Information Technology Governance Audit Using The COBIT 2019 Framework at XYZ Institution

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Abstract

Information technology governance has become an essential part of most companies. The use of information technology is not only limited to companies but also educational institutions. Information technology capabilities must keep pace with the times to help achieve process efficiency. Return on investment in information technology is an important consideration, so an assessment of information technology governance needs to be carried out. This study aims to determine how well information technology at the XYZ institution supports companies in doing their business. The COBIT 2019 framework is used in this research to achieve good information technology governance by showing how information technology can be aligned with the business. The study results show that the BAI03 Managed Solutions Identification and Build, BAI07 Managed IT Changes Acceptance and Transitioning, BAI10 Managed Configuration, DSS01 Managed Operations, and DSS05 Managed Security Services processes were found to be priority processes for XYZ institution. Using the COBIT 2019 design factor toolkit, the DSS01 process has a target capability level of 4, while the BAI03, BAI07, BAI10, and DSS05 processes have a target capability level of 3. Each priority process was found to have a capability level of level 1, resulting in a gap in the capability level between the current capability levels and the target capability level. The BAI10 process has the lowest capability level among the five priority processes with a partially rating of 20%.

Keywords—information technology, governance, COBIT 2019, design factor, capability level

Abstract

Tata kelola teknologi informasi telah menjadi bagian penting dari sebagian besar perusahaan. Penggunaan teknologi informasi tidak hanya terbatas pada perusahaan tetapi juga lembaga pendidikan. Kemampuan teknologi informasi harus mengikuti perkembangan zaman untuk membantu mencapai efisiensi proses. Pengembalian terhadap investasi dalam teknologi informasi menjadi pertimbangan penting, sehingga perlu dilakukan penilaian terhadap tata kelola teknologi informasi agar investasi tidak sia-sia. Penelitian ini bertujuan untuk mengetahui seberapa baik dukungan teknologi informasi pada institusi pendidikan XYZ dalam menjalankan bisnisnya. Framework COBIT 2019 digunakan dalam penelitian ini untuk mencapai tata kelola teknologi informasi yang baik dengan menunjukkan bagaimana teknologi informasi dapat diselaraskan dengan bisnis. Hasil studi menunjukkan bahwa proses BAI03 Managed Solutions Identification and Build, BAI07 Managed IT Changes Acceptance and Transitioning, BAI10 Managed Configuration, DSS01 Managed Operations, dan DSS05 Managed Security Services ditemukan sebagai proses prioritas untuk institusi XYZ. Dengan menggunakan toolkit Design Factor dari COBIT 2019, proses DSS01 memiliki level kapabilitas target 4, sedangkan proses BAI03, BAI07, BAI10, dan DSS05 memiliki level kapabilitas target 3. Setiap proses prioritas ditemukan memiliki level kapabilitas level 1, menghasilkan kesenjangan dalam tingkat kemampuan antara tingkat kemampuan saat ini dan tingkat kemampuan target. Proses BAI10

memiliki tingkat kapabilitas terendah di antara lima proses prioritas dengan peringkat sebagian 20%.

Kata kunci—teknologi informasi, tata kelola, COBIT 2019, faktor desain, tingkat kapabilitas

1. INTRODUCTION

Organizational information technology must always adapt to changing internal and external data requirements. Nearly all organizations, including educational institutions [1], utilize information technology, which is conceded to increase process efficiency. IT management must be organized in order to achieve greater process efficiency [2].

Benefit realization, risk optimization, and resource optimization are the advantages gained by the company after implementing good IT governance. An IT governance analysis is one way for businesses, including educational instition to align their IT implementation with their organizational goals [3]. IT governance analysis is extremely beneficial because it can evaluate the maturity of the use of information technology and correct any errors or irregularities in the application of information technology [4].

