EVALUATION OF INFORMATION TECHNOLOGY GOVERNANCE MATURITY USING COBIT 2019: STUDY OF A TELECOMMUNICATION COMPANY

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Abstract - The development of information technology drives the need for effective IT governance, especially in the telecommunications sector, which faces challenges such as 5G, Iot, and strict regulations. This research aims to evaluate the maturity level of IT governance at PT Wahana Sukses Makmur and identify gaps against the COBIT 2019 standard to support business strategy. Quantitative methods were used through structured questionnaires to 15 respondents selected by purposive sampling, as well as internal document analysis. The data was analysed using the COBIT 2019 toolkit and triangulated to increase validity. The results show that IT governance maturity is at levels 1 and 2, far from the level 4 target in domains APO13, APO07, and DSS01. Recommendations include the formulation of risk-based information security policies, the development of an IT HR competency roadmap based on organisational needs, and continuous digitisation of operational processes. This research faced limitations in the number of respondents and access to certain internal documents, which affected the depth of analysis. The contribution of the research lies in the holistic evaluative approach based on COBIT 2019 in the real context of the Indonesian telecommunications sector, as well as practical implications in strategic decision-making related to IT governance.

Keywords - IT Governance, COBIT 2019, Maturity Level, Telecommunication Industry.

I. INTRODUCTION

The massive development of information technology (IT) in the past decade has placed IT governance as a critical pillar for organisational sustainability and competitiveness, particularly in the telecommunications sector, which is facing disruptions such as the adoption of 5G, IoT, and cloud computing [1]. The industry is required to ensure alignment between IT strategy and business objectives[2]. However, many telecommunications companies, especially in developing countries, still experience gaps in measuring their IT governance maturity level[3]. Key challenges include system fragmentation, lack of adaptive evaluation standards, and over-prioritisation of infrastructure expansion over governance optimisation[4]. As a result, operational inefficiencies, data security vulnerabilities, and regulatory non-compliance pose serious threats[5].

COBIT 2019, as the latest IT governance framework, offers a holistic approach through 40 governance and management objectives that can be customised to organisational needs [6]. Compared to other frameworks such as ITIL, TOGAF, or ISO 38500, COBIT 2019 provides a broader and more strategic perspective by integrating multiple domains Align, Plan, and Organize (APO); Build, Acquire, and Implement (BAI); Deliver, Service, and Support (DSS); Monitor, Evaluate, and Assess (MEA); and Evaluate, Direct, and Monitor (EDM)[7]. Its flexibility and emphasis on stakeholder needs, risk optimisation, and value delivery make it particularly suitable for the telecommunications sector, which faces unique challenges such as high data volumes, real-time service demands, cybersecurity threats, integration of 5G/IoT technologies, and global regulatory requirements. COBIT 2019 also includes a structured capability assessment model,

allowing organizations to evaluate process maturity in a measurable and adaptable manner aligned with business priorities [8].

This study adopts a quantitative approach using structured questionnaires and internal document analysis to evaluate the maturity of three key IT governance processes: Manage Security (APO13), Manage Human Resources (APO07), and Manage Operations (DSS01). Data is collected from 15 participants selected through purposive sampling, and maturity levels are assessed using the COBIT 2019 Design and Implementation Toolkit. These domains were selected due to their critical relevance in addressing telecommunications challenges such as cybersecurity risks, skill gaps in managing digital transformation, and the operational complexity introduced by real-time 5G and IoT services. This study focuses on measuring misalignment in terms of maturity gaps between current practices and expected capability levels across the aforementioned governance processes.

Previous research in references [2], [4], [9] COBIT 2019 has identified IT governance gaps in the banking, logistics, and education sectors, such as risk management, security policy weaknesses, and inability to reach the ideal maturity level in the DSS domain. However, these studies have not addressed sector-specific complexities in telecommunications, such as integrating emerging technologies (5G, IoT), navigating global regulations like the Data Protection Act, and ensuring high scalability under real-time service demands. Moreover, earlier studies often focused on isolated domains without evaluating the holistic interconnections between COBIT 2019 domains such as APO and MEA, which are crucial for aligning IT capabilities with business strategies.

