

## DOMAIN ANALYSIS AND AUDIT OF IT GOVERNANCE BASED ON COBIT 5 AT DENPASAR INDUSTRIAL TRAINING CENTER

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### Abstract

Information technology has become a key element of organizations and one of institutions' added value and competitive advantages. Therefore, IT must be properly managed and measured. Denpasar Industrial Training Center (BDI) has implemented the IT Governance Education and Training Information System, SISDIKLAT. These applications have never been evaluated from an IT governance perspective. This study aimed to determine domains and assess SISDIKLAT using methods relevant to COBIT 5. To assist the organization in focusing on its main objectives and strategies, a tailored governance system based on the specificities of SISDIKLAT is required. This research assist BDI Denpasar in establishing healthy governance and IT management by utilizing the COBIT 5 framework. Both qualitative and quantitative approaches are used to select relevant governance/management objectives. Four domains and nine subdomains were chosen based on the domain analysis. According to the assessment results, the capability value of each subdomain was 2--3, with a gap value of 0.2--0.8. To reach the target level, the nine subdomains were advised.

**Keywords :** Information System Audit, COBIT 5 Framework, capability level, gap analysis

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### INTRODUCTION

Information technology (IT) has become a necessity for all aspects of individuals, groups, organizations and government agencies. It can affect the achievement of a goal. Essentially, it will serve the overall goals of the organization by facilitating the collaboration and integration of resources. [1], [2]. The Industrial Work Training Center (BDI) Denpasar is a unit under the Ministry of Industry of the Republic of Indonesia which is responsible for industrial development and further education. The management of training and continuing education by BDI Denpasar uses the Continuing Education and Training Information System (SISDIKLAT). SISDIKLAT is used in almost every training process, from registration to participant certification. In addition, professional certification bodies, training managers, and BDI partners also use it.

The use of SISDIKLAT was not properly managed during the implementation, and the alignment of information technology and business processes was not evaluated. Audits of management information systems and

technology controls are required for SISDIKLAT [3], [4].

We must first identify issues or problems with various techniques, such as an efficient Q-approach and the concept of part-of-speech (POS) trees [5], before conducting a system audit. Problem identification can be accomplished through a variety of methods, such as questioning, conducting interviews, or making observations [5].

Control Objectives for Information and Related Technology (COBIT), the Information Technology Infrastructure Library (ITIL) [6], and the ISO/IEC 27000 family [7], [8] are the most commonly used for managing information systems today [9]. ITIL focuses solely on information technology and how it can be managed and profited [10]. ISO, on the other hand, addresses relevant policies, processes, requirements, and procedures. ITIL focuses only on the logical phases of the process, defining what can be done but not how [9]. Furthermore, while ISO 27001 focuses primarily on information security, COBIT covers a broader range of topics [11]. Because of its scope, COBIT can act as an integrator, mapping it to business objectives IT-

related objectives (EGITs) covering specific areas [9]. The COBIT 5 framework can help auditors, users, and managers bridge the gap between business risks, control requirements, and technical information technology challenges. A complete COBIT 5 framework assists organizations in meeting their corporate governance and IT management objectives. It also allows for comprehensive IT regulation and management for all types of organizations, whether private, non-profit, or public [12]. Every organization needs a customized management system and operating context to function well. Thirty-seven auditing processes and five domains are defined by COBIT 5. Evaluate, Direct, and Monitor (EDM), Align, Plan, and Organize (APO), Build, Acquire, and Implement (BAI), Deliver, Service, and Support (DSS), and Monitor, Evaluate, and Assess (ME) are the domains included in this list [13], [14].

This paper presents a methodology for determining identification processes in SISDIKLAT, BDI Denpasar, using the COBIT 5 framework. The purpose of this study is to assess the degree of IT governance skills of currently operating training centers by considering several factors such as effectiveness, efficiency, information technology functional units within the

organization, and data integrity. To get an overview of IT governance performance to make decisions, asset protection, reliability, confidentiality, availability, and security [15]. One of the strengths of this study is the determination of process capability levels for IT models in training centers using COBIT 5.

### METHOD

The research method is descriptive-quantitative evaluation. The analytical tool used in this study is the Information Systems Audit and Control Association (ISACA) standard procedure COBIT, and data can be obtained in a variety of ways, including observations, a survey approach, and questionnaires.

The study was conducted in several clearly defined stages to make it more structured, systematic, controlled, and directed. The following research flowchart, as shown in Figure 1, starts with a literature review, then moves on to identifying problems by mapping IT related to the implementation of COBIT 5 goals cascade, determining domain and subdomain, mapping the RACI Chart, collecting data, processing calculations, and providing recommendations [16].