The role of IT governance in educational institutions is to ensure that information technology resources are used effectively and efficiently to support the institution's mission [5] . To do this, educational institutions must have a clear understanding of their overall strategic direction and how information technology can best be aligned to support it. IT governance also requires effective decision-making processes to ensure that investments in information technology are made in a way that maximizes the benefits to the institution [6].

In recent years, there has been an increasing focus on the importance of IT governance in educational institutions. This is due in part to the growing reliance on information technology within these organizations, as well as the increasing complexity of IT systems[7]. As a result, educational institutions must now pay more attention to ensuring that their IT resources are being used effectively and efficiently [5]. The most widespread framework in IT Governance is COBIT [8].

COBIT has been designed keeping in mind the best practices followed in the field of IT governance. It helps educational institutions to align their IT resources and processes with their business goals. Additionally, COBIT also provides guidance on how to effectively manage risks associated with IT systems and processes [9].

Implementing COBIT in an educational institution can help in achieving many benefits such as improved IT management, increased transparency, enhanced accountability, etc. Overall, COBIT can be extremely beneficial for educational institutions in ensuring that their IT infrastructure is up to the mark and aligned with their business goals [10].

The latest version of COBIT, the COBIT 2019, combines organizational governance and management by providing an openly accepted analytical model for enhancing the value and reliability of information systems. COBIT 2019 consists of 5 domains, one of which is included in the governance objectives, namely EDM (Evaluate, Direct, and Monitor), and the other four domains are included in the management objectives, namely BAI (Build, Acquire, and Implement), APO (Align, Plan, and Organize), MEA (Monitor, Evaluate, and Assess), and DSS (Deliver, Service, and Support) [2].

XYZ institution is one of the many universities in North Sulawesi supported and managed by the *Gereja Masehi Advent Hari Ketujuh* (GMAHK). The XYZ institution has implemented information technology to assist with data processing and service delivery. The concept of IT in universities is a response to the need of businesses to ensure a return on IT investment. Without IT governance, there is a risk of IT investment failure and service failure. For this reason, companies must conduct audits of IT governance to determine the extent to which IT is utilized to achieve business objectives [11].

In this study, researchers used the COBIT 2019 framework, the latest version of COBIT, which is an improvement from COBIT 5 [12]. COBIT is a well-known framework for analyzing

IT governance, with the COBIT 2019 edition allowing for greater implementation flexibility [13]. COBIT 2019 has been provided with a design factor (DF) concept that enables more detailed identification of processes or domains based on the company's actual IT governance conditions [14].

2. RESEARCH METHODS

This research uses qualitative descriptive methods and literature study methods based on research conducted in the last five years [9] [13] [16] [17] on IT governance at XYZ institutions, as well as information from relevant journals, books, and research papers. All previous researches used the older version which is the COBIT 5 version. The COBIT 2019 framework was utilized by researchers to evaluate the IT governance of XYZ institutions. The progression of this research includes several stages which started with the prioritization of Governance and Management Objectives or processes from the COBIT 2019 core model. Using the COBIT 2019 design factor evaluation tool, researchers assessed the importance of currently active processes at the XYZ organization. From this design factor toolkit, researchers conducted interviews with those who directly oversee IT governance at XYZ institutions and generated the target level capability for each process in the COBIT 2019 core model. The process that being evaluated all have target capabilities levels of level 3 and 4 [18]. After that, another interview was conducted with the relevant stakeholders based on the RACI Chart mapping for the priority processes, and the rating for each sub-process then determined using the NPLF method based on all sub-process activities. The percentage used for the NPLF method is as follows:

Table 1 NPLF Method Rating *[19]*

Percentage	Rating
0% - 15%	Not Achieved (N)
15% - 50%	Partially (P)
51% - 85%	Largely (L)
86%-100%	Fully (F)

To advance to the next level of capability assessment, one must have a Fully (F) rating or more than 85 percent. After determining the rating for each sub-process, the researcher will calculate the capability level of those processes, which can then be used to identify the gaps between the existing capability level of implementation of IT governance and the pre-defined target IT governance capability level of XYZ institution. The final phase of this research is the formulation of recommendations for enhancing the level of capability of each priority process based on the desired level of IT governance capabilities. The recommendations to enhance the IT governance capability level are based on any unaccomplished activities in each subprocess [18].

