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Research paper



Modeling and Validating COBIT 5-Based It Governance Capability in Automotive After-Sales Services: Empirical Insights from Authorized Dealerships

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Abstract

The increasing adoption of digital technologies in automotive after-sales services has introduced new challenges for IT governance, particularly within authorized car dealerships. These dealerships rely on digital tools, such as customer relationship management (CRM), service scheduling, and performance monitoring systems, to deliver consistent and effective services. As these systems become more complex, structured IT governance is critical to ensure strategic alignment, risk management, and service quality.
This study assesses the implementation and perceived effectiveness of IT governance practices using the COBIT 5 framework. The assessment model is based on its five core domains: 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 (MEA). A total of 87 respondents from authorized car dealerships in Indonesia participated in a quantitative survey. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).
The results indicate moderate governance maturity across all domains, with the highest capability observed in EDM (mean = 3.6) and the lowest in MEA (mean = 2.9). Important path links between domains support the structural reasoning of the COBIT 5 model. This paper offers empirical analysis on COBIT 5 implementation in customer-facing automotive environments as well as pragmatic advice for improving IT governance, service delivery, and performance measurement in after-sales operations. While the findings provide valuable insights, they are contextually limited to authorized dealerships in Indonesia and may vary in other regions with different governance practices or IT maturity.

Keywords: *IT Governance; After-Sales Services; Authorized Dealership; Cobit-5; Capability Assessment.*

1. Introduction

Driven by quick digitalization all along its value chain, the automotive industry has changed dramatically lately. Among the most significant sectors affected by this shift is that of after-sales services. Today, authorized dealerships manage service scheduling, customer relationship management (CRM), vehicle diagnostics, spare part inventory, and customer comments via digital platforms. These technologies improve operational efficiency, customer experience, contentment, and loyalty, therefore directly helping businesses to be more competitive [1].
Given the increasing reliance on digital services, information technology (IT) governance becomes extremely vital. The set of tools, policies, and systems known as IT governance guarantees the best and efficient use of IT, enabling the accomplishment of the goals of an institution [2]. Aligning IT investments with corporate goals, controlling IT-related risks, and guaranteeing adherence to relevant laws and standards all depend on it. Developed by ISACA, COBIT 5 provides a complete approach integrating governance and management across five domains among several IT governance frameworks: 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 (MEA)[3].
Although COBIT 5 has been utilized extensively in government, education, and banking as well as other industries, empirical research on its implementation in the automobile sector, particularly within distributed, customer-facing dealership environments, is still lacking.

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Current studies largely focus on upstream automotive processes like production and supply chain management, therefore excluding the governance challenges in after-sales operations [4]. These dealership settings are special because of their operational autonomy, connection with OEM digital systems, and different degrees of IT maturity [5]. This study examines the implementation and apparent efficacy of COBIT 5-based IT governance in authorized car dealerships in Indonesia, aiming to close this gap. Using a quantitative, survey-based approach, data were collected from IT and operational personnel in the after-sales division. The research analyzes governance capability across the five COBIT 5 domains and explores their interrelationships using Partial Least Squares Structural Equation Modeling (PLS-SEM) [6].

Threefold are the goals of this study. It first evaluates the degrees of COBIT 5 implementation in the operations of after-sales dealers. Second, it assesses staff opinions about the efficiency and difficulties of IT governance policies. Third, it points up areas of weakness and suggests doable solutions for operational and strategic enhancement. This work is organized as follows. Section 2 offers a survey of the literature on COBIT 5 architecture and IT governance. Section 3 describes the study approach, including data analysis techniques, instrument development, and sampling. Section 4 offers the empirical results; Section 5 addresses important conclusions and ramifications. Section 6 ends with a review and suggestions for the next investigations.

2. Related work

The current literature on IT governance is succinctly reviewed in this part. It covers essential definitions, basic ideas, and earlier research on the application of IT governance models, especially in the automobile sector, which investigates the implementation of structured governance frameworks, including COBIT 5 and its applicability to managing digital transformation and operational difficulties in after-sales service environments.

