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Governance Audit of DevOps Based on COBIT 2019 in the APO Domain: A Case Study at PT. Pegadaian

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Abstract**—***This study examines the implementation of information technology (IT) governance at PT Pegadaian in supporting DevOps adoption through a COBIT 2019–based audit, focusing on the* ***APO (Align, Plan, and Organize)*** *domain. The research is motivated by the company's need to optimize its ongoing digital transformation, in which DevOps is utilized to accelerate the system development lifecycle. However, challenges arise in managing risks, ensuring security, and aligning initiatives with business objectives. A qualitative case study approach was employed, using observation, interviews, and questionnaires distributed to relevant stakeholders to assess IT governance capability. The findings indicate that most subdomains within APO have reached a high capability level, although certain areas—particularly framework management and risk management—still require improvement. In conclusion, PT Pegadaian has demonstrated a strong commitment to DevOps implementation, yet enhancements in several IT governance subdomains remain essential to ensure a more effective digital transformation. The implications of this study highlight the importance of strengthening IT governance to reduce potential risks associated with DevOps adoption.*

Keywords*: Audit, COBIT 2019, RACI Chart, IT Governance..*

INTRODUCTION

The rapid advancement of information technology driven by the Industry 4.0 revolution marks an era where digital technology is central to daily life, changing how we interact, work, and view the world. Digital transformation is no longer just an addition but a crucial factor for companies to remain competitive in the digital economy. IT now drives innovative business strategies, enabling companies to respond quickly to market changes, improve customer experience, and create new revenue opportunities.

In this fast-changing context, DevOps has emerged as a paradigm that bridges development and operations teams through principles like continuous integration and delivery (CI/CD), workflow automation, and integrated collaboration tools. DevOps speeds up the software development lifecycle from months to days or even hours, while improving product quality with real-time feedback and automated testing.

However, the fast and agile nature of DevOps also presents significant IT governance challenges, such as cybersecurity risks (e.g., unscanned container images, loose Identity and Access Management, sensitive data leaks), and compliance with standards like ISO 27001, GDPR, and PCI-DSS. Managing infrastructure complexity and hybrid environments requires structured governance, complicated by limited visibility in CI/CD pipelines and weak audit trails for Infrastructure as Code changes.

Without strong governance, DevOps can be a double-edged sword—fostering innovation but increasing operational, financial, and reputational risks that could damage stakeholder trust. Therefore, thorough evaluation of IT governance is needed, where COBIT 2019 Domain APO audit plays an important role in assessing governance integration in operations.

PT Pegadaian, a subsidiary of Bank Rakyat Indonesia operating in pawn services, faces major challenges in leveraging IT for business transformation. By the end of 2022, it operated numerous regional and branch offices across Indonesia. As part of its IT Master Plan aligned with its digital transformation grand strategy, Pegadaian established the G-STAR+ program (until 2024), which includes six components focused on

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business growth, digital ecosystem development, strategic partnerships, talent development, IT governance, and corporate culture aligned with core values.

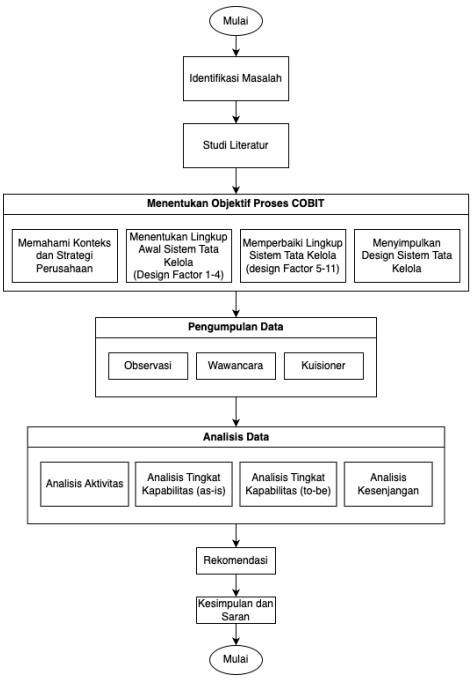
Given this, it is crucial for PT Pegadaian to evaluate its IT governance to ensure alignment with business plans and objectives. Hence, an IT governance audit focused on DevOps using the COBIT 2019 framework was conducted to assess compliance with standards, reduce risks, and enhance business performance.

This research adopts the latest COBIT 2019 framework, which aligns well with business strategy and allows deep assessment using the design factor toolkit. IT governance is essential, especially for state-owned enterprises and their subsidiaries. The study aims to evaluate PT Pegadaian's current IT governance, supporting good corporate governance principles.