3. RESULTS AND DISCUSSIONS

3.1 DF 1: Enterprise Strategy
In the evaluation of DF 1 about the enterprise startegy in Figure 1, it was found that the primary strategy of XYZ institution is client service/stability, and the secondary strategy is cost leadership.
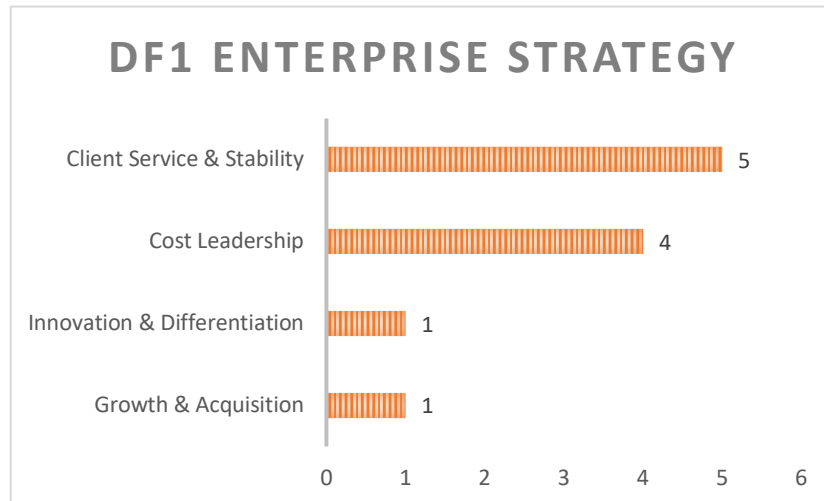
Figure 1 DF 1: Enterprise Strategy

3.2 DF 2: Enterprise Goals

In Figure 2, DF 2 depicts the XYZ institution's enterprise goals. According to interviews with respondents, EG01, EG06, EG08, EG10, EG12, and EG13 represent the enterprise goals which are focus on competitive portfolio, costumer service culture, business continuity, staff performance and skill, and lastly, they also focus on innovation of products.
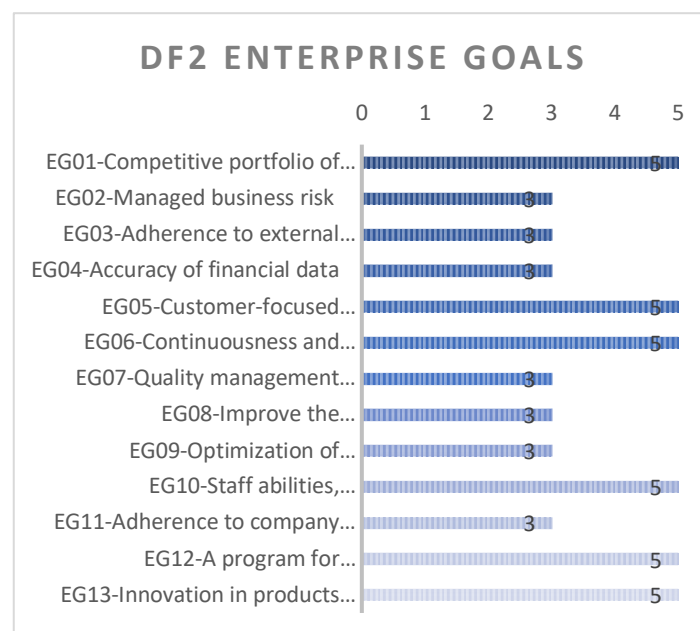

