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Evaluation of Integration and Human Resources in Information Technology Governance using COBIT 2019: PT. Pelabuhan Indonesia Tanjung Priok Branch

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Abstract

The Tanjung Priok Branch of PT. Pelabuhan Indonesia is a state-owned enterprise fully owned by the Ministry of State-Owned Enterprises, representing the Republic of Indonesia. Despite its commitment to governance, the branch encounters certain deficiencies. These include challenges related to system optimization, hindering the realization of effective processes. Moreover, there's a recognized need to enhance the expertise of the workforce to better leverage existing knowledge assets. To address these concerns, a comprehensive study focused on the IT governance of the Tanjung Priok Branch was conducted. The research employed the COBIT 2019 framework to evaluate the IT governance landscape. The investigation pinpointed areas requiring attention and enhancement within the organization. Notably, three key domains emerged as pertinent: APO08 - Managed Relationship, APO11 - Managed Quality, and BAI08 - Managed Knowledge. The assessment revealed noteworthy insights into the organization's IT governance structure. The evaluation of the APO08 process indicated that its performance fell short of the anticipated target, remaining at level 3. On the other hand, the APO11 process achieved the desired level, reaching level 4 and demonstrating significant progress. Similarly, the BAI08 process attained level 4, successfully meeting the intended target. These findings shed light on areas of accomplishment as well as those requiring further attention. To propel the Tanjung Priok Branch of PT. Pelabuhan Indonesia towards its envisioned level of excellence, it's imperative to address the identified gaps and build upon the areas of success. This strategic approach will pave the way for the realization of optimized IT governance, efficient processes, and empowered human resources, aligning with the organization's overarching objectives.

Keywords: Capability Level, COBIT 2019, Capability assessment

1. INTRODUCTION

In the modern era, technology and information have become inseparable from human activities, offering immense potential for individuals, organizations, companies, and government bodies. PT. Pelabuhan Indonesia Tanjung Priok Branch, a state-owned enterprise, operates in various shipping and port management activities in one of Indonesia's busiest ports. The company has

embraced digitalization, integrating technology and information systems into services like shipping, cargo handling, and passenger management. This integration has led to efficient remote control, optimal cost management, and the ability to anticipate cargo handling speed through specialized service facilities. However, the company faces challenges in IT governance, such as message delivery failures and the need for human intervention to address issues. To overcome these hurdles, the research employs COBIT 2019, an updated framework that aligns organizational needs with technical implementation, providing flexibility in governance strategies and adaptability to new technologies [1-4].

The research embarks on an exploration of IT governance, harnessing the transformative power of COBIT 2019 as its guiding framework. To enrich this endeavor, it draws upon the insights gleaned from a corpus of prior scholarly studies that intricately employed COBIT across diverse contexts. These encompassed a spectrum of themes, including the quantification of organizational capabilities via COBIT 5.0 within corporate realms [5], the cultivation of robust IT governance in a bank celebrated for its customer-centric ethos and managerial evolution [6], the comprehensive evaluation of service quality, managerial efficacy, and risk landscapes within a corporate milieu [7], the orchestration of IT governance audits to distill recommendations and enhancements within governmental agencies [8], the meticulous audit of information systems within educational institutions [9], the scrutiny of response dynamics and efficiency within the attendance systems of textile industries [10], the dissection of cybersecurity standards to amplify ICT management paradigms [11], the strategic optimization of resource allocation and investment determinations within university project portfolios [12], the alignment of strategic trajectories with governance imperatives within institutional frameworks [13], and the proposition of system refinements grounded in meticulous capability assessments [14]. This constellation of antecedent studies provides a robust scaffold upon which the present research builds, interweaving diverse insights into the overarching tapestry of contemporary IT governance practices.

At its core, the research is underpinned by the ambitious aspiration to elevate the realms of IT governance within PT. Pelabuhan Indonesia Tanjung Priok Branch. Guided by the dynamic COBIT 2019 framework, this inquiry sets its sights on forging a path towards enhanced governance mechanisms in the modern technological landscape. In this quest, the research not only embraces the cutting-edge facets of COBIT 2019, as ratified by ISACA, but also channels its focus towards specific domains. This precise trajectory is illuminated by insights gleaned from intimate dialogues with the Information System Project Manager within the company, underscoring the symbiotic relationship between theoretical prowess and pragmatic applicability [5-10], [12-13], [15-17]. The study's distinctiveness resides in its dual nature: as an innovative adopter of the latest governance

framework and a responsive enabler of tangible transformation guided by real-world stakeholder input.