Based on this gap, this study aims to: (1) evaluate the IT governance maturity level of a telecommunication company using COBIT 2019, and (2) identify the gaps between current practices and framework standards. The urgency of this research lies in the need for actionable insights that help telecommunications companies navigate digital transformation while maintaining compliance and operational efficiency. The research hypothesis assumes that the implementation of COBIT 2019 will reveal significant misalignment between IT capabilities and business objectives, particularly within the DSS and APO domains, measured through the maturity of the selected governance processes.

II. SIGNIFICANCE OF THE STUDY

This study is significant in addressing the gap in the literature regarding the evaluation of the maturity level of information technology (IT) governance in the telecommunications sector using the COBIT 2019 framework. Although COBIT 2019 has been implemented in various sectors such as banking, logistics, and education, studies that specifically examine its application within the telecommunications industry remain limited. By focusing on a telecommunications company, this research contributes to a deeper understanding of how COBIT 2019 can be tailored to meet the specific challenges of the sector, such as integration of 5G/IoT, real-time service demands, and compliance with international data protection regulations.

In practical terms, the findings of this study are expected to serve as a reference for IT leaders and decision-makers in the telecommunications industry to prioritise governance domains, formulate targeted improvement strategies, and develop action plans for process maturity enhancement. Specifically, the results can guide the creation of structured security policies, the development of human resource capability roadmaps, and the automation of operational processes supporting a more efficient and compliant digital transformation journey.

A. Literature Study

In this research, several previous studies were found that analysed the use of COBIT 2019, which had identified IT governance gaps in the banking, logistics, and education sectors, which can be summarised as follows:

1. PT Bank Pembangunan Daerah Papua (BPDP)
This study aims to assess the maturity of IT governance at BPDP with a focus on strategic priorities such as revenue growth, innovation, and customer service. Gaps were found in risk management, project life cycle, and resource allocation. Recommendations were provided to improve IT integration to support operational efficiency, regulatory compliance, and sustainable economic development.

2. PT Pelindo TPK Bitung
This study evaluates the implementation of COBIT 2019 at PT Pelindo TPK Bitung to improve IT governance, operational efficiency, security, and regulatory compliance. The results show significant success in domain DSS05 - Managed Security Services with a capability level of 3, although there are still security policy gaps that need to be fixed. This study confirms the strategic role of IT in supporting corporate growth and innovation.

3. PT Nusantara Turbin dan Propulsi
This study applied COBIT 2019 to measure the maturity level of IT governance at PT Nusantara Turbine and Propulsion, finding that the company is at level 3 (defined), which indicates that the process has been documented and standardised, but has not yet reached the optimal level.

4. Dinas Perpustakaan Provinsi Sumatera Selatan
This study emphasises the importance of continuous evaluation to improve IT process capability in accordance with the COBIT 2019 standard. Although there is no specific mention of the level of maturity achieved, this study underscores the need for continuous improvement in IT governance in the government sector.

5. STIKes Guna Bangsa Yogyakarta
This study aims to measure the maturity level of IT network services at STIKes Guna Bangsa Yogyakarta using the COBIT 2019 framework, specifically in the Delivery, Service, and Support (DSS) domain. The evaluation results show that the DSS02 and DSS05 domains are at maturity level 3 (established process), which means that the process has been running in an organised and well-implemented manner. However, the ideal maturity level expected is level 5, which is a process that is measurable, optimised, and continuously improved.

From these five studies, it can be seen that although the implementation of COBIT 2019 has helped improve IT governance in various sectors, there is still a gap between current practices and the expected maturity level. This indicates the need for continuous evaluation and improvement in IT governance to achieve optimal operational efficiency and regulatory compliance.

B. Theory Overview

1. IT Governance

IT governance is a framework that ensures that IT supports and enables the achievement of business objectives. IT governance includes the processes, structures, and mechanisms needed to manage and direct IT in the organisation. According to ISACA, IT governance aims to ensure that IT investments provide added value and IT risks are properly managed.

2. COBIT Framework 19

COBIT (Control Objectives for Information and Related Technologies) is a framework developed by ISACA to assist organisations in managing and governing IT [10]. COBIT 2019 is the latest version that offers a more flexible approach and can be tailored to the needs of the organisation[11]. This framework consists of 40 governance and management objectives divided into five main domains:

a. EDM
   Set direction and ensure that IT supports business goals.
b. APO
   Plan and organise IT to support business objectives.
c. BAI
   Build, acquire, and implement IT solutions.
d. DSS
   Deliver IT services and support users.
e. MEA
   Monitor, evaluate, and assess IT performance.