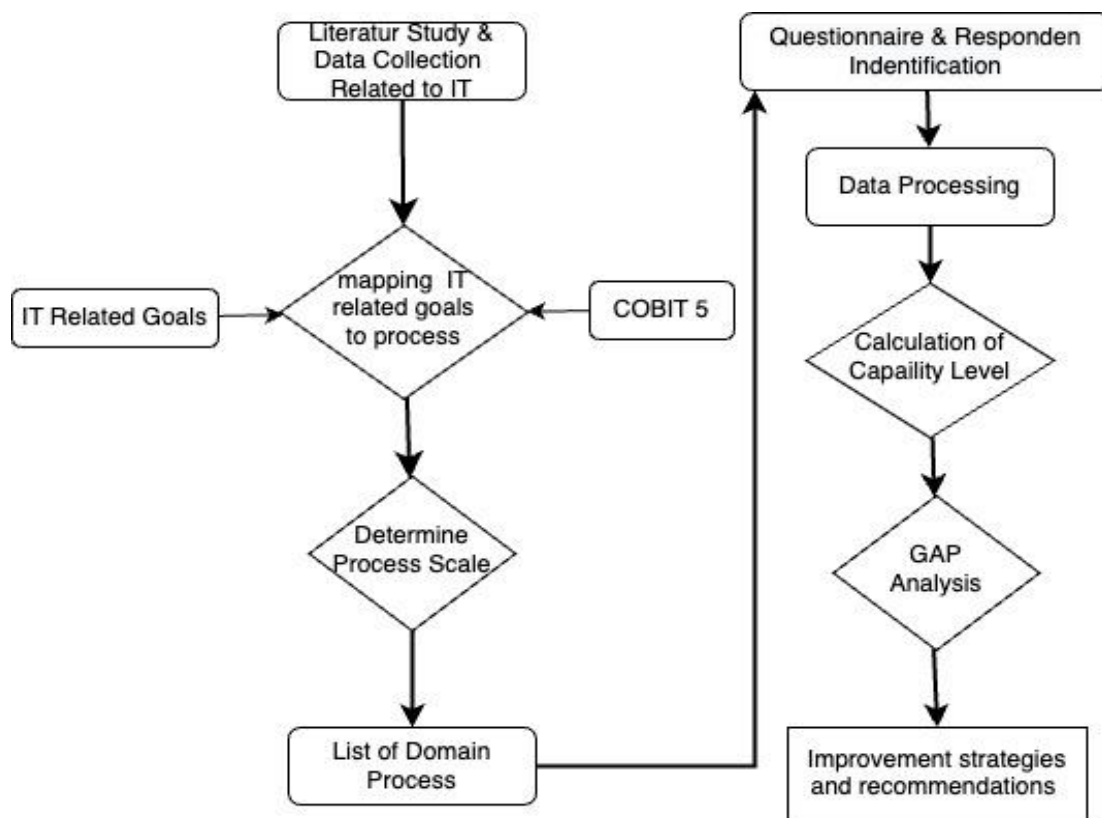


Figure 1. Research Method

Table 1. COBIT 5 Enterprise Goal

BSC Dimension	Enterprise Goal	Relation to Governance Objectives		
		Benefits Realisation	Risk Optimization	Resource Optimization
Financial	1. Stakeholder value of business investment	P	-	S
	2. Portfolio of competitive products and services	P	P	S
	3. Managed business risk (safeguarding of assets)	-	P	S
	4. Compliance with external laws and regulations	-	P	-
	5. Financial transparency	P	S	S
Customer	6. Customer-oriented service culture	P	-	S
	7. Business service continuity and availability	-	P	-
	8. Agile responses to a changing business environment	P	-	S
	9. Information-based strategic decision making	P	P	P
	10. Optimization of service delivery costs	P	-	P
Internal	11. Optimization of business process functionality	P	-	P
	12. Optimization of business process costs	P	-	P
	13. Managed business change program	P	P	S
	14. Operational and staff productivity	P	-	P
	15. Compliance with internal policies	-	P	-
Learning and Growth	16. Skilled and motivated people	S	P	P
	17. Product and business innovation culture	P	-	-

Explanation of each stage on Figure 1 involved in the auditing process:

1. Literature study by collecting data related to COBIT 5 implementation from various sources, books, articles and journals. The collection and processing of data into company information is carried out by conducting interviews with open-ended questionnaires and observations, collecting document data, files, and IT-related problems at BDI.
2. Defining COBIT 5 domain processes by mapping IT related goals based on IT issues to derive processes and to evaluate.
3. Merge COBIT 5 process and IT related goal to get process with scale P (Primary) and S (Secondary) that will be chosen to be evaluated based on stakeholder needs.
4. A list of domain processes will be used to create questionnaires for auditing the sisdiklat system.
5. Data is gathered through questionnaires with interested respondents and information about

- the company's assets. Respondents determine by using the RACI diagram to describe the roles of stakeholders (Table 5).
6. Data processing is the next phase following data processing, which is completed after gathering the information required for the study.
7. Perform the capability level calculation process, and analyze the results.
8. GAP Analysis. Analysis of the difference between the current and expected conditions.
9. Improvement strategies and recommendations provide recommendations based on audit results.

The company's achievement goals necessitate outcomes that are highly relevant to IT goals, and IT-related goals are compiled using the dimensions of the IT balanced scorecard. COBIT 5 has finalized the definition of 17 IT-related objectives [17], which are shown in table 1 and 2 [18].