2.1. Information technology (IT) governance

As digital systems progressively support operational as well as strategic activities, information technology governance has grown to be a vital tool in companies. IT governance guarantees that performance is measured, risks are under control, and IT-related decisions complement corporate objectives [7]. It runs using well-defined systems and procedures that distribute decision rights and responsibility among several organizational levels. Emphasizing performance, conformance, and human behavior, the ISO/IEC 38500:2015 standard published by the International Organization for Standardization offers high-level concepts for efficient IT governance [8]. However, for practical implementation, more detailed frameworks such as COBIT, ITIL, and TOGAF are used.

2.2. COBIT 5 framework

COBIT 5 is an internationally acknowledged framework for IT governance and management created by ISACA. It provides a holistic approach by integrating governance and management activities through five domains: EDM, APO, BAI, DSS, and MEA [3]. Unlike ITIL, which is service-management focused, and TOGAF, which emphasizes enterprise architecture, COBIT 5 offers a governance-oriented, process-centric approach with maturity assessment capabilities. This makes COBIT 5 particularly suitable for dealership settings that require both strategic oversight and operational control. Figure 1 illustrates the interaction between governance and management functions within the COBIT 5 framework. It shows how business needs drive governance objectives, which in turn provide feedback to the management layer. This visualization supports the conceptual foundation of how COBIT 5 aligns IT processes with organizational strategy.

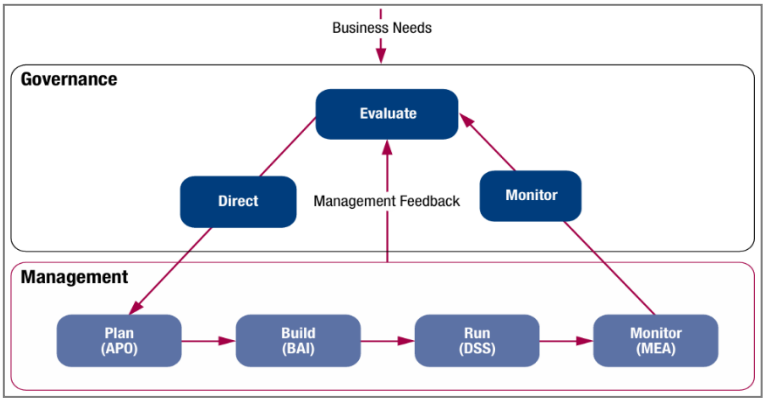


Fig. 1: Key Areas of COBIT 5 Governance and Management.

Every domain corresponds to procedures whose capacity can be evaluated depending on the Process Assessment Model/PAM. Stakeholder value, resource optimization, and continuous improvement are underlined in COBIT 5. Its disciplined approach lets companies assess IT governance maturity in several spheres. Complementing ISO/IEC 15504, the Process Capability Model helps evaluation on a level 0 (incomplete) to level 5 (optimizing).

2.3. IT governance in the automotive industry

Digital transformation has affected downstream services, including vehicle maintenance and CRM, as well as upstream areas, including manufacturing execution systems (MES) in the automotive industry. Particularly in the framework of Industry 4.0, studies show that IT governance policies in OEMs and suppliers are developing [9]. In the automobile industry, after-sales services cover all operations performed following vehicle sale. These service providers satisfy consumers and provide seamless and effective operation of cars, by means of which vehicle operators retain brand loyalty. Durugbo [10] claims that these services improve the customer experience and have several purposes meant to guarantee the best vehicle operating throughout its lifetime.

As shown in Figure 2, automotive after-sales services include spare parts distribution, technical assistance, customer care, and accessory sales. This breakdown helps to contextualize the DSS (Deliver, Service, and Support) domain in COBIT 5, emphasizing its relevance in supporting downstream service reliability.