2. METHODS

The research methodologically adheres to Gallegos' comprehensive four-step procedure for conducting a meticulous and streamlined information technology audit at PT. Pelabuhan Indonesia Tanjung Priok Branch [18]. The sequential progression of the study's phases is visually encapsulated in the illustrative representation presented in Figure 1.

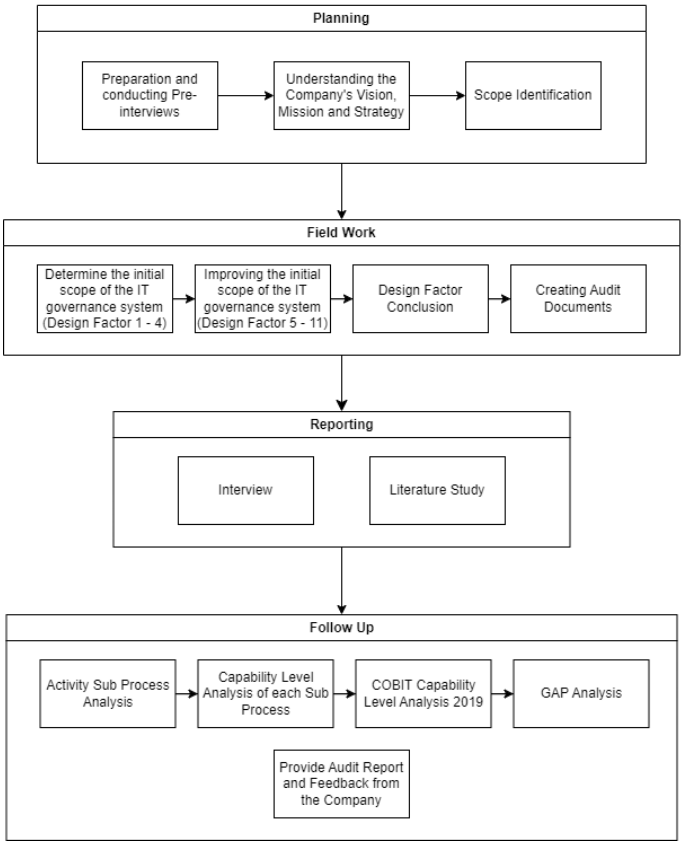

Figure 1. Research Phase

Derived from the insights presented in Figure 1, the intricate workings of each sequential step unfold as follows:

1) **Planning:** The research begins by selecting PT. Pelabuhan Indonesia Tanjung Priok Branch as the research object. Pre-interviews are conducted with representatives, including the Information System Project Manager, to

understand the company's challenges and improvement initiatives. The company's vision, mission, and strategies are also examined to grasp its main objectives. The scope of the research is identified within the Information System Division.

2) **Field Work:** The study delves into the initial scope of IT governance, covering Design Factors 1 to 4, and progresses to Design Factors 5 to 10. The research concludes with an audit document that addresses specific issues related to the identified Design Factors.
3) **Reporting:** Data is collected through interviews with the Information System Project Manager, and relevant literature is studied. This data is then used in the Capability Measurement phase.
4) **Follow Up:** Sub-process activities from the audit document are analyzed, and their capability levels are assessed. The capability levels are then used to determine the average capability level for each COBIT 2019 objective domain. A Gap Analysis is performed to compare the desired target levels with the current capability levels. Finally, a report with recommendations based on COBIT 2019 guidelines is presented to the company for improvement.