Table 2. IT Related Goals

IT BSC Dimension	Information and Related Technology Goal
Financial	01 Alignment of IT and business strategy
	02 IT compliance and support for business compliance with external laws and regulations
	03 Commitment of executive management for making IT-related decisions
	04 Managed IT-related business risk
	05 Realized benefits from IT-enabled investment and service portfolio
	06 Transparency of IT costs, benefits and risk
Customer	07 Delivery of IT services in line with business requirements
	08 Adequate use of applications, information and technology solutions
Internal	09 IT agility
	10 Security of information, processing infrastructure and applications
	11 Optimization of IT assets, resources and capabilities
	12 Enablement and support of business process by integrating applications and technology into business process
	13 Delivery of programs that provide benefits, are on time, within budget, and meet quality requirements and standards
	14 Availability of reliable and useful information for decision making
	15 IT compliance with internal policies
Learning and Growth	16 Competent and motivated business and IT personnel
	17 Knowledge, expertise and initiatives for business innovation

## RESULT AND DISCUSSION

BDI Denpasar is a governance unit that has been operating since 2012 and has experience in providing information technology solutions and professional services to various companies in Indonesia, from small medium businesses to enterprises. Several issues were discovered while using SISDIKLAT, including: unreadable barcode scans that affect the check-in system for training participants in the dormitory, online attendance scans that have not been prepared by partners and integrated with the system, the certificate printing process is awaiting synchronization with the central system, and the assigning assessors by the BDI Denpasar Professional Certification Institute which is still manual because the system does not yet support it.

### 1. Domain Analysis

The results of the data collection at BDI Denpasar revealed details about the organizational structure, objectives and functions. To implement training for the use of SISDIKLAT, BDI Denpasar is also collaborating with a number of partners. The first step in determining the IT process that will be used later in the audit is the identification of business goals. This process uses COBIT 5 to align BDI's vision and mission with the company's business goals. 17 The general objectives are defined in COBIT

5 and refer to both corporate and government objectives. P stands for primary linkage and S stands for secondary linkage in the mapping table [19], [20].

#### a. Mapping Enterprise Goals Based on Company Goals

The process of mapping enterprise goals based on company goals is an important step in determining the COBIT 5 domain. According to the Table 1, the data to be collected is part of the Realization of Benefits and Optimization of Resources of SISDIKLAT BDI Denpasar. Business and institutional goals can be identified using dimensions of the Balanced Scorecard (BSC), more details is shown in Table 3.

#### b. Mapping Enterprise Goals to IT Related Goals

After Mapping Enterprise Goals Based on Company Goals, a mapping process is carried out between IT goals and institutional business. Mapping is done based COBIT 5 process reference model, to keep the process running. Mapping is performed with the goal of obtaining results that are in accordance with the process [8]. Table 4 shows the process mapping between each mapped destination.

There are twelve BDI Denpasar enterprise goals selected from the questionnaires: EG-02, EG-04, EG-06, EG-09, EG-11, EG-12, EG-15 and EG-16. The number of IT-related outcomes

represented by IT-related goals (ITrG) is required to achieve enterprise goals [9]. As a result, a mapping between EG and ITrG was created. The ITrGs chosen from the mapping are ITrG-02, ITrG-04, ITrG-07, ITrG-11, ITrG-14 ITrG-15 and ITrG-17.

*c. Mapping IT Related Goals to Determine Process*

The COBIT Framework 5 consists of 5 domains and 37 processes, and the domain in this study is determined by the results of Mapping IT-Related Goal based on Figure 2, in to the Process. The results of the domain mapping adjusted for the purposes of BDI Denpasar are:

- 1) Evaluated, Direct and Monitor (EDM),
- 2) Align, Plan and Organize (APO),
- 3) Deliver, Service and Support (DSS),
- 4) Monitor Evaluate and Assess (MEA),

as shown in Table 2.

Four domains and nine subdomains were chosen based on the domain analysis. These were EDM03, APO01, DSS01, DSS02, DSS03, DSS04, MEA01, MEA02, MEA03, and MEA04. The average process domain, as in Table 6, for EDM domain is 2.30, APO is 2.60, DSS is 2.58 and MEA is 2.46. According to PAM, EDM and MEA domain is at level 2, this means that the process has been implemented and managed with planned and monitored, while APO and DSS is at level 3, this means that the IT process has been implemented correctly in terms of planning, monitoring, work product adjustments, control, and maintenance.

These results show that some of SISDIKLAT's current abilities are at level 2-3. The process has been mostly implemented, and that the majority of the process goals have been met; still deemed to be less than optimal in delivering the information required.

**2. IT Governance Audit**

*a. Capability Level Calculation Results*

The capability model is measured using questionnaires. One hundred fifty-nine respondents were used to validate the questionnaires using *Bivariate Pearson* and Cronbach's Alpha. Questionnaires was valid with  $r_{\text{calculation}} > r_{\text{table}}$  and reliable with a Cronbach's Alpha value  $> 0,6$ . Questionnaires were distributed to six section based on the RACI diagram identification as in Table 5. The extent of IT infrastructure management is determined by measuring the level of governance of IT infrastructure. At COBIT 5, the measuring scale employs process assessment model (PAM). Maturity levels are classified into six categories ranging from 0 to 5. Each level has its own set of criteria; the assessment is based on the achievement (output) of Process Attribute (PA) [21].