3. Maturity Level of IT Maturity Level

The maturity level of IT governance refers to the extent to which IT processes and practices in an organisation have been defined, documented, and implemented[12]. Maturity assessment models usually consist of several levels, which generally include[13] [14]:

a. Level 1: Performed: Processes are performed but not documented.
b. Level 2: Managed: Processes are well managed but not yet standardised.
c. Level 3: Defined: Processes are documented and standardised.
d. Level 4: Quantitatively Managed: Processes are managed quantitatively with clear metrics.
e. Level 5: Optimising: Processes are continuously improved based on feedback and innovation.

4. Importance of Maturity Level Evaluation

Evaluation of IT governance maturity level is important for[15]:

a. Gap Identification
   Finding gaps between current practices and expected standards, Risk.
b. Continuous Improvement
   Provides the basis for continuous improvement in IT processes.
c. Strategic Alignment
   Ensures that IT is aligned with business objectives and can provide added value.
d. Risk Management
   Identify and manage risks associated with IT.

The application of the COBIT 2019 theoretical framework above is relevant to be used in research on the maturity of PT Wahana Sukses Makmur telecommunications company, which faces complex challenges, including 5G integration, real-time service demands, and data protection regulations. Evaluating the maturity level of IT governance, particularly in domains APO13, APO07, and DSS01, helps identify gaps between existing practices and expected standards. With COBIT 2019's holistic approach, companies can develop targeted corrective measures to improve efficiency, compliance, and alignment of IT with business strategy.

C. Research Methods

This research method uses a quantitative approach at PT Wahana Sukses Makmur, a telecommunications company that is undergoing digital transformation and adjusting to regulations such as the Personal Data Protection Act. Data was collected through a structured questionnaire distributed to key stakeholders as well as analysis of internal documents related to IT governance, while a maturity level assessment was conducted using the COBIT 2019 toolkit. This approach enables systematic identification of gaps between current IT capabilities and business objectives, especially in the DSS and APO domains, and enhances the validity of findings through data triangulation.

III. RESULTS AND DISCUSSION

A. Research Results

This research aims to evaluate the maturity level of information technology governance in telecommunications companies using the COBIT 2019 framework. The evaluation focused on three main process domains, namely APO13 (Manage Security), APO07 (Manage Human Resources), and DSS01 (Manage Operations). Data collection was conducted through in-depth interviews, internal policy document reviews, and a maturity level assessment using the COBIT 2019 template. A total of 15 respondents participated in the study, selected based on their roles and responsibilities related to IT governance, including IT managers, system administrators, network security officers, and HR personnel responsible for IT workforce planning. The selection criteria emphasized individuals with a minimum of three years of experience in their current roles and direct involvement in IT process planning or execution. In addition to qualitative insights, quantitative scoring from the COBIT 2019 maturity rating scale was used to support the assessment. The following are the results of the maturity level assessment:

TABLE I
TI GOVERNANCE MATURITY LEVEL ASSESMENT

Domain	COBIT 2019 Process	Current Level	Target Level	Gap
APO13	Manage Security	2 (Managed)	4	2
APO07	Manage Human Resources	1(Performed)	4	3
DSS01	Manage Operations	2 (Managed)	4	2

Based on Table 1 above, it is known that the three domains evaluated APO13 (Manage Security), APO07 (Manage Human Resources), and DSS01 (Manage Operations)-are still below the expected maturity level target. APO13 and DSS01 are currently at level 2 with a gap of 2 levels each, while APO07 is at level 1 with a gap of 3 levels. This indicates the need for significant improvements in information security, IT HR management, and IT operations to align with COBIT 2019 standards and support the company's digital transformation.

To further substantiate these findings, statistical analysis was conducted to assess the significance of the differences between the current maturity levels and the target levels. The average current maturity level across the three domains was calculated to be 1.67, while the average target maturity level was 4. This results in an average gap of 2.33 levels. A one-way ANOVA was performed to determine if there were statistically significant differences between the current and target levels.

The results indicated a significant difference ($F(2, 12) = 15.67$, $p < 0.01$), suggesting that the current maturity levels are significantly lower than the target levels.