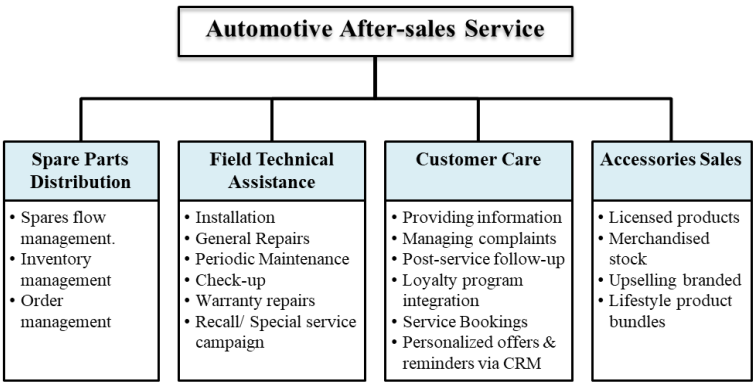


Fig. 2: Automotive After-Sales Service.

Research still underplays dealership-level governance, though. Dealerships have difficulties: limited IT budgets, reliance on OEM systems, varied customer expectations, and inconsistent policies of governance [5]. Applying COBIT 5 in this context could thus provide a methodical way to raise compliance monitoring, service consistency, and IT alignment [11].

2.4. Research gap and recent literature (post-2020)

While IT governance models have been studied in various sectors, there remains a lack of empirical research on the application of COBIT 5 in decentralized, service-oriented dealership environments. Most literature centers on manufacturing and corporate IT. Our study addresses this gap by analyzing COBIT 5 implementation across Indonesian authorized dealerships.

Recent literature adds depth to this discussion. IT governance process capability can drive business performance [7]. Servitization 4.0 and digital supply chain integration have also been recognized as key elements in modern automotive ecosystems [9]. These insights reaffirm the relevance of governance frameworks that address both strategic and operational IT alignment in complex environments.

This literature review supports the methodological choice of COBIT 5 and highlights the study's contribution to a relatively underexplored yet practically important area within IT governance.

3. Methodology

This paper uses a quantitative survey-based research approach to assess the application and apparent success of COBIT 5-based IT governance in automotive after-sales operations. The methodology includes instrument development, sample selection, data collection, and analysis procedures. Figure 3 provides a process-based visualization of the assessment methodology used in this study. The diagram outlines the sequence from planning and data collection to validation and reporting, following the Process Assessment Model (PAM) as applied to COBIT 5 governance evaluation.

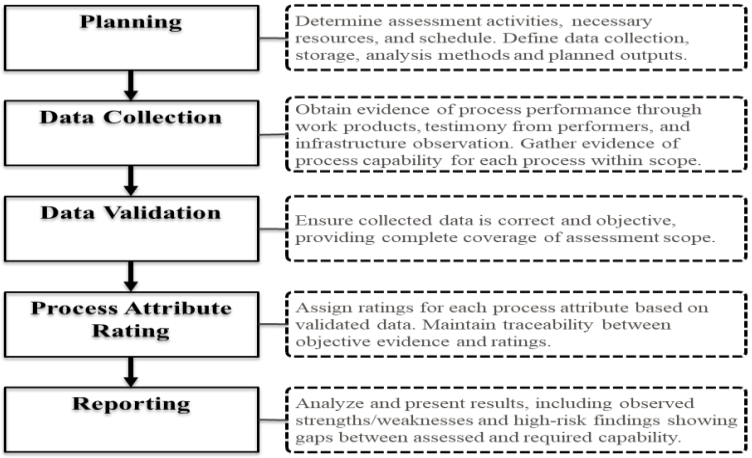


Fig. 3: Flow Diagram Assessment.

3.1. Research design

A structured questionnaire was designed based on the five core domains of the COBIT 5 framework: EDM, APO, BAI, DSS, and MEA. Ten COBIT 5 processes were chosen based on the identification of challenges in automotive after-sales services and consultations with stakeholders: EDM01, EDM02, APO02, APO07, BAI01, BAI03, DSS01, DSS02, MEA01, and MEA03. This selection thoroughly addresses governance and management, considering both practical relevance and theoretical foundations to facilitate strategic direction, align IT and business, manage resources and projects, ensure service reliability, and evaluate performance and compliance.

Each domain was evaluated using the reflecting indicators derived from the COBIT 5 Process Assessment Model [3]. Items are arranged on a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) to evaluate respondents' perceptions of IT governance implementation. Table 1 shows the emphasis of the COBIT 5-based research questionnaire.