*b. Gap capability level*

This level of inequality is calculated by comparing the current process position (as is) to future expectations (to be). BDI Denpasar conducts a gap analysis to determine which activities should be carried out so that the current level of capability meets the desired level of expectations. The gap value is calculated by subtracting the current position value from the expected position value. This level of disparity is used to determine how much improvement the process needs to achieve the desired level of maturity. Figure 3 shows a comparison of the process with the level of the subdomain gap ranging from 0.2 to 0.8. EDM domain has the highest average gap, followed by MEA, DSS, and APO at 0.7, 0.53, 0.43, and 0.4, respectively. The gap difference between the current level and the target level still appears to be moderate.

Table 3. Mapping enterprise goals based on company goals

BSC Dimension	Enterprise Goal	Company Goal
Financial	2. Portfolio of competitive products and services	To become a competitive educational and training center for industrial human resources based on specialization and competence in the fields of animation, crafts, and art goods on 2025
Customer	4. Compliance with external laws and regulations	
	6. Customer-oriented service culture strategies	
Internal	9. Information-based strategic decision making	
	11. Optimization of business process functionality	
Learning and Growth	12. Optimization of business process costs	
	15. Compliance with internal policies	
	16. Skilled and motivated people	



Table 4. Mapping Enterprise Goals to IT Related Goals

		Mapping COBIT 5 Enterprise Goals to IT-related Goals							
		Enterprise Goal							
		Portfolio of competitive products and services	Compliance with external laws and regulations	Customer oriented service culture strategies	Information-based strategic decision	Optimization of business process functionality	Optimization of business process costs	Compliance with internal policies	Product and business innovation culture
		2	4	6	9	11	12	15	16
IT Related Goal		Financial	Customer			Internal			Learn and Growth
Financial	2	IT compliance and support for business compliance with external laws and regulations	P					P	
	4	Managed IT-related business risk		S				S	S
Customer	7	Delivery of IT services in line with business requirements	P	S	P	S	P	S	S
Internal	11	Optimization of IT assets, resources and capabilities	S				S	P	
	14	Availability of reliable and useful information for decision making	S	S		P	S		
	15	IT compliance with internal policies	S	S				P	
Learned and	17	knowledge expertise and initiatives for business innovation	P		S	S	S		S

Table 5. Respondents List Based on RACI

No	Section / Position	Amount
1	Structural of BDI	5
2	Training organizer	15
3	Instructor Team	10
4	Training participants	7
5	BDI partners Training	120
6	Professional Certification Institute	2

		IT-related goal																
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
		Alignment of IT and business strategy	IT compliance and support for business compliance with external law regulation	Commitment of executive management for making IT-related decisions	Management IT-related business risk	Realised benefits from IT-enabled investments and service portfolio	Transparency of IT costs, benefits and risk	Delivery of IT service in line with business requirement	Adequate use of application, information and technology solutions	IT Agility	Security of information, processing infrastruktur and applicators	Optimization of IT Asset, resources and capabilities	Enablement and support of business processes by integrating application and technology into business processes	Delivery of programms delivering benefits, on time, on budget, and meeting requirements and quality standards	Availability of reliable and useful information for decision making	IT compliance with internal policies	Competent and motivated business and IT personnel	Knowledge, expertise and initiatives form business innovation
COBIT 5 Process		Financial					Customer			Internal						Learning and Growth		
Evaluate, Direct and Monitor	EDM01	Ensure Governance Framework Setting and Maintenance	P	S	P	S	S	S	P		S	S	S	S	S	S	S	S
	EDM02	Ensure Benefits Delivery	P		S		P	P	P	S			S	S	S		S	P
	EDM03	Ensure Risk Optimization	S	S	S	P		P	S	S		P			S	S	P	S
	EDM04	Ensure Resource Optimisation	S		S	S	S	S	S	S		P		P				S
	EDM05	Ensure Stakeholders Transparency	S	S	P		P	P							S	S	S	S
Align, Plan and Organise	AP001	Manage the IT Management Framework	P	P	S	S			S		P	S	P	S	S	S	P	P
	AP002	Manage Strategy	P		S	S	S		P	S	S	S	S	S	S	S	S	S
	AP003	Manage Enterprise Architecture	P		S	S	S	S	S	S	P	S	P	S	S	S	S	S
	AP004	Manage Innovation	S			S	P			P	P		P	S		S		P
	AP005	Manage Portfolio	P		S	S	P	S	S	S	S		S		P			S
	AP006	Manage Budget and Costs	S		S	S	P	P	S	S			S		S			
	AP007	Manage Human Resources	P	S	S	S			S		S	S	P		P		S	P
	AP008	Manage Relationships	P		S	S	S	S	P	S			S	P	S		S	P
	AP009	Manage Service Agreements	S			S	S	S	P	S	S	S	S		S	P	S	
	AP010	Manage Suppliers		S		P	S	S	P	S	P	S	S		S	S	S	S
	AP011	Manage Quality	S	S		S	P		P	S	S		S		P	S	S	S
	AP012	Manage Risk		P		P		P	S	S	S	P			P	S	S	S
	AP013	Manage Security		P		P		P	S	S		P				P		
Build, Acquire and Implement	BAI01	Manage Programmes and Projects	P		S	P	P	S	S	S		S		P			S	S
	BAI02	Manage Requirements definition	P	S	S	S	S		P	S	S	S	S	P	S	S		S
	BAI03	Manage Solutions and Edentification Build	S			S	S		P	S			S	S	S	S		S
	BAI04	Manage Availability and Capacity				S	S		P	S	S		P		S	P		S
	BAI05	Manage Organisational Change Enablement	S		S		S		S	P	S		S	S	P			P
	BAI06	Manage Changes			S	P	S		P	S	S	P	S	S	S	S	S	S
	BAI07	Manage Change Acceptance and Transitioning				S	S		S	P	S			P	S	S	S	S
	BAI08	Manage Knowledge	S				S		S	S	P	S	S			S		S
	BAI09	Manage Assets		S		S		P	S		S	S	P			S	S	
	BAI10	Manage Configuration		P		S		S		S	S	S	P			P	S	
Deliver, Service and Support	DSS01	Manage Operations		S		P	S		P	S	S	S	P			S	S	S
	DSS02	Manage Service Requests and Incidents				P			P	S		S				S	S	S
	DSS03	Manage Problems		S		P	S		P	S	S		P	S		P	S	S
	DSS04	Manage Continuity	S	S		P	S		P	S	S	S	S	S		P	S	S
	DSS05	Manage Security Service	S	P		P			S	S		P	S	S		S	S	
	DSS06	Manage Business Process Controls		S		P			P	S		S	S	S		S	S	S
Monitors, Evaluate and	MEA01	Monitors, Evaluate and Access Performance and Conformance	S	S	S	P	S	S	P	S	S	S	P		S	S	P	S
	MEA02	Monitors, Evaluate and Access the system of Internal Control		P		P		S	S	S		S			S	P	S	
	MEA03	Monitors, Evaluate and Access Compliance With External Requirements		P		P	S		S			S				S		S