Figure 2 DF2: Enterprise Goals

3.3 DF 3: IT Risk Profile

In Figure 3, DF 3 indicates the IT risk profile of the XYZ institution. Based on the interviews with the respondents, six risks have been identified. One of them, data and information management, is classified as extremely high risk. In contrast, the other five, IT operational infrastructure incidents, unauthorized actions, logical attacks, technology-based innovation, and environmental risk, are classified as high risk.
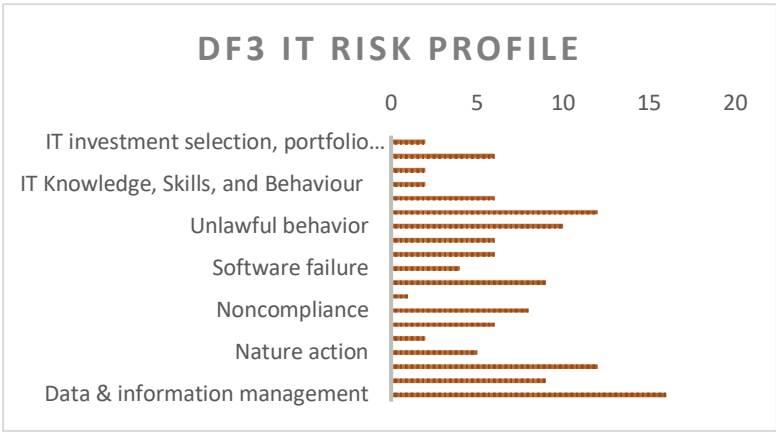
Figure 3 DF 3: IT Risk Profile

3.4 DF 4: I&T Related Issues

In Figure 4, DF 4 indicates the XYZ institution's I&T-related issues. According to interviews with respondents, the XYZ institution is currently facing five I&T-related issues. These I&T-related issues include: dissatisfaction between IT departments and business departments; insufficient IT resources and lack of staff skills; impeded implementation of innovations or initiatives due to IT architecture and systems; knowledge gaps between IT and non-IT personnel; and inability to use or implement new technologies.
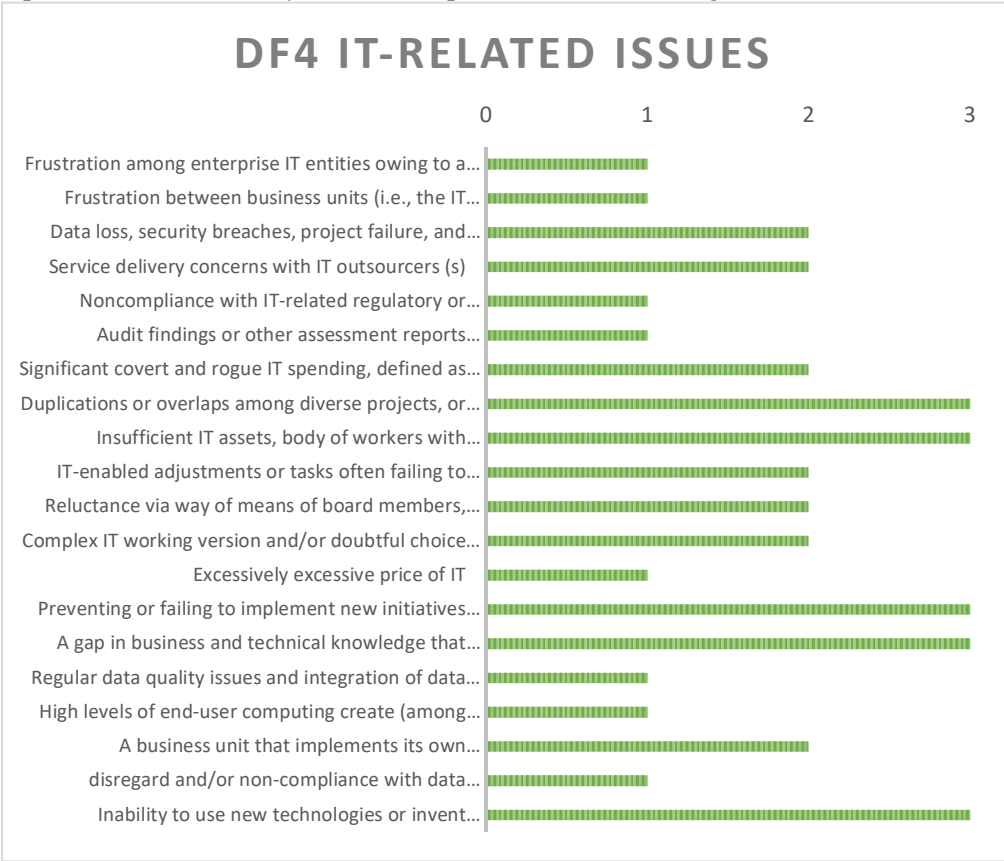

