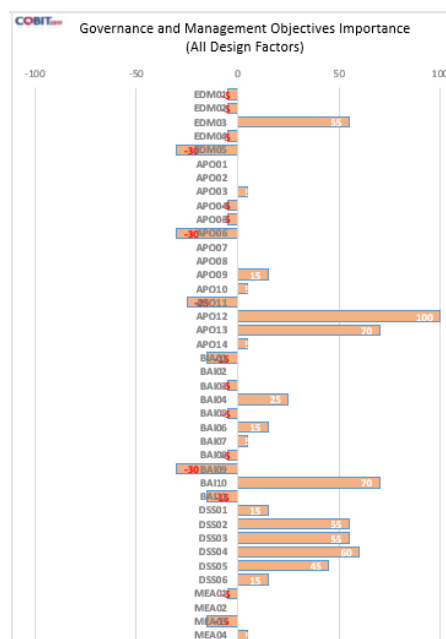


Figure 2. Design Factors Conclusions (ISACA, 2018c).

Figure 2 displays the results of the measured design factors, aligning objectives with the company's prioritized needs. Goals are rated from -100 to 100, with 100 being the most important. While all processes are evaluated, not all processes are equally important. The target capability level is based on the score: 75+ is level 4, 50+ is level 3, and 25+ is level 2. The company prioritized three domains: APO12 (Managed Risk) at 100, APO13 (Managed Security) at 70, and DSS03 (Managed Issues) at 70 (ISACA, 2018c).

Measuring Capability Level

Based on the assessment results obtained from interviews with the head of the IT division and the head of the company's business department, the following are the average calculation results for each objective, along with their capability levels:

Table 1. Domain Calculation Results

Domain	Current Skill Level	Rating
APO12	2	66%
APO13	2	60%
BAI10	2	73%

Table 1 shows the calculation results of 3 domains at ability level 2. Namely, APO12 got a rating of 66%, APO23 got a rating of 60%, and BAI10 got a rating of 73%. These results indicate that the three domains only reach level 2 and cannot move to level 3 because the score does not reach 85%.

Gap Analysis

After measuring the capability level values in the APO12, APO13, and BAI10 subdomains, the next step is to conduct a gap analysis between the obtained values and the target levels. The targets are determined based on the design factor results, with values of 75 or higher directed to level 4, 50 or higher to level 3, and 25 or higher to level 2. Gap analysis compares the current capability level with the desired target, identifying processes needing improvement (Kurniawan & Wella, 2023)(ISACA, 2018c).

Table 2. Gap Analysis

No.	Objective	Capability Results	Target Capability	Gap
1.	APO12 (Managed Risk)	2	4	2
2.	APO13 (Managed Security)	2	3	1
3.	BAI10 (Managed Configuration)	2	3	1

Table 2 explains the comparison of the current capability level analysis with the expected capability level target, thus providing a clearer picture for the company in evaluating the effectiveness of the IT governance implementation that has been carried out.

Findings and Impacts

Based on previous evaluations, some activities scored ≤ 50 (Partially Achieved). These findings are critical for assessing IT performance and guiding ERP system improvement and readiness. These findings highlight the impact on the enterprise, especially on APO13, where two activities require immediate improvement. These activities include aligning the information security management system with the company's overall approach, preparing an implementation statement, and communicating the approach, which exposes the company to security threats such as cyberattacks and data leaks (ISACA, 2018a).

Recommendations for improving capability levels.

Table 3. Level 3 Recommendations for APO12

Process	Recommendations
APO12.01	Enhance data collection methods to ensure comprehensive data gathering.

Process	Recommendations
	Establish clear standards and procedures for consistent and reliable data collection. Conduct training for personnel to improve their understanding of effective data collection practices.
APO12.03	Improve risk inventory maintenance by ensuring documentation. Regularly update risk analysis for an up-to-date risk profile. Manage risk records for business process and IT security by identifying, evaluating risks, and proposing solutions.
APO12.05	Implement innovative strategies to manage opportunities and reduce risk. Establish measurable performance indicators to assess the success of risk management actions.

Table 3 provides recommendations for enhancing the level 3 capability of objective APO12, such as data collection, analysis, recording, and implementing preventive measures for potential IT risks.