In the pursuit of data collection, a diverse array of communication channels was judiciously harnessed to engage in insightful interviews with the Information System Project Manager. These channels encompassed the realms of E-Mail, WhatsApp, and in-person meetings conducted on-site. Evidently, the on-site interactions emerged as the optimal modality, seamlessly facilitating the precision of inquiry delivery while affording the luxury of lucid and immediate elucidations, thereby circumventing any unwarranted delays in responses. The data acquisition process was further augmented through the administration of a well-structured questionnaire, strategically tailored to solicit insights from a spectrum of respondents. These participants comprised not only the project manager but also the information system implementers and the dedicated staff. This collaborative endeavor culminated in a six-member panel of respondents, notably comprising one Information System Project Manager, one Information System Executor, and four adept Information System Staff members, collectively lending their expertise to enrich the data landscape for subsequent analyses.

3. RESULTS AND DISCUSSION

3.1. Planning

Prior to the initiation of this research, meticulous deliberation underscored the critical selection of pertinent processes within the COBIT 2019 framework, a decisive choice aimed at appraising the intricate fabric of IT governance processes within the confines of PT. Pelabuhan Indonesia Tanjung Priok Branch. The central objective rested upon the identification of focal points warranting due

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attention, encapsulating these into problem statements that, in turn, furnished the groundwork for offering insightful recommendations and viable solutions tailored to the company's context. In tandem, the research embarked on a mission to gauge the very echelons of the company's IT governance maturity, a metric meticulously gauged against the robust backdrop of COBIT 2019.

The judicious selection of process domains unfurled as a collaborative venture, achieved through harmonious discourse with representatives from the company. This consultative approach seamlessly homed in on the crux of pertinent concerns – encompassing the lacuna in system optimization, underscored by instances of manual intervention necessitated by communication bottlenecks. This stance further echoed the company's ardent drive to enrich the knowledge reservoirs of its human resources. In the current paradigm characterized by a shift-based system, the aspiration was to instate an equitable knowledge distribution system, effectively countering prospective human errors pervading both hardware and software domains.

In navigating this intricate terrain, the COBIT 2019 toolkit unfurled as an invaluable compass. It facilitated the meticulous delineation of domain objectives while also carving out the contours of the governance system's ambit, meticulously hinged upon the profound underpinnings of design factors 1-4. This foundation, further buoyed by an expansive vista encapsulating design factors 5-11, yielded a comprehensive encapsulation culminating in a succinct summary, the values thereof echoing within the range of -100 to 100. This painstakingly orchestrated process, a harmonious symphony of precision, unfolded as an instrumental gauge, meticulously measuring the echelons of IT Governance Capability within the precincts of PT. Pelabuhan Indonesia Tanjung Priok Branch. This robust alignment of domain objectives with the quintessential crucibles encapsulating the IT division's challenges seamlessly wove an intricate fabric of effective governance, seamlessly threaded through the fabric of COBIT 2019.

1) **Design Factor 1 Enterprise Strategy:** Based on the COBIT 2019 enterprise strategy, the primary focus is on Client Service/Stability with a value of 5. The organization prioritizes client service, particularly in port operations. Therefore, the optimization efforts are concentrated on addressing integration and human resource challenges.
2) **Design Factor 2 Enterprise Goals:** In the COBIT 2019 toolkit, the highest-rated enterprise goal for the company is EG10 - Staff, skills, motivation, and productivity with a value of 5. Following closely are EG03 - Compliance with external laws and regulations, EG05 - Customer-oriented service culture, EG06 - Business service continuity and availability, and EG11 - Compliance with internal policies with a value of 4. This indicates that the company's chosen enterprise goals prioritize maximizing the capabilities of human resources to enhance business processes.