Figure 4 DF 4: IT-Related Issues

3.5 DF 5: Threat Landscape

As shown in Figure 5, DF 5 indicated that the threat level where the XYZ Institution operated was 80% normal and 20% high.
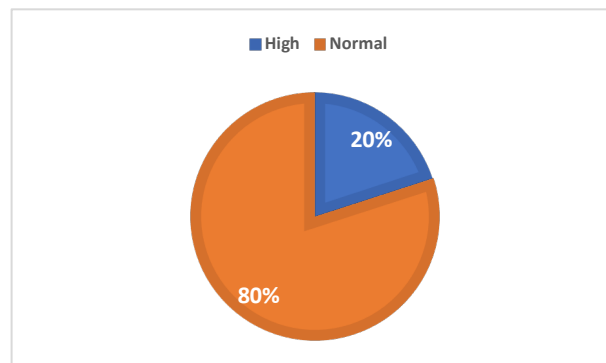

Figure 5 DF 5: IT Threat Landscape

3.6 DF 6: Compliance Requirment

In DF 6, according to interviews with respondents, the University of Klabat's compliance with each external and internal regulation was 85 percent high and 15 percent low, as indicated in Figure 6.
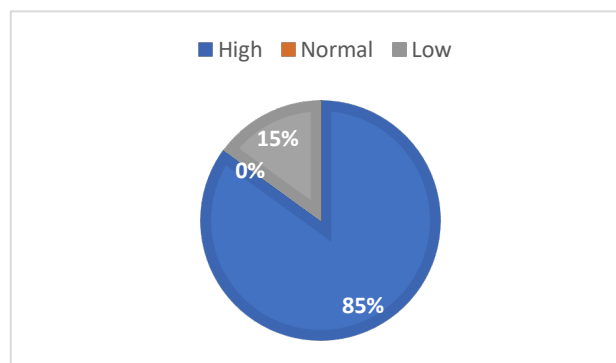

Figure 6 DF 6: Compliance Requirements

3.7 DF 7: Role of IT

DF 7 describes the role of IT at XYZ institution. As indicated in Figure 7, according to the results of interviews with respondents, the primary role of IT at XYZ institution is as support, as IT in the organization is merely a facilitator of business processes and services. The secondary role of IT for institution XYZ is viewed as a turnaround because IT in the company is viewed as a driver for innovation and business processes.
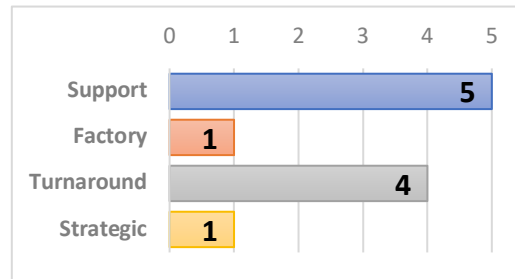
Figure 7 DF 7: Role of IT