The research focuses on evaluating DevOps implementation at PT Pegadaian using COBIT 2019 to assess IT management capabilities. Initially, key evaluation areas are identified through COBIT's design elements to focus the assessment. COBIT 2019's flexibility accommodates rapid IT changes and existing management structures, facilitating implementation both strategically and operationally.

Thus, the study titled "DevOps Governance Audit Based on COBIT 2019 Domain APO: Case Study at PT Pegadaian" aims to evaluate IT management capabilities at PT Pegadaian and provide recommendations to improve IT governance, supporting strategic goals and enhancing company performance.

MATERIALS AND METHODS



The first stage of the research framework involves problem identification. This step requires understanding and monitoring issues occurring within the company. Once the problem has been identified, a literature review is conducted. The research focuses on sources such as the company's annual reports and related academic references, including books and journals. The objective is to gain a comprehensive understanding of the company profile and the problems it faces, while also determining governance objectives through the use of design factors.

The second phase is the literature review, which serves to establish a strong theoretical and conceptual foundation for the research. This involves reviewing a range of sources including reference books, academic journals (both national and international), and relevant internal documents such as annual reports. The literature review primarily explores the COBIT framework, particularly in the context of determining IT governance objectives using ISACA's Design Factor approach. Additionally, it examines the company's strategic context—vision, mission, and business direction—which directly influences the scope and focus of the analysis. A thorough literature review ensures that the study is grounded, focused, and aligned with the research problem.

The next step is to determine the COBIT process objectives using ISACA's governance system design methodology. This design system guides the selection of objectives to be analyzed. The process begins with understanding the company's context and strategy, including its vision and mission. The next stage is defining the initial

scope of the governance system using design factors 1 to 4, followed by refining the governance system's scope. The outcome of this stage is the identification of governance objectives to be further analyzed.

Data collection is carried out through multiple methods to ensure accuracy and relevance. The first method is direct observation of current IT governance processes. This is followed by interviews with key personnel involved in IT management, aimed at exploring their insights on policies, challenges, and their perceptions of the existing system. The final method is the distribution of questionnaires, which serve as the primary instrument to gather quantitative data. These questionnaires are designed to measure IT governance capability levels based on the COBIT framework. Once data is collected, analysis is conducted using the Guttman scale, followed by capability analysis (as-is and to-be) and gap analysis. The findings are used to develop recommendations for improving IT governance, which are then presented to company stakeholders as the basis for future improvements. The research concludes with a summary of findings and strategic suggestions.

This study adopts the COBIT 2019 framework, focusing on the APO (Align, Plan, and Organize) domain, as the basis for auditing IT governance in the context of DevOps implementation at PT Pegadaian. The APO domain is critical for evaluating IT strategy alignment, planning, and resource organization to support business goals. Its relevance lies in addressing strategic processes such as IT strategy management, enterprise architecture, innovation, and service delivery — all closely related to the principles of DevOps. With its goal-oriented and flexible design, COBIT 2019 allows organizations to adapt assessments to their specific needs, offering a clear view of the current capability and effectiveness of DevOps governance practices.

The APO domain comprises 13 subprocesses, ranging from managing IT frameworks (APO01) and aligning IT strategy (APO02), to handling innovation (APO04), budgeting (APO06), human resources (APO07), and integrated security (APO13). These subprocesses help assess whether DevOps at PT Pegadaian is being implemented with proper oversight, risk control, and strategic alignment. Using this structured evaluation, the research aims to determine how effectively DevOps governance supports business transformation, and to identify improvement areas that add measurable value to the organization.

RESULTS AND DISCUSSION

The assessment of the current capability level (as-is) was conducted to understand how effectively PT Pegadaian is managing its IT processes within the APO (Align, Plan, and Organize) domain of the COBIT 2019 framework. This analysis serves as a baseline for evaluating how well the organization is currently supporting its DevOps implementation and broader digital transformation initiatives. The evaluation used a combination of questionnaires and interviews to determine the capability levels of selected APO subprocesses.

The findings showed that three subprocesses—APO02 (Manage Strategy), APO03 (Manage Enterprise Architecture), and APO07 (Manage Human Resources)—have achieved Capability Level 5, indicating highly mature and strategic IT governance practices. These areas demonstrated strong alignment with business goals, robust architectural planning, and well-developed talent management, especially in supporting DevOps teams. In contrast, subprocesses such as APO01 (IT Management Framework), APO04 (Innovation), APO08 (Stakeholder Relationships), APO09 (Service Agreements), and APO12 (Risk Management) were at Capability Levels 2 or 3, suggesting that although foundational governance practices exist, further development is required to reach optimal maturity.