3) **Design Factor 3 Risk Profile:** The COBIT 2019 toolkit revealed the highest IT Risk Profile areas based on interviews with the Information System Project Manager: IT expertise, skills & behavior, software failure, Data & Information Management, and Enterprise/IT Architecture.
4) **Design Factor 4 IT-Related Issues:** In the IT-Related Issues section, the company faces inadequate knowledge management, resulting in a gap between business and technical knowledge within the company.
5) **Design Factor 5 IT Threat Landscape:** Based on interviews with the Information System Project Manager and staff, the IT Threat Landscape for the company is rated at 85% normal and 15% high. This indicates that the company meets quality standards in network infrastructure, Palo Alto Firewall, and adopts enterprise network methods.
6) **Design Factor 6 Compliance Requirements:** Based on interviews with the Information System Project Manager and staff, the Compliance Requirements for Company X have a high value of 15% and a normal value of 85%. This is attributed to the company's effective management of cloud and data center, separate Server DB, applications, and low redundancy, resulting in minimal downtime.
7) **Design Factor 7 Role of IT:** The Role of IT is identified as Support, as the company requires IT to govern information technology effectively.
8) **Design Factor 8 Sourcing Model for IT:** The IT Sourcing Model involves collaboration with an IT subsidiary, with approximately half of its cloud and outsourcing services being sourced externally.
9) **Design Factor 9 IT Implementation Methods:** The IT Implementation Methods for Company X reveal that approximately 70% utilize DevOps for application development, with in-house divisions creating applications. Additionally, Agile methods are employed, where the company also participates in developing in-house applications. Around 10% use third-party systems for website application design.
10) **Design Factor 10 Technology Adoption Strategy:** IT Implementation Methods: The Technology Adoption Strategy indicates that it is a Follower with a value of 70%. The company aligns technology needs and adopts the latest technologies to avoid falling behind. Additionally, there are 20% Slow Adopters, as they require evaluation of existing technologies. Lastly, there are 10% First Movers, indicating the company is not the primary driver in technology implementation.
11) **Design Factor 11 Enterprise Size:** Design Factor 11 explains the size of the organization based on the number of employees working in the company. The company has a workforce of 1300 employees, indicating it is a large organization.

Based on the COBIT design factor results, APO08 domain scored 40, APO11 scored 80, and BAI08 scored 50. These three domains indicate constraints and issues. The next step involves data collection through interviews and distributing

forms related to the selected domain's sub-process activities. Subsequently, the capability level of each sub-process is analyzed, followed by determining the capability level for the identified domains: APO08, APO11, and BAI08. Further, a GAP analysis with findings and impacts is conducted, and recommendations for improvements and level increments are provided.

3.2. Fieldwork

To measure the capability level, three interviewees are selected. The three potential interviewees are as follows:

1) **Information System Project Manager:** Responsible for executing tasks, making decisions, and overseeing projects.
2) **Information System Executor:** Accountable for carrying out orders and making decisions related to existing issues.
3) **Information System Staff:** Provides input, suggestions, and involvement in tasks, as well as information, actions, and decision-making.

The RACI Chart in Table 1 outlines the roles and responsibilities within PT. Pelabuhan Indonesia Tanjung Priok Branch.

Table 1. Outlines the Roles and Responsibilities within PT. Pelabuhan Indonesia Tanjung Priok Branch

Activities	Project Manager	Executor	Staff
APO08.01 Understand business expectations.	A	I	I
APO08.02 Align I&T strategy with business expectations and identify opportunities for IT to enhance the business.	R	C	I
APO08.03 Manage the business relationship.	A	I	I
APO08.04 Coordinate and communicate.	R/A	C	I
APO08.05 Provide input to the continual improvement of services.	R/A	C	I
APO11.01 Establish a quality management system (QMS).	A	C	C
APO11.02 Focus quality management on customers.	A	I	I
APO11.03 Manage quality standards, practices and procedures and integrate quality management into key processes and solutions.	R/C	I	I
APO11.04 Perform quality monitoring, control and reviews.	I	I	I
APO11.05 Maintain continuous improvement.	A	C	C

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Activities	Project Manager	Executor	Staff
BAI08.01 Identify and classify sources of information for governance and management of I&T.	A	I	I
BAI08.02 Organize and contextualize information into knowledge.	R	C	C
BAI08.03 Use and share knowledge.	R	I	I
BAI08.04 Evaluate and update or retire information.	R/A	C	C

3.3. Reporting

The table below presents the measurement results for each domain, along with the processes and the achieved capability levels:

Table 2. Measurement results for each domain

Capability Level	Domain	Process	Score	Average Score
2	APO08 – Managed Relationships	APO08.01	86.6	86.9
		APO08.04	87.2	
	APO11 – Managed Quality	APO11.03	86	86
		APO11.05	86	
	BAI08 – Managed Knowledge	BAI08.01	86.58	87.12
		BAI08.03	87.66	
3	APO08 – Managed Relationships	APO08.01	81.6	84.14
		APO08.02	86.6	
		APO08.03	85.87	
		APO08.04	82.5	
	APO11 – Managed Quality	APO11.01	86.66	86.65
		APO11.02	87.22	
		APO11.03	85.61	
		APO11.04	86.66	
		APO11.05	87.11	
	BAI08 – Managed Knowledge	BAI08.01	85	86.41
		BAI08.02	86.5	
		BAI08.03	87.5	
		BAI08.04	86.66	
4	APO11 – Managed Quality	APO11.01	85	86.35
		APO11.02	87.5	
		APO11.03	86.83	
		APO11.04	86.61	
		APO11.05	85.83	

BAI08 – Managed Knowledge	BAI08.01	86.5	86.44
	BAI08.03	85.16	
	BAI08.04	87.66	

The Gap analysis table between the target level and the results obtained from the interviews is provided below:

Table 3. Gap Analysis

Process	Target Level	Current Level	Gap
APO08 – Managed Relationships	4	3	1
APO11 – Managed Quality	4	4	0
BAI08 – Managed Knowledge	4	4	0

3.4. Follow Up

In the follow up phase, recommendations are provided based on the identified findings. The Table 4, present the explanations for the improvement recommendations in the APO08.

Table 4. Findings, Impacts and Recommendation Domain APO08

Process	Findings	Impacts	Recommendations
APO08.01	The lack of a standardized classification and the urgency from the user's perspective.	Users' expectations for response time and resolution may differ. This can result in user dissatisfaction and potentially harm the company's reputation.	Establish Key Performance Indicators (KPIs) that are not excessive, limiting them to no more than 4 per staff member. Utilizing a Dashboard can be beneficial as it provides relevant information and delivers optimal outcomes.
APO08.04	The current practice relies on non-formal communication methods.	Confusion in understanding user requests, leading to mismatched expectations. Non-formal communication causes information gaps and decision-making issues, resulting in delays in delivering products and services.	Implementing Communication Metrics & KPIs is essential. This involves measuring communication engagement through identifying delivery rates, open rates, and click-through rates.

3.5. Discussion

The assessment outcomes from the three distinct domains, namely APO08, APO11, and BAI08, offer insightful reflections on the effectiveness of the IT governance processes within the company. Notably, the evaluation highlights divergent trajectories for these domains, underpinning the nuanced nature of their progress.

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Starting with APO08, the results signify that this domain is yet to attain the company's predetermined target level. While the achieved level of 3 is commendable, with an average score of 84.14%, there exists a slight shortfall in aligning with the company's aspirations. This finding underscores the potential for targeted process enhancements, warranting a strategic approach to bridge the gap and elevate the APO08 domain to the desired level. This could involve a focused strategy encompassing training, resource allocation, or procedural adjustments to catalyze the journey towards optimization.

In contrast, the APO11 domain has showcased a remarkable achievement, surpassing the company's target level by reaching level 4 with an average score of 86.35%. This accomplishment serves as a testament to the efficiency and efficacy of the processes underpinning APO11. While the attainment of level 4 is a notable achievement, there remains an avenue for further improvements. The company could channel this momentum to explore advanced strategies, which might entail leveraging best practices, technological integration, or streamlined workflows to further enhance APO11 processes.

Likewise, the BAI08 domain has emulated the success story of APO11, exceeding the company's target level by attaining level 4 with an average score of 86.44%. This achievement reaffirms the robustness of the processes enveloping BAI08. As with APO11, the present attainment serves as a springboard for continuous growth. The company could delve into refining BAI08's practices, potentially exploring avenues such as increased automation, risk mitigation strategies, or optimization of resource allocation.

Collectively, these findings underscore the dynamic nature of IT governance within the company. While challenges persist in certain domains, others have demonstrated substantial achievements. The differential trajectories within these domains emphasize the importance of tailored strategies for improvement. The company stands poised to harness the momentum from successful domains, devising targeted strategies for domains in need of refinement. This holistic approach, rooted in the assessment results, lays the groundwork for an evolving and responsive IT governance landscape within the company.