Table 4. Level 4 Recommendations for APO12

Process	Recommendations
APO12.01	Gather data on risk incidents affecting or potentially affecting the business, as per predefined impact categories in the risk taxonomy.
APO12.02	Select a risk analysis approach tailored to the company's requirements. Evaluate high-priority risks through risk analysis. Identify actionable steps to mitigate identified risks.
APO12.03	Collect risk profile data regularly and incorporate the information into a consolidated risk profile, update the risk profile regularly with the latest information.
APO12.04	Create a detailed risk analysis report, including potential gains or losses and worst-case scenarios. Regularly identify IT opportunities with equivalent risk and capacity levels.
APO12.05	Determine if each unit monitors risks and takes responsibility within risk tolerance levels. Analyze resource needs, expected impact, and assess achieved success.
APO12.06	Establish specific, timely risk management measures for effective response to risks. Test risk management measures to ensure they are appropriate and effective.

Table 4 provides recommendations to enhance risk management capability to level 4 for objective APO12. Recommendations include recording, analyzing risks, producing reports, testing management actions, and evaluating their effectiveness.

Table 5. Level 3 Recommendations for APO13

Process	Recommendations
APO13.01	Establish an up-to-date and clear policy on information security management. Establish a clear scope and boundaries for the information security management system. Conduct communication and education programs to all levels of the company.

Table 5 recommends enhancing the security level to level 3 for objective APO13. The suggestions include establishing policies and procedures for implementing an information security management system, defining the system's scope and boundaries, and training employees on the company's information security policies and procedures.

Table 6. Level 3 Recommendations for BAI10

Process	Recommendations
BAI10.01	Expand and enhance the configuration repository with more detailed information. Implement active monitoring and management of the repository for sustainability. Provide training for employees on effective management and utilization of the repository.
BAI10.03	Monitor item configurations regularly for timely updates and maintenance. Enhance maintenance and control processes for item configurations to improve efficiency and accuracy in management. Improve access control for item configurations to prevent unauthorized changes.

Process	Recommendations
BAI10.04	Create status and configuration reports to ensure completeness, accuracy, and relevance, providing stakeholders with up-to-date information. Review reports to ensure quality standards are met, including clarity, accuracy, and relevance, to identify and address potential issues.

Table 6 outlines steps to enhance security management capability to level 3 for BAI10 objectives. Recommendations include establishing and maintaining a configuration management repository, creating a controlled configuration baseline, and reporting changes in configuration item status. Recommendations for implementing ERP modules. The following are some ERP modules that are recommended for development by the company(Akmal et al., 2024)(M. et al., 2022)(Sumaryono, 2023):

Table 7. ERP Module Recommendation

Module Recommendations	Benefits and uses
Risk Management	Assist in identifying, evaluating, and managing the risks faced by the company. Provides a better understanding of the risks that may be faced. Assist in better decision-making to reduce risk.
Management Information Security	Provide a framework for identifying, managing, and mitigating information security risks. Increase information security awareness throughout the organization throughout the organization. Ensure effective and consistent implementation of security controls
Human Resource Management	Identify training needs to enhance employee understanding of risk, security, and technology. Regularly monitor employee performance to address issues affecting ERP implementation and risk management. Plan HR capacity for projects to minimize delays caused by staffing issues.

Table 7 shows the benefits and objectives of recommended ERP modules, providing valuable solutions for companies. Implementing these modules can enhance risk management, strengthen information security, integrate systems more effectively, improve monitoring and evaluation, and enhance human resource capacity, addressing areas identified for improvement in the 2019 COBIT audit. The UI is designed to clarify the benefits of each module to the company based on the ERP module recommendations. Recommendations include risk management, human resource management, and information security management modules.