3.8 DF 8: IT Sourcing Model

As shown in Figure 8, DF 8 indicates that the IT sourcing model at XYZ institution is 90% insourced, 0% outsourced, and 10% cloud, based on the results of interviews with respondents.
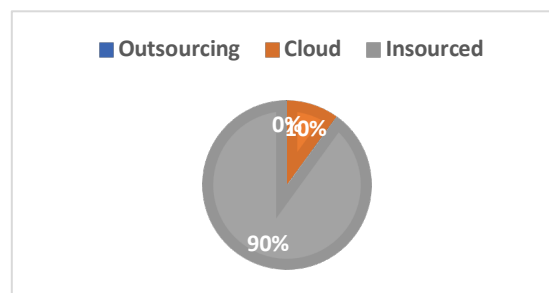

Figure 8 DF 8: IT Sourcing Model

3.9 DF 9: Importance of IT Implementation Methods

In DF 9, based on the results of interviews with respondents, it is known that 100% of IT implementation methods in XYZ Institutions are DevOps because the development and operation of the system were performed by XYZ Institutions until recently, as shown in figure 9.
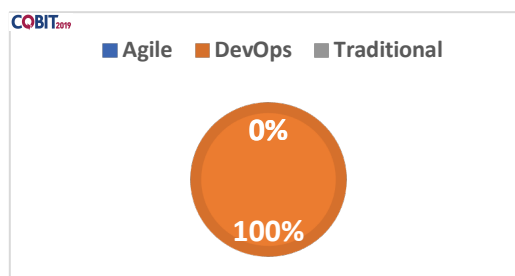

Figure 9 DF 9: IT Implementation Methods

3.10 DF 10: Technology Adoption Strategy

As shown in Figure 10, DF 10 indicates that the technology adoption strategy at XYZ institution is comprised of 0% first movers, 50% followers, and 50% slow adopters, based on the results of interviews with respondents.
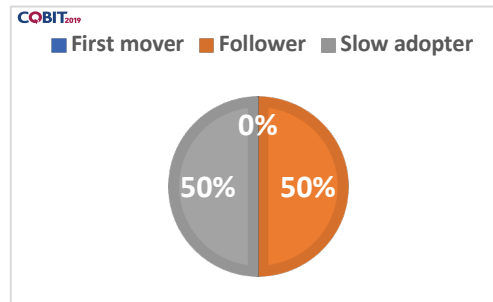
Figure 10 DF 10: Technology Adoption Strategy

The evaluation of DFs generates five processes with target capability levels of three and four. Figure 11 indicates the outcome of the DF evaluation.
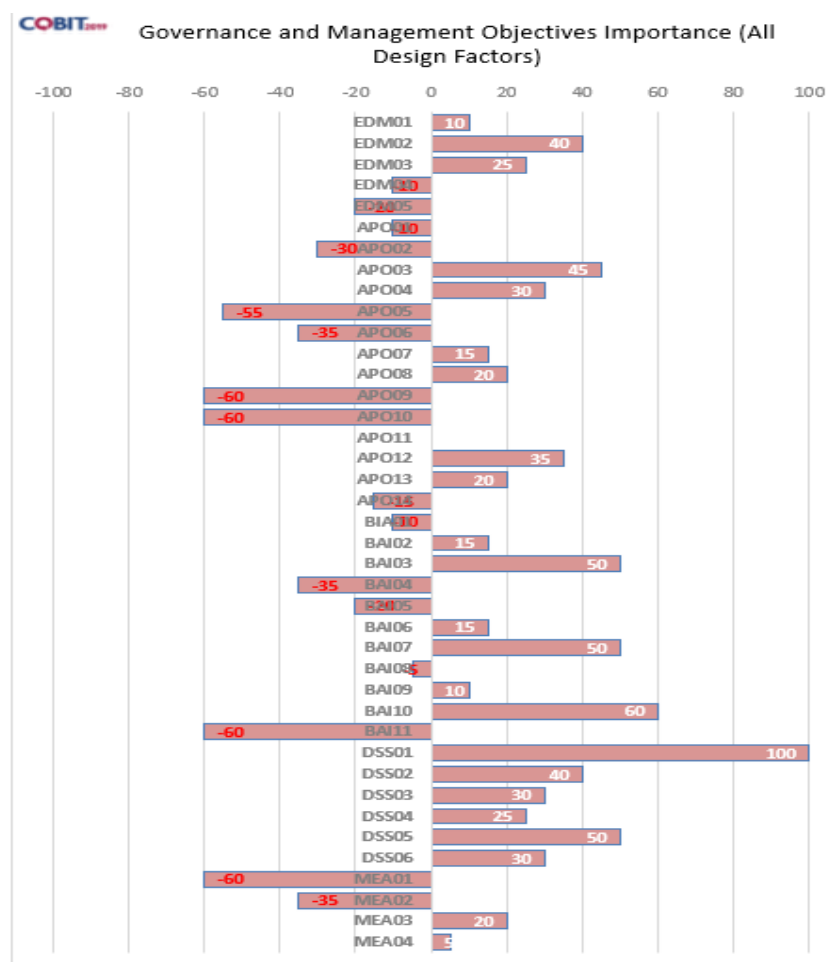