Figure 2. Mapping IT Related goals to Determine Process

Tabel 6. SISDIKLAT Capability Level

Domain	Process	Capabililty Level
EDM03	Ensure Risk Optimization	2.3
APO01	Manage the IT Management Framework	2.6
DSS01	Manage Operations	2.8
DSS02	Manage Service Requests and Incidents	2.3
DSS03	Manage Problems	2.7
DSS04	Manage Continuity	2.5
MEA01	Control Assessment and Performance Evaluation	2.4
MEA02	Monitor, Evaluate and Asses the system of internal control	2.8
MEA03	Monitor, Evaluate and Asses Compliance with External Requirements	2.2

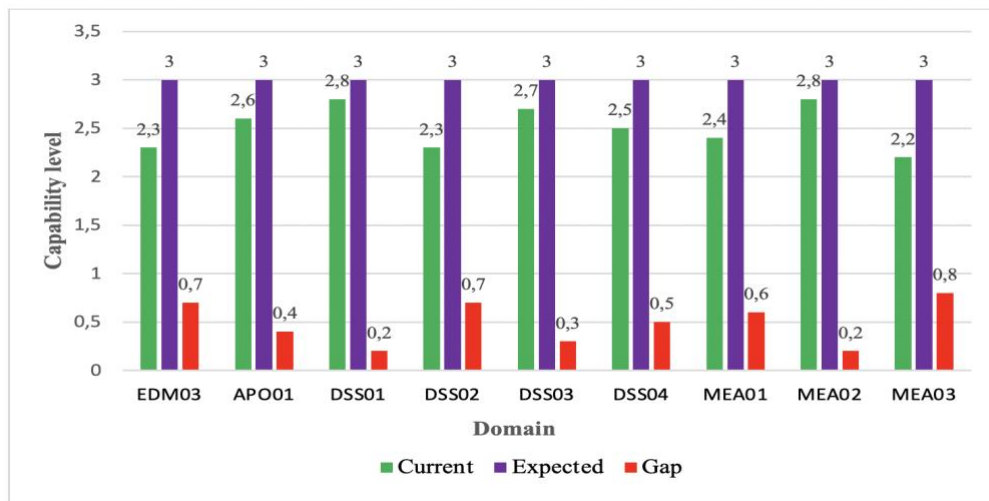


Figure 3. GAP Analysis

**c. Plan Program and Recommendation**

The average gap amongst domains studied is 0.849. When compared to the optimal value, the average domain gap is 2.489, which is half of the maximum capability value. Figure 4 depicts differences in gaps across process domains, with current, expected, and optimal values. The green line represents the current capability level gap, which is close to the expected target level. However, according to the findings of this study, the current level of capability looks quite far from the optimal level. Recommendations are made by compiling a series of activities in improving IT service processes based on the level of achievement obtained in this study.