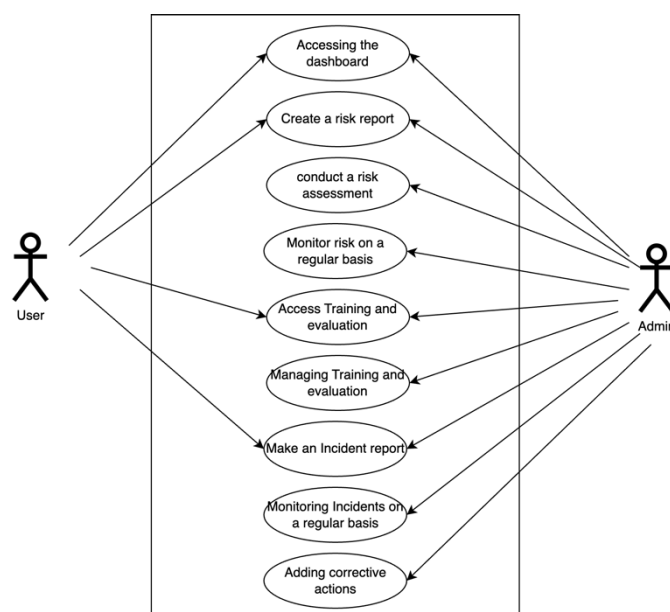


Figure 3. Use Case Diagram

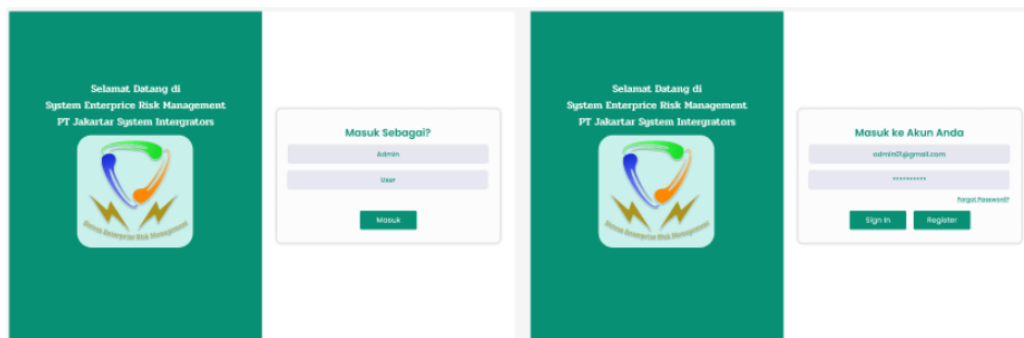


Figure 4. Log in Page Display

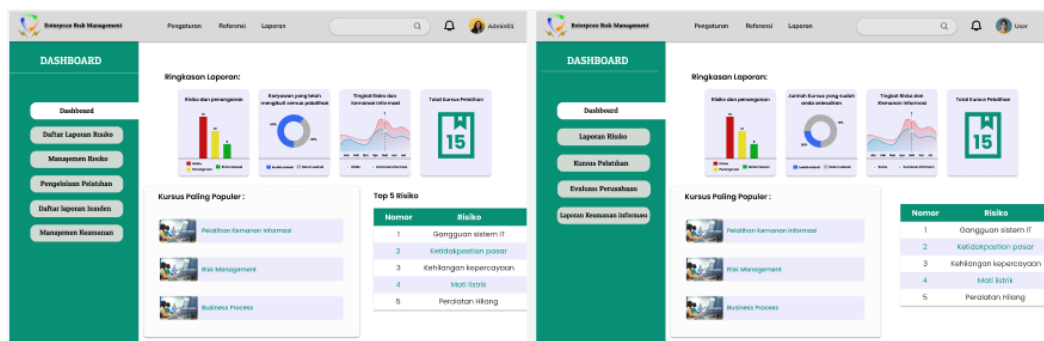


Figure 5. Admin and User dashboard view

Figure 3 shows the use case diagram of the developed user interface. Users can add risk information, create risk reports, access training and evaluation, create information security incident reports, and access dashboards. Admins have full access to all features. Figure 4 displays two login pages; the first contains a choice of whether the user is an admin or a user. The first one contains a choice of whether the user has admin or user status. After choosing, a page will appear to enter the user's email and password. User. Figure 5 is the main page, namely the admin and user UI dashboard menu. The admin dashboard contains a menu of risk report lists, risk management, training, incident report lists, and information security management. At the same time, the user dashboard contains a menu of risk reports, training courses, company evaluations, and information security incident reports.

CONCLUSION

The IT governance evaluation results show that three objects are at level 2, with one aiming to reach level 4 and the other two at level 3. The difference between the current and target levels indicates a gap of between 1 and 2 levels, indicating some deficiencies in the company's business processes and readiness for ERP system implementation. Several recommendations are proposed to help the company achieve the desired capability level, including suggestions for developing ERP modules and a user interface to illustrate the recommended ERP system.

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