To guide future improvements, a target capability level (to-be) was also defined for each subprocess. The goal is for all subprocesses to eventually reach Level 5, representing optimized and continuously improved practices. For instance, APO01 needs stronger standardization and documentation within its IT management framework, while APO04 requires more structured innovation processes to better align with emerging business needs and technology trends. Likewise, APO08 must enhance internal and external stakeholder collaboration, and APO09 should improve its service-level agreement processes, including performance monitoring and vendor risk management. APO12, although well-documented, must deepen its risk identification and mitigation strategies across all IT operations.

A gap analysis comparing as-is and to-be levels revealed key areas of concern. The largest gaps (of 3 levels) were observed in APO01, APO04, and APO09, indicating the need for immediate and significant attention in those subprocesses. Smaller but important gaps (of 2 levels) were seen in APO08 and APO12, suggesting that while basic governance mechanisms are in place, improvements in communication, collaboration, and integrated risk management are still needed.

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Subprocesses that already met the target level, such as APO02, APO03, and APO07, should focus on maintaining their maturity through continuous review and adaptation to evolving business and technological changes.

GMO	*Capability Level*		
	as-is	*to-be*	*gap*
APO01	2	5	3
APO02	5	5	-
APO03	5	5	-
APO04	2	5	3
APO07	5	5	-
APO08	3	5	2
APO09	2	5	3
APO12	3	5	2

Based on this analysis, the audit provides a set of strategic recommendations. These include enhancing the documentation and structure of the IT governance framework, fostering a culture of innovation with clear evaluation and feedback mechanisms, investing in stakeholder relationship management tools, and improving SLA and risk management processes using more advanced, data-driven approaches. By closing the identified capability gaps, PT Pegadaian can ensure that its DevOps initiatives are not only fast and flexible but also secure, compliant, and aligned with long-term business objectives. Strengthening IT governance in this way will significantly contribute to a more resilient and successful digital transformation journey.

No	Finding	Recommendation
1	**APO01 – Manage IT Management Framework**: IT management processes are structured but do not yet fully meet the criteria to achieve Capability Level 4.	Improve documentation and quality management within IT governance, and ensure a more systematic implementation to reach Level 4.
2	**APO02 – Manage Strategy**: IT strategy management is very mature and has achieved Capability Level 5.	Maintain the current strategy management and continue to foster innovation and adaptability to technological changes.
3	**APO03 – Manage Enterprise Architecture**: IT architecture management is strong, but there is still room for improvement.	Deepen the integration of IT systems to enhance flexibility and adaptability in the enterprise architecture.
4	**APO04 – Manage Innovation**: Innovation processes are adequate but have not yet reached Level 4.	Enhance innovation processes with a more strategic and systematic approach to support faster digital transformation.
5	**APO07 – Manage Human Resources**: Human resource management effectively supports DevOps implementation.	Continue developing IT personnel and DevOps team skills to remain competitive in supporting digital transformation.
6	**APO08 – Manage Relationships**: Stakeholder relationship management is good, but improvements are needed to reach Level 5.	Strengthen partnerships with strategic stakeholders and adopt a more proactive approach in collaboration to support digital transformation.
7	**APO09 – Manage Service Agreements**: Service agreement management is adequate but needs enhancement.	Conduct more systematic evaluations of service agreements and improve performance monitoring to support smooth operations.
8	**APO12 – Manage Risk**: IT risk management is functioning well but needs improvements to reach Level 5.	Leverage more advanced tools and methodologies to identify and mitigate risks more effectively.

CONCLUSION

Based on the audit results, the evaluation of IT governance at PT. Pegadaian shows that the company has implemented IT management quite well, with several subdomains achieving high maturity levels. Specifically, APO02 – Manage Strategy, APO03 – Manage Enterprise Architecture, and APO07 – Manage Human Resources have reached Capability Level 5, indicating that IT strategy and human resource management strongly support digital transformation and the implementation of DevOps. However, subdomains such as APO01, APO04, APO08, APO09, and APO12 are still at Levels 2 or 3, meaning further improvement is needed to enhance governance maturity.

To address these gaps, several strategic recommendations are proposed. First, process capability needs to be strengthened in the lower-level subdomains by improving documentation, monitoring systems, and structured governance practices. Second, continued investment in IT human resource development—through training, certification, and cross-team collaboration—is essential for maintaining an effective DevOps environment. Third, adopting modern technologies like cloud computing, big data analytics, and machine learning can enhance automation and accelerate DevOps processes, improving overall efficiency and customer satisfaction.

Furthermore, improving IT risk management is necessary to ensure stability and security in DevOps operations, especially given the rapid and automated nature of deployments. Strengthening collaboration between IT and business units, as well as engaging external experts in governance audits, can also provide valuable insights to enhance DevOps governance. With these efforts, PT. Pegadaian can significantly improve its DevOps capabilities, accelerate its digital transformation, and better align IT governance with long-term strategic goals.

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