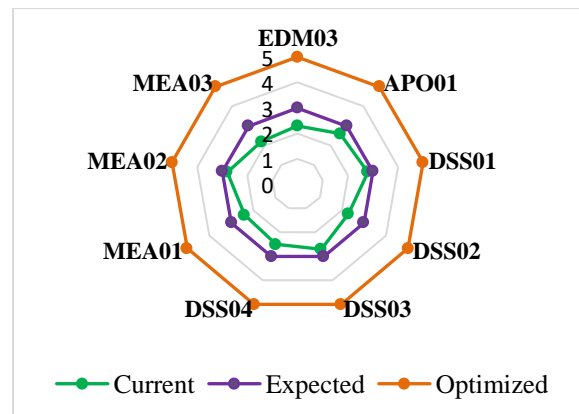


Figure 4. Index Level Process Capability



Recommendations vary by process domain. To reduce the GAP value to the desired target level, the following recommendations should be followed.

First, the addition of duties and responsibilities from the organizational structure is an initial suggestion for EDM03. Internal control requires authorization and responsibility at all levels. As long as there are clear human resource responsibilities and standards or criteria, every individual and team is empowered and encouraged to take initiative, focus on problems, and solve them [22]. The second is related to the evaluation of infrastructure and resource needs. When incidents occur and there are not enough resources to cover them, activities are disrupted due to lack of human resources and backup infrastructure. The third recommendation is to optimize the process of risk oversight and risk assessment. Risk monitoring is the board's oversight process of the risk management framework, and risk assessment is an important part of risk management. Monitoring and risk assessment will help ensure that activities remain objective. The recommendation for APO01 is to evaluate the quality of the current IT strategy process. Leaders and staff must establish and implement a process to ensure that the goals of the institution are achieved consistently [17].

Consider identifying and developing mechanisms for measuring data migration, conversion, and backup aspects, as well as available performance and IT performance when changes occur in the operation of systems or IT services, and plan according to the BDI is needed. Recommended DSS01. There are three recommendations for DSS01, the first suggestion is to review related policies and SOPs for data security. Given the importance of data and information and the findings that there are data loss cases due to a broken computer, it is necessary to review the existing data security policy. The second recommendation is to create logbook to mitigate the risk of unauthorized changes, unauthorized access and unavailability of financial data. The third recommendation is to make classification scheme and priority of service requests obtained from users before being forwarded to the education and training manager so that the repair and updating process is carried out based on priority order.

Two recommendations for DSS03 are as follows: first, a troubleshooter function must be developed in order to identify problems that occur quickly and on target, and second, a permanent solution to the root cause of the problem that has been identified must be developed.

The recommendation for DSS04 is to create documentation, perform scenario analysis, and monitor potential disruptive incidents. After successfully handling post-disruption business processes and services, conduct a review by assessing the adequacy of the Education and Training System.

Based on the gap analysis and target levels to be achieved in the MEA, some recommendations for improving the quality of SISDIKLAT BDI Denpasar are given below. For MEA01, the BDI lead reviews the system that monitors each task to ensure, for example, that the assessment lead monitors and submits responses to reports on assignment results. Establish SISDIKLAT quality assurance standards based on the BDI Denpasar Strategic Plan. Follow-up with the Indonesian Certification Guarantee Agency is required for setting quality assurance standards.

The Head of BDI Denpasar must ensure that SISDIKLAT quality assurance standards are developed, approved, and followed by recommendations for MEA02. Suggestions for improving MEA03 are to prepare an SOP mechanism for controlling SISDIKLAT in accordance with the recommendations for changes to MEA02 based on external changes in SISDIKLAT. Create requests to monitor IT activities in the form of daily/weekly reports or a dashboard system. Establish agreed monitoring objectives and metrics for monitoring activities, and set targets for performance and suitability of monitoring activities. After monitoring, create a document for processing the monitoring data.

## CONCLUSION

Four domains and nine subdomains were chosen based on the domain analysis. The expected value of progress in the whole process is at level 3 with gaps at 0,2-0,8 performance. The average value of the analysis obtained is 2.5, indicating that BDI does not yet have a quality management system (QMS) as used in the industrial world, but they get feedback on service quality by filling out service surveys. Therefore, it is necessary to advise BDI Denpasar to implement a sustainable quality management system within the quality management framework. Recommendations are provided to improve the maturity level of IT Infrastructure Governance SISDIKLAT, specifically to support e-Government implementation in BDI Denpasar.