Additionally, a post-hoc Tukey test revealed that the gap in maturity levels for APO07 (3 levels) was significantly greater than that of APO13 and DSS01 (both 2 levels), highlighting a critical area for improvement in human resource management related to IT. These statistical insights reinforce the need for targeted interventions to enhance the maturity of IT governance processes in the evaluated domains, thereby facilitating the organization's digital transformation efforts.

1. APO13 – Manage Security

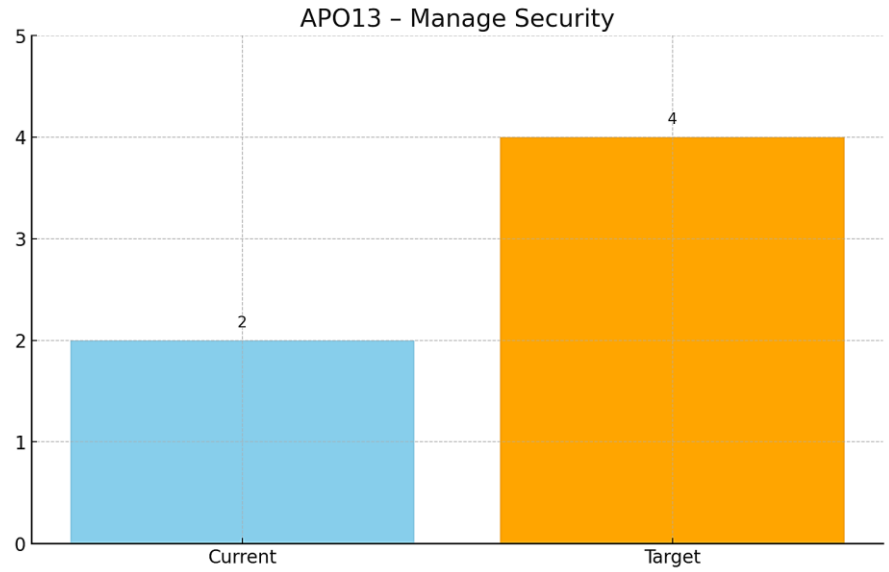

Figure 1. APO13- Manage Security

Figure 1 shows that the maturity level of information security governance at PT Wahana Sukses Makmur in domain APO13 (Manage Security) is at level 2 (Managed), while the target to be achieved is level 4 (Quantitatively Managed), reflecting a gap of two levels. When compared to the other two domains analysed, APO07 (Manage Human Resources) and DSS01 (Manage Operations), the maturity level of APO13 is on par with DSS01 and better than APO07, which is still at level 1. This finding indicates that although the company has basic policies in place and implemented technical measures such as firewalls and antivirus, the policy coverage is not comprehensive, not regularly updated, and not supported by an optimally integrated monitoring system. In addition, low security awareness outside the IT team also increases the risk of data leakage due to human error. Therefore, to accelerate the achievement of the targeted maturity level, the company needs to develop a comprehensive and regularly updated information security policy, integrate the monitoring system into a centralised platform such as SIEM, and build a security culture through continuous training for all employees.