4. CONCLUSION

The research on IT governance capability at PT. Pelabuhan Indonesia Tanjung Priok Branch, using the COBIT 2019 framework, led to several conclusions. The measurement of IT governance in the selected domains, namely APO08 – Managed Relationships, APO11 – Managed Quality, and BAI08 – Managed Knowledge, was successfully conducted based on the identified issues within the company. The processes were aligned with the RACI Chart, and interviews were conducted with the responsible parties for IT governance in the company. From

the interviews with the respondents and the calculation of domain process values, the IT governance capability at PT. Pelabuhan Indonesia Tanjung Priok Branch was concluded as follows: The APO11 and BAI08 domains have achieved the target level set by the company, both at level 4 with a rating of "Fully Achieved." However, the APO08 domain has not reached the targeted level, only reaching level 3 with a rating of "Largely Achieved" and an average score of 84.14%. As a result, the APO08 process domain could only reach level 3.

Recommendations were given to the Project Manager of Information Systems to create Key Performance Indicators (KPIs) for user priorities and to utilize a Dashboard to provide useful information. Additionally, it was recommended to establish communication metrics to gain a deeper understanding of recipients who receive, open, and interact with the communication. The outcomes of this research are meant to guide the company in improving the identified findings and implementing the recommendations to enhance IT governance and achieve the desired target levels in the future.

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REFERENCES

[1] D. G. Putra and R. Rahayu, "Peranan Implementasi Tata Kelola Teknologi Informasi (IT Governance) sebagai Faktor Penting dalam Meningkatkan Kinerja Perusahaan," *Jurnal Inovasi Pendidikan Ekonomi,* vol. 10, no. 1, p. 7, 2020.

[2] T. Haryanti and Y. A. Rahman, "Perancangan Sistem Informasi Inventory Monitoring," *Jurnal PILAR Nusa Mandiri,* vol. 16, no. 1, p. 8, 2020.

[3] G. S. Gandara and S. Hasibuan, "Analisis Penerapan SNI 9001:2015 Melalui Jumlah Ketidaksesuaian Produk, Proses dan Layanan pada PT. X," *Jurna Standardisasi,* p. 18, 2020.

[4] C. I. Safitri, D. Supriyadi and S. Astiti, "Analisis Tingkat Kematangan Manajemen Layanan Teknologi Informasi Menggunakan Framework (ITIL) V3," *JUPITER (Jurnal Penelitian Ilmu dan Teknologi Komputer),* vol. 13, no. 1, p. 11, 2021.

[5] D. A. Sudarnoto and R. I. Desanti, "COBIT 5: How Capable PT GTI Governing Innovation, Human Resource, and Knowledge Aspect?," *Ultima Infosys : Jurnal Ilmu Sistem Informasi,* vol. 12, no. 2, p. 7, 2021.

[6] E. B. Saputra Priyono and W. , "COBIT 5.0: IT Governance Measurement on Reputable Bank in Indonesia," *Ultima Infosys : Jurnal Ilmu Sistem Informasi,* vol. 13, no. 2, p. 6, 2022.

[7] A. M. Fikri, H. S. Priastika, N. Octaraisya, S. and L. H. Trinawati, "Rancangan Tata Kelola Teknologi Informasi Menggunakan Framework COBIT 2019 (Studi Kasus: PT XYZ)," *Information Management for Educators and Professionals,* vol. 5, no. 1, p. 14, 2020.

[8] I. G. M. S. Dharma, I. G. M. A. Sasmita and I. M. S. Putra, "Evaluasi Dan Implementasi Tata Kelola Timenggunakan Cobit 2019 (Studi Kasus Padadinas Kependudukan Dan Pencatatan Sipilkabupaten Tabanan)," *Jurnal Ilmiah Teknologi dan Komputer,* vol. 2, no. 2, p. 12, 2021.

[9] D. Darwis and D. M. Pauristina, "Audit Sistem Informasi Menggunakan Framework Cobit 4.1 Sebagai Upaya Evaluasi Pengolahan Data Pada SMKK BPK Penabur Bandar Lampung," *Jurnal Ilmiah Infrastruktur Teknologi Informasi (JIITI),* vol. 1, no. 1, p. 6, 2020.