Figure 11 Governance and Management Objectives

Figure 11 displays the five processes that achieve a value of 50% or higher, with one process having a target capability of level 4 (DSS01 Managed Operations) and four processes having a target capability of level 3 (BAI03 Managed Solutions Identification and Build, BAI07 Managed IT Changes Acceptance and Trasitioning, BAI10, and DSS05) [14] [20]. The five processes will then proceed to the evaluation of the core model based on these results.

As shown in Table 2, the BAI03 process conducts an evaluation of the level 2 capability process.

Table 2 BAI03 Level 2 Activities

BAI03 Managed Solutions Identification and Build Activities	Check box
Create a high-level design specification that converts the suggested solution into a high-level design for business operations, supporting services, workflows, applications, infrastructure, and information repositories that may satisfy business and enterprise architectural requirements.	☒
To ensure that the design offers a solution that optimally leverages the suggested I&T capabilities to improve the business process, involve IT professionals and user experience designers who are adequately trained and experienced in the design process.	☒
Design something that adheres to the organization's design guidelines. Make sure it keeps a level of depth appropriate for the solution and development approach, compatible with business, enterprise, and I&T strategy, the enterprise architecture, security/privacy plan, and relevant laws, regulations, and contracts.	☒
Submit the final high-level design to the project stakeholders and the sponsor/business process owner for approval in accordance with predetermined criteria after quality assurance approval. As understanding increases throughout the project, this design will change.	☑
To achieve the enterprise objectives, design the business process activities and workflows that must be implemented in tandem with the new application system, including the manual control activities.	☒

According to the results of the level 2 capability assessment for BAI03, only 28% of level 2 activities had been completed. Therefore, the BAI03 process does not meet the criteria for capability level 2, so it is set to capability level 1.

As shown in Table 3, the BAI07 process conducts an evaluation of the level 2 capability process.

Table 3 BAI07 Level 2 Activities

BAI07 Managed IT Change Acceptance and Transitioning Activities	Check box
Establish an implementation strategy that includes the broad implementation approach, the order of implementation steps, the resource requirements, interdependencies, the criteria for management acceptance of the production implementation, the installation verification requirements, the transition strategy for production support, and the updating of business continuity plans.	☑
Obtain a commitment from external solution suppliers to take part in every phase of deployment.	☒
Determine and record the backup and recovery procedures.	☒
Establish a strategy for the migration of business processes, I&T service data, and infrastructure. Think about things like hardware, networks, operating systems, software, transaction data, master files, backups and archives, interfaces with other systems (internal and external), potential compliance needs, business procedures, and system documentation while building the strategy.	☒
Include any essential procedure modifications, such as updated roles and responsibilities and control processes, in the business process conversion strategy.	☒
Verify that, unless absolutely necessary for business reasons, the data conversion plan does not call for changing data values. Changes to data values should be documented and approved by the business process data owner.	☑

According to the results of the level 2 capability assessment for BAI07, only 40% of the level 2 activities had been completed. Therefore, the BAI07 process does not meet the criteria for capability level 2, so it is set to capability level 1.