2. APO07 – Manage Human Resources

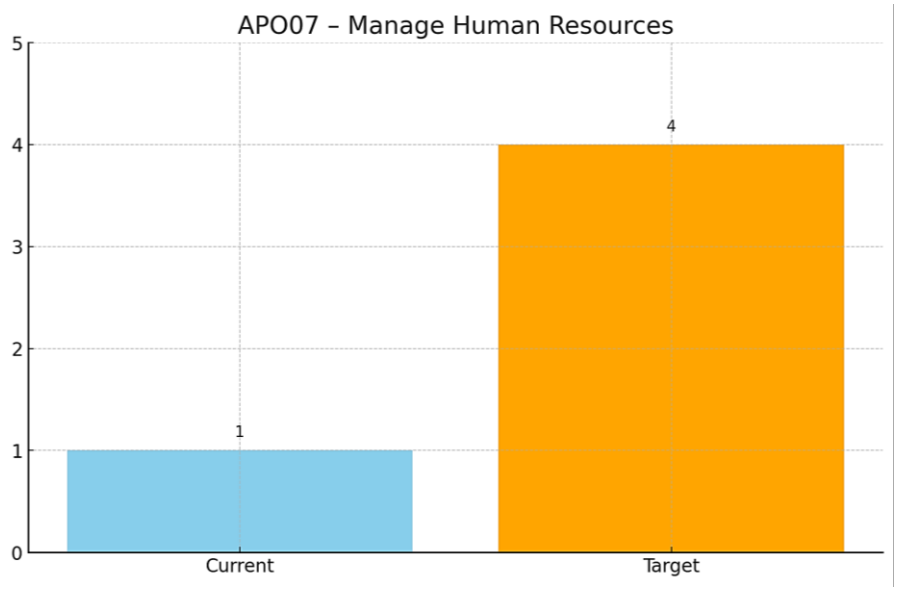

Figure 2. APO07-Manage Human Resources

Figure 2 shows that the maturity level of IT HR management at PT Wahana Sukses Makmur in domain APO07 (Manage Human Resources) is at level 1 (Performed), with a target level of 4 (Quantitatively Managed), reflecting a gap of three the highest among the three domains analysed. This visual confirms that the HR management process is still reactive, undocumented, and does not support the company's digital transformation. Compared to APO13 and DSS01 domains that have reached level 2, APO07 is a major weak point. This lag is caused by the absence of a structured competency development strategy, sporadic training, and recruitment that has not been integrated with the vision of digitalisation. To overcome this, the company needs to develop a competency development strategy that is aligned with the digital roadmap, conduct regular skills assessments, and design sustainable training programs. The recruitment process also needs to be geared towards future strategic needs, such as cybersecurity, data analytics and cloud computing.

3. DSS01 – Manage Operations

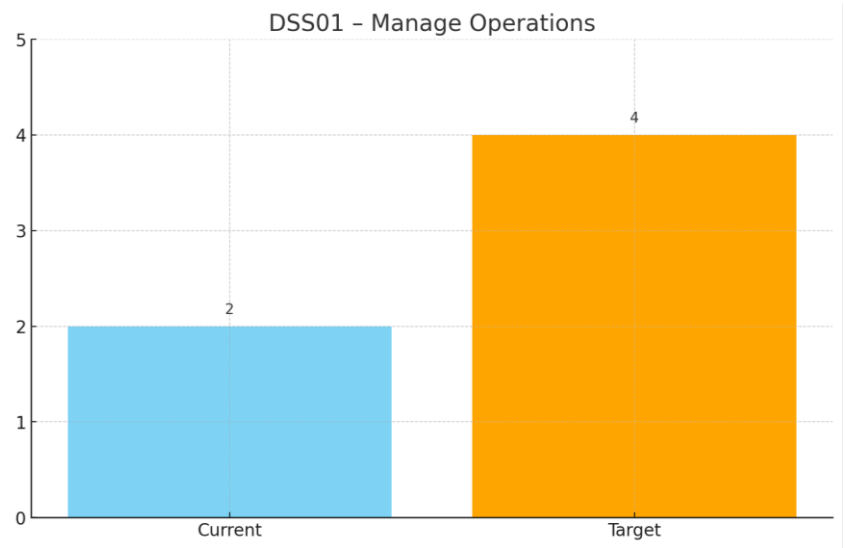

Figure 3. DSS01-Manage Operations

Figure 3 shows that the level of maturity of IT operational governance at PT Wahana Sukses Makmur in the DSS01 domain (Manage Operations) is at level 2 (Managed), while the target to be achieved is level 4 (Quantitatively Managed), so there is a gap of two levels. When compared to the APO13 domain, which is at the same level and APO07, which is still at level 1, DSS01 occupies an intermediate position in terms of process readiness. This visual shows that although operational processes are in place, there are still weaknesses such as incomplete documentation, manual monitoring, incident handling that is not yet automated, and the absence of clearly defined performance metrics. This hinders service effectiveness and creates a high dependency on individual knowledge. To bridge this gap, companies need to thoroughly document all operational processes, standardise practices based on frameworks such as ITIL, and implement ITSM systems and proactive monitoring tools to automate incident handling and early detection of disruptions. In addition, it is important to formulate IT service performance metrics that are relevant to the company's strategic objectives to support performance evaluation and data-driven decision-making.