[10] J. F. Andry, H. and A. Chakir, "Assessment IT Governance of Human Resources Information System Using COBIT 5," *International Journal of Open Information Technologies,* vol. 8, no. 4, p. 5, 2020.

[11] D. Sulistyo, F. Handayani and Y. Suryanto, "Comparative Analysis and Design of Cybersecurity Maturity Assessment Methodology Using NIST CSF, COBIT, ISO/IEC 27002 and PCI DSS," *International Journal on Informatics Visualization,* vol. 4, no. 4, p. 6, 2020.

[12] S. Ahriz, A. E. Yamami, K. Mansouri and M. Qbadou, "Cobit 5-Based Approach for IT Project Portfolio Management: Application to a Moroccan University," *(IJACSA) International Journal of Advanced Computer Science and Applications,* vol. 9, no. 4, p. 9, 2018.

[13] H. T. Sihotang, M. Zarlis, S. Efendi, D. Jollyta and H. , "Evaluation of Maturity Level of Information and Communication Technology (ICT) Governance with COBIT 5.0 Case Study: STMIK Pelita Nusantara Medan," *The International Conference on Computer Science and Applied Mathematic,* vol. 1255, p. 7, 2019.

[14] L. H. Atrinawati, E. Ramadhani, T. P. Fiqar, Y. T. Wiranti, A. I. N. F. Abdullah, H. M. J. Saputra and D. B. Tandirau, "Assessment of Process Capability Level in University XYZ Based on COBIT 2019," *Journal of Physics: Conference Series,* vol. 1803, no. 1, p. 12, 2021.

[15] ISACA, Introduction and Methodology, Schaumburg: ISACA, 2018.

[16] L. N. Amali, M. R. Katili, S. Suhada and L. Hadjaratie, "The measurement of maturity level of information technology," *TELKOMNIKA Telecommunication, Computing, Electronics and Control,* vol. 18, no. 1, p. 7, 2020.

[17] K. Wabang, Y. Rahma, A. P. Widodo and F. Nugraha, "Tata Kelola Teknologi Informasi Menggunakan COBIT 2019 pada PSI Universitas

Muria Kudus," *JURTEKSI (Jurnal Teknologi dan Sistem Informasi),* vol. 7, no. 3, p. 8, 2021.

[18] D. Sanjaya and M. I. Fianty, "Measurement of Capability Level Using COBIT 5 Framework (Case Study: PT Andalan Bunda Bijak)," *Ultima Infosys: Jurnal Ilmu Sistem Informasi,* vol. 13, no. 2, p. 9, 2022.

[19] J. S. A. Rajjani, B. T. Hanggara and Y. T. Musityo, "Evaluasi Manajemen Risiko Teknologi Informasi pada Department of ICT PT Semen Indonesia (Persero) Tbk menggunakan Framework COBIT 2019 dengan Domain EDM03 dan APO12," *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer,* vol. 5, no. 5, p. 11, 2021.

[20] S. F. Pane, R. M. Awangga, R. Nuraini and S. Fathonah, "Analysis of investment IT planning on logistic company using COBIT 5," *Journal of Physics: Conference Series,* p. 7, 2018.

[21] E. Nachrowi, Y. Nurhadryani and H. Sukoco, "Evaluationof Governance and Management of Information Technology Services Using Cobit 2019 and ITIL 4," *RESTI journal System Engineering and Information Technology,* vol. 4, no. 4, p. 10, 2020.

[22] S. F. Bayastura, S. Krisdina and A. P. Widodo, "Analisis dan Perancangan Tata Kelola Teknologi Informasi Menggunakan Framework COBIT 2019 pada PT.XYZ," *JIKO (Jurnal Informatika dan Komputer),* vol. 4, no. 1, p. 8, 2021.

[23] M. Anjelina, "Pengukuran Kemampuan Tata Kelola Teknologi Informasi Menggunakan Kerangka Kerja COBIT 2019 pada PT. Emobile Indonesia," *Universitas Multimedia Nusantara*, Tangerang, 2021.