Table 1: COBIT 5-Based Research Questionnaire

COBIT 5 Domain	Code	Statement Focus
EDM	EDM01	Formal policies and oversight of decisions
	EDM02	IT leadership strategy and evaluation
APO	APO02	IT strategic planning
	APO07	IT resource management
BAI	BAI01	IT project management
	BAI03	IT development and acquisition
DSS	DSS01	IT service consistency (CRM, reminders, service systems)
	DSS02	IT service incident handling
MEA	MEA01	IT service performance monitoring
	MEA03	Assessment of compliance with IT policies

3.2. Instrument structure

The questionnaire consisted of two main sections. The first section collected demographic information, including role, department, and years of experience in after-sales operations. The second section measured the five COBIT 5 domains using a total of ten indicators (based on the identification of challenges in automotive after-sales services and consultations with stakeholders). Ten members of the target population participated in a pilot test to help improve the item clarity and phrasing.

3.3. Sample and data collection

The study focused on IT and operational staff employed in authorized car dealerships all around Indonesia. Directly engaged in after-sales service management and IT operations, respondents were identified using a purposive sampling method. Using an online questionnaire sent out via Google Forms, data were collected from 87 valid responses. Confidentiality was kept all through the process; participation was totally voluntary. Representing important roles in charge of implementing and supervising IT governance in the after-sales division, the respondents were service managers, IT officers, service advisers, and branch managers.

3.4. Data analysis

Data were analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The Partial Least Squares Structural Equation Modeling (PLS-SEM) model was chosen over other models, such as Covariance-Based Structural Equation Modeling (CB-SEM), due to its suitability for exploratory research, complex models with many constructs, and small to medium sample sizes. PLS-SEM also allows for the simultaneous assessment of measurement models and structural models without requiring strict normality assumptions.

The analysis followed a two-stage approach. First, the measurement model was evaluated to assess internal consistency reliability (Cronbach's alpha, composite reliability), convergent validity (Average Variance Extracted), and discriminant validity (Heterotrait-Monotrait Ratio). The structural model was evaluated by analyzing path coefficients, significance levels (t-values & p-values), and the coefficient of determination (R^2) for the endogenous components [12].

The logical and structural link among COBIT 5's IT governance domains is shown by the EDM → APO → BAI → DSS → MEA model. This flow experimentally verifies a capability maturity model-based process methodology as described in the process assessment methodology, with the support of PLS-SEM analysis in this study. This methodological approach enables the study to evaluate the individual performance of governance domains as well as the interrelationships among them, therefore offering a whole picture of IT governance capabilities in the framework of automobile after-sales services.

4. Result

This section presents the results of the empirical study resulting from survey responses of 87 workers of approved vehicle dealerships. Among the dealerships that took part were authorized Toyota, Daihatsu, and Isuzu dealerships dispersed over several regions of Indonesia. Figure 4 categorizes the functional roles of the survey respondents, including Branch Managers, IT Officers, Service Advisors, and others. These role distributions are critical because they influence domain-specific perceptions — for instance, IT Officers may be more familiar with DSS issues, while Service Managers may impact MEA evaluations. Two phases comprise the analysis: evaluation of the structural model using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4 and evaluation of the measurement model.

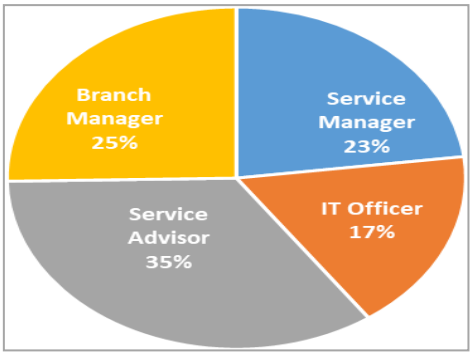


Fig. 4: Distribution of Respondents.

4.1. Measurement model evaluation

The measuring method was analyzed to evaluate the reliability & validity of the constructs. All latent variables exhibited substantial internal consistency, with Cronbach's alpha & composite reliability (CR) values surpassing the suggested level of 0.70. The Average Variance Extracted (AVE) for each construct exceeded 0.50, confirming adequate convergent validity. The measurement model evaluation result is presented in Table 2.