B. Discussion

This study aims to evaluate the maturity level of information technology (IT) governance in a telecommunications company using the COBIT 2019 framework. The assessment results reveal a significant gap between the current maturity levels and the targeted levels, particularly in the domains of APO13, APO07, and DSS01. Unlike previous studies conducted in sectors such as banking [2] logistic [4] and education, which also identified maturity gaps but tended to emphasise individual technical or documentation-related issues, this research highlights that the maturity challenges in the telecommunications sector are shaped by a higher level of complexity. This complexity arises from internal factors such as the lack of integration between IT strategy and human resource development, as well as weak organisation-wide security culture, and external pressures like global data protection regulations and the need to adopt advanced technologies such as 5G and IoT. Therefore, although similar maturity gaps are observed across sectors, the underlying causes and impacts in telecommunications require a more strategic and systemic approach to address the evolving demands and regulatory intensity of the industry.

In the APO07 domain (Manage Human Resources), this study found that PT Wahana Sukses Makmur is currently at level 1 (Performed), far below the target of level 4 (Quantitatively Managed). This low maturity level reflects a reactive and unstructured approach to IT human resource management, characterised by the absence of formal competency frameworks, irregular training programs, and a lack of alignment with the company's digital transformation strategy. Several internal factors contribute to this condition, including the limited involvement of HR in IT strategic planning, unclear role definitions for IT personnel, and the absence of continuous skills assessments. Externally, the rapid evolution of digital competencies required in the telecommunications sector, such as cloud infrastructure, cybersecurity, and data analytics, exacerbates the talent gap when not addressed by proactive workforce planning. While previous studies, such as the one at PT Nusantara Turbine and Propulsion [7], identified documentation as a positive aspect, they also demonstrated similar challenges in achieving higher maturity due to limited integration with strategic goals. Moreover, this study emphasises the often-overlooked interdependencies between domains in COBIT 2019, particularly between APO (strategy and planning) and DSS (delivery and support). Most prior research, such as that at the South Sumatra Provincial Library Office[8] and STIKes Guna Bangsa Yogyakarta [9], tended to focus narrowly on operational domains, without considering how weak human capital governance could hinder operational performance and the attainment of strategic IT objectives. Therefore, this study underlines the need for a comprehensive and interconnected approach to HR development in the telecom industry to close the maturity gap and ensure sustainable digital growth.

This research fills a significant gap in previous studies by not only evaluating individual domains but also exploring the inter-domain relationships within the COBIT 2019 framework, particularly in the context of the telecommunications sector. Unlike most earlier studies that focused on isolated domains or overlooked sector-specific complexities, this research critically analyzes how internal factors such as limited integration between IT and HR planning, lack of standardized processes, and low organizational awareness of IT governance and external factors such as rapid technological advancements like 5G and IoT, and increasing demands from global data protection regulations have contributed to the low maturity levels in APO13, APO07, and DSS01. These insights are crucial for understanding the underlying causes of the maturity gaps observed. Furthermore, the study offers practical implications by outlining how the recommended improvements, such as implementing SIEM for security, developing a digitally aligned HR competency roadmap, and automating IT operations through ITSM, can be gradually implemented. Each step is designed to not only elevate the maturity level but also to strengthen operational performance and align IT governance with the company's broader digital transformation strategy. Therefore, this research contributes a more holistic and contextual understanding of COBIT 2019 application in the telecom industry, offering both diagnostic depth and actionable direction for governance enhancement.

IV. CONCLUSIONS

The findings of this study indicate that the IT governance maturity level in the telecommunications companies evaluated is still at a low to medium level based on the COBIT 2019 framework, with domains APO13 and DSS01 at level 2, and APO07 at level 1. This gap between current practices and the expected maturity level reflects the need for significant improvements in IT governance processes, particularly in strategic alignment, risk management, and value delivery. To address these gaps, practical recommendations include the development of a comprehensive information security policy, an IT HR competency roadmap aligned with the company’s digital transformation objectives, and the standardisation and automation of IT operational processes. These actions will help close the maturity gap and enhance IT support for business strategy and regulatory compliance. The study also highlights the importance of understanding the interconnectedness of COBIT 2019 domains (such as APO, DSS, and BAI), which can significantly improve overall IT governance by ensuring more holistic and integrated approaches. By implementing these recommendations, the telecommunications companies can foster a more resilient IT governance structure, enabling them to adapt to technological advancements such as 5G/IoT and regulatory pressures, ultimately driving long-term business success.

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