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## REFERENCES

- [1] H. Taherdoost, "A review of technology acceptance and adoption models and theories," *Procedia Manuf.*, vol. 22, pp. 960–967, 2018, doi: <https://doi.org/10.1016/j.promfg.2018.03.137>.
- [2] M. Lee *et al.*, "How to respond to the fourth industrial revolution, or the second information technology revolution? Dynamic new combinations between technology, market, and society through open innovation," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 4, no. 3, p. 21, 2018, doi: <https://doi.org/10.3390/joitmc4030021>.
- [3] "Profile, Duties, and Functions of The Denpasar Training Centre (BDI) Denpasar." <https://bdidenpasar.kemenperin.go.id/> (accessed Aug. 22, 2022).
- [4] U. P. Rahargo and L. M. Jannah, "Tantangan Dalam Pengembangan Program Pelatihan Balai Diklat Industri Di Era Revolusi Industri 4.0," *Kebijakan: Jurnal Ilmu Administrasi*, vol. 11, no. 2, pp. 1–9, 2020, doi: <https://doi.org/10.23969/kebijakan.v11i2.2894>.
- [5] S. Siregar, E. Rustamaji, and others, "Determining evaluated domain process through problem identification using COBIT 5 framework," in *2017 5th International Conference on Cyber and IT Service Management (CITSM)*, 2017, pp. 1–6. doi: <https://doi.org/10.1109/CITSM.2017.8089281>.
- [6] Y. Mitev and L. Kirilov, "Group Decision Support for e-Mail Service Optimization through Information Technology Infrastructure Library Framework," in *2021 16th Conference on Computer Science and Intelligence Systems (FedCSIS)*, 2021, pp. 227–230. doi: [10.15439/2021F93](https://doi.org/10.15439/2021F93).
- [7] I. Meriah and L. B. A. Rabai, "Comparative Study of Ontologies Based ISO 27000 Series Security Standards," *Procedia Comput Sci.*, vol. 160, pp. 85–92, Jan. 2019, doi: [10.1016/J.PROCS.2019.09.447](https://doi.org/10.1016/J.PROCS.2019.09.447).
- [8] C. Gikas, "A general comparison of FISMA, HIPAA, ISO 27000 and PCI-DSS Standards," *Information Security Journal*, vol. 19, no. 3, pp. 132–141, 2010, doi: [10.1080/19393551003657019](https://doi.org/10.1080/19393551003657019).
- [9] B. S. L. Borges, "Comparison of COBIT 5 and ITIL V3 using Semantic Analysis," 2018, [Online]. Available: <https://www.semanticscholar.org/paper/Comparison-of-COBIT-5-and-ITIL-V3-using-Semantic-Borges/c91dcbffe99b45d3a831e990865c4d56cacf6d68>
- [10] L. A. Aprilianti, E. Darwiyanto, and Y. F. Arie, "Information Technology Governance Audit Using the COBIT 5 Framework (Case Study of PDAM Tirta Patriot Kota Bekasi)," *Indonesia Journal on Computing (Indo-JC)*, vol. 6, no. 2, pp. 11–22, 2021, doi: <https://doi.org/10.34818/INDOJC.2021.6.2.563>.
- [11] R. Almeida, R. Lourinho, M. M. da Silva, and R. Pereira, "A model for assessing COBIT 5 and ISO 27001 simultaneously," in *2018 IEEE 20th Conference on Business Informatics (CBI)*, 2018, vol. 1, pp. 60–69. doi: <https://doi.org/10.1109/CBI.2018.00016>.
- [12] R. Umar, I. Riadi, and E. Handoyo, "Analysis security of SIA based DSS05 on COBIT 5 using capability maturity model integration (CMMI)," *Sci. J. Informatics*, vol. 6, no. 2, pp. 193–202, 2019, doi: <https://doi.org/10.15294/sji.v6i2.17387>.
- [13] A. Razzaque, "Artificial Intelligence and IT Governance: A Literature Review," in *The Big Data-Driven Digital Economy: Artificial and Computational Intelligence*, A. M. A. Musleh Al-Sartawi, Ed. Cham: Springer International Publishing, 2021, pp. 85–97. doi: [10.1007/978-3-030-73057-4\\_7](https://doi.org/10.1007/978-3-030-73057-4_7).
- [14] R. Yunis, Djoni, and Angela, "A Proposed of IT Governance Model for Manage Suppliers and Operations Using COBIT 5 Framework," in *2019 Fourth International Conference on Informatics and Computing (ICIC)*, 2019, pp. 1–6. doi: [10.1109/ICIC47613.2019.8985979](https://doi.org/10.1109/ICIC47613.2019.8985979).
- [15] S. Galiveeti, L. Tawalbeh, M. Tawalbeh, and A. A. A. El-Latif, "Cybersecurity Analysis: Investigating the Data Integrity and Privacy in AWS and Azure Cloud Platforms," in *Artificial Intelligence and Blockchain for Future Cybersecurity Applications*, Y. Maleh, Y. Baddi, M. Alazab, L. Tawalbeh, and I. Romdhani, Eds. Cham: Springer International Publishing, 2021, pp. 329–360. doi: [10.1007/978-3-030-74575-2\\_17](https://doi.org/10.1007/978-3-030-74575-2_17).