Table 2: Measurement Model Evaluation

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE
EDM	0.79	0.87	0.77
APO	0.82	0.89	0.80
BAI	0.76	0.85	0.74
DSS	0.81	0.88	0.79
MEA	0.78	0.86	0.75

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT), with all inter-construct HTMT values below the threshold of 0.85, indicating acceptable discriminant validity.

4.2. Structural model evaluation

The structural model results demonstrated significant positive relationships (t-value > 1.96 & p-value < 0.001) among the COBIT 5 domains. Path coefficients, t-values, and p-values were computed using bootstrapping with 5,000 subsamples. Table 3 shows the result of the structural model evaluation.

Table 3: Structural Model Evaluation

Hypothesized Path	β (Path Coefficient)	t-value	p-value
EDM → APO	0.63	8.12	< 0.001
APO → BAI	0.58	7.34	< 0.001
BAI → DSS	0.52	6.77	< 0.001
DSS → MEA	0.49	5.91	< 0.001

The R^2 values for endogenous constructs indicated moderate explanatory power (0.25–0.50):

1) APO: $R^2 = 0.40$
2) BAI: $R^2 = 0.34$
3) DSS: $R^2 = 0.27$
4) MEA: $R^2 = 0.24$.

4.3. Descriptive statistics and capability levels

Descriptive statistics of responses revealed moderate IT governance maturity across the five COBIT 5 domains. The mean scores indicate that strategic-level domains (EDM, APO) are perceived more positively than operational domains (DSS, MEA). Results of the capability level measurements are shown in Table 4.

Table 4: Capability Level Result

Domain	Mean	Std. Dev.	Capability Level*
EDM	3.6	0.71	Level 4 – Predictable
APO	3.5	0.68	Level 4 – Predictable
BAI	3.4	0.73	Level 3 – Established
DSS	3.2	0.77	Level 3 – Established
MEA	2.9	0.78	Level 3 – Established

*Capability levels are interpreted based on the COBIT 5 Process Assessment Model criteria.

These findings indicate that while operational governance domains—particularly in service delivery (DSS) and performance evaluation (MEA) have reached an established level of capability, they still lag slightly behind strategic domains in terms of predictability and optimization. Further development and reinforcement are needed to ensure consistency and continuous improvement in operational governance practices.

5. Discussion

The results of this study are interpreted in the context of current literature on IT governance and COBIT 5 implementation. The analysis provides insights into the maturity levels of IT governance practices in authorized automotive dealerships' after-sales operations and explores the interrelationships among the governance domains.

5.1. Interpretation of governance capability

Strategic governance domains—Evaluate, Direct and Monitor (EDM) and Align, Plan and Organize (APO) demonstrated the highest capability levels, each achieving Level 4 – Predictable maturity. This indicates that strategic direction-setting and IT planning practices are well-established, consistently executed, and supported by strong leadership engagement across authorized dealerships. The high ratings in these areas show the existence of structured government systems, thorough policy documentation, and harmony between IT projects and corporate objectives. While these processes are institutionalized, the Build, Acquire, and Implement (BAI) and Deliver, Service, and Support (DSS) domains attained Level 3 – Established, implying that they may not yet show complete optimization or predictability. The

domain Monitor, Evaluate and Assess (MEA), with a mean score of 2.9, also falls under Level 3 – Established, but remains the lowest among the five domains.

In practice, dealerships often face DSS challenges such as inconsistencies in CRM follow-ups, a lack of integration between booking and service platforms, and limited automation in handling customer inquiries. For example, missed service reminders or outdated customer records may lead to lower service engagement.

Similarly, MEA shortcomings may include irregular performance audits, manual compliance reviews, and a lack of real-time dashboards for IT monitoring. These operational issues contribute to the relatively lower maturity ratings in these domains and emphasize the need for enhanced governance execution in customer-facing processes.

5.2. Interrelationships among COBIT 5 domains

The structural model confirms the sequential and hierarchical interdependence of the COBIT 5 domains. The strong path from EDM to APO ($\beta = 0.63$) suggests that strategic