As shown in Table 4, the BAI10 process conducts an evaluation of the level 2 capability process.

Table 4 BAI10 Level 2 Activities

BAI10 Managed Configuration Activities	Check box
Identify and categorize CIs, then add them to the repository.	☑
Recognize any CI modifications on a regular basis.	☒
Review proposed adjustments to CIs against the baseline to ensure thoroughness and correctness.	☒
Update configuration information for authorized CI modifications.	☒
Report against the baseline and identify CI status changes.	☒

According to the results of the level 2 capability assessment for BAI10, only 20% of the level 2 activities had been completed. Therefore, the BAI10 process does not meet the criteria for capability level 2, so it is set to capability level 1.

As shown in Table 5, the DSS01 process conducts an evaluation of the level 2 capability process.

Table 5 DSS01 Level 2 Activities

DSS01 Managed Operations Activities	Check box
Create and manage operational policies and associated tasks to support all provided services.	☑
Continually keep a schedule of operational tasks to complete.	☒
Log happenings. Decide on the degree of data that has to be recorded depending on performance and risk.	☒
The location of the IT facilities may be subject to both natural and man-made disasters. Analyze the possible impact on the IT facilities.	☑
Determine the methods used to safeguard I&T equipment, including mobile and off-site equipment, from environmental hazards. Make sure that the policy restricts or outlaws eating, drinking, and smoking in critical areas and forbids the storage of stationery and other goods that represent a fire threat in computer rooms.	☑
Examine the need for protection against power fluctuations and outages for the IT facilities in conjunction with other needs for business continuity planning. To assist business continuity planning, purchase the appropriate uninterruptible supply equipment (such as batteries and generators).	☒

According to the results of the level 2 capability assessment for DSS01, only 50% of the level 2 activities had been completed. Therefore, the DSS01 process does not meet the criteria for capability level 2, so it is set to capability level 1.

As shown in Table 6, the DSS05 process conducts an evaluation of the level 2 capability process.

Table 6 DSS01 Level 2 Activities

DSS05 Manage Security Services Activities	Check box
Installing and turning on malicious software prevention technologies with regularly updated malicious software definition files at all processing facilities (automatically or semi-automatically).	☒

To prevent receiving unwanted information, filter incoming traffic such as email and downloads	☑
Only authorized devices should be permitted access to company data and the enterprise network. Set up these gadgets to need password entry.	☑
Put firewalls and other network filtering tools into place. Enforce the necessary laws to regulate both inbound and outgoing traffic.	☑
Network connectivity should follow established security standards.	☑
Securely configure your network's hardware.	☑

According to the results of the level 2 capability assessment for DSS05, only 61.54% of the level 2 activities had been completed. Therefore, the DSS05 process does not meet the criteria for capability level 2, so it is set to capability level 1.

4. CONCLUSION

The study results show that the BAI03 Managed Solutions Identification and Build, BAI07 Managed IT Changes Acceptance and Transitioning, BAI10 Managed Configuration, DSS01 Managed Operations, and DSS05 Managed Security Services processes were found to be priority processes for XYZ institution. Using the COBIT 2019 DF toolkit, the DSS01 process has a target capability level of 4, while the BAI03, BAI07, BAI10, and DSS05 processes have a target capability level of 3. Each priority process was found to have a capability level of level 1, resulting in a gap in the capability level between the current capability levels and the target capability level. The BAI10 process has the lowest capability level among the five priority processes with a partially rating of 20%.

5. SUGGESTION

On the basis of the research findings, several recommendations can be made to the XYZ institution, including using the COBIT 2019 framework as a guide for IT governance, implementing the recommended activities for each sub-process, and conducting regular, IT audits to improve the company's IT quality and ensure that IT is aligned with the institution's business objectives to provide stable customer service.

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