- [16] C. Montenegro, A. de la Torre, and N. Nuñez, "Integrated IT Governance and Management Model: Evaluation in a Developing Country," in *Trends and Applications in Software Engineering*, 2018, pp. 71–81.
- [17] I. Aguilar-Alonso and J. Vergara-Calderón, "Identification of IT Governance Frameworks and Standards Implemented in Organizations," in *2020 IEEE International Conference on Sustainable Engineering and Creative Computing (ICSECC)*, Dec. 2020, pp. 36–41. doi: 10.1109/ICSECC51444.2020.9557561.
- [18] A. I. Saridewi, D. M. Wiharta, and N. P. Sastra, "Evaluation of Integrated University Management Information System Using COBIT 5 Domain DSS," in *2018 International Conference on Smart Green Technology in Electrical and Information Systems: Smart Green Technology for Sustainable Living, ICSGTEIS 2018 - Proceeding*, 2018. doi: 10.1109/ICSGTEIS.2018.8709144.
- [19] S. Tranchard, "Risk management: The new ISO 31000 keeps risk management simple," *Governance Directions*, vol. 70, no. 4, pp. 180–182, 2018.
- [20] B. Barafort, A.-L. Mesquida, and A. Mas, "Integrated risk management process assessment model for IT organizations based on ISO 31000 in an ISO multi-standards context," *Comput Stand Interfaces*, vol. 60, pp. 57–66, 2018, doi: <https://doi.org/10.1016/j.csi.2018.04.010>.
- [21] G. Auth, "The Evolution of IT Management Standards in Digital Transformation: Current Status and Research Implications," in *Engineering the Transformation of the Enterprise: A Design Science Research Perspective*, S. Aier, P. Rohner, and J. Schelp, Eds. Cham: Springer International Publishing, 2021, pp. 301–318. doi: 10.1007/978-3-030-84655-8\_19.
- [22] Idil Kaya, "Perspectives on Internal Control and Enterprise Risk Management," in *Eurasian Business Perspectives*, 2018, pp. 379–389.

No	Questionnaires Statement				
	Structural of BDI and Training organizer	Professional Certification Institute	Training participants	BDI partners Training	Instructor Team
1	Monitoring online attendance is simple.	It is simple to coordinate training participants with training organizers.	Online attendance is simple to accomplish.	Flyers can be easily uploaded.	It's simple to upload a CV
2	It is simple to keep track of participant disciplinary actions.	The test schedule calendar can be easily entered.	Online enrollment is simple.	Fortofolia can be downloaded without difficulty.	Easy to upload NPWP
3	Coordination with partners for SIDIA maintenance is simple.	It's simple to input test results.	Document uploading is simple.	Participant selection is straightforward.	It is simple to check participant attendance online.
4	Developing systems with partners is simple.	It's simple to upload certificates from testkom.	Easy to complete the input for the training evaluation.	It is simple to upload partner documentation.	Online training input evaluation is simple to complete.
5	Leaders support the development of SIDIA	It's simple to provide the input needed to evaluate the online test.	Certificate downloads are simple.	It's simple to keep track of participant attendance	Online participant input evaluation is simple to carry out.
6	SIDIA is easy to use (user friendly)	SIDIA is easy to use (user friendly)	SIDIA is easy to use (user friendly)	SIDIA is easy to use (user friendly)	SIDIA is easy to use (user friendly)
7	The tools in SIDIA are simple to utilize.	The tools in SIDIA are simple to utilize.	The tools in SIDIA are simple to utilize.	The tools in SIDIA are simple to utilize.	The tools in SIDIA are simple to utilize.
8	Partners promptly responded to SIDIA error events	Partners promptly responded to SIDIA error events	The admin quickly responded to complaints about SIDIA usage incidents.	The admin quickly responded to complaints about SIDIA usage incidents.	The admin quickly responded to complaints about SIDIA usage incidents.
9	BPSDMI successfully synchronized the training information data.	BPSDMI successfully synchronized the training information data.	As needed, the SIDIA feature has been prepared.	As needed, the SIDIA feature has been prepared.	As needed, the SIDIA feature has been prepared.
10	Partners responded quickly to SIDIA's constraints.	Partners responded quickly to SIDIA's constraints.	SIDIA administrators responded quickly to constraints.	SIDIA administrators responded quickly to constraints.	SIDIA administrators responded quickly to constraints.
11	Partners can properly resolve problem-solving responses.	Partners can properly resolve problem-solving responses.	SIDIA administrators can properly resolve problem-solving responses.	SIDIA administrators can properly resolve problem-solving responses.	SIDIA administrators can properly resolve problem-solving responses.
12	User passwords can provide better security.	User passwords can provide better security.	User passwords can provide better security.	User passwords can provide better security.	User passwords can provide better security.
13	Data security can be provided by antivirus software.	Data security can be provided by antivirus software.	Data security can be provided by antivirus software.	Data security can be provided by antivirus software.	Data security can be provided by antivirus software.
14	Access is granted in accordance with the functions of each user.	Access is granted in accordance with the functions of each user.	Access is granted in accordance with the functions of each user.	Access is granted in accordance with the functions of each user.	Access is granted in accordance with the functions of each user.
15	It is necessary to carry out system maintenance so that SIDIA can operate efficiently.	It is necessary to carry out system maintenance so that SIDIA can operate efficiently.	It is necessary to carry out system maintenance so that SIDIA can operate efficiently.	It is necessary to carry out system maintenance so that SIDIA can operate efficiently.	It is necessary to carry out system maintenance so that SIDIA can operate efficiently.
16	It is necessary to improve features so that SIDIA can function optimally.	It is necessary to improve features so that SIDIA can function optimally.	It is necessary to improve features so that SIDIA can function optimally.	It is necessary to improve features so that SIDIA can function optimally.	It is necessary to improve features so that SIDIA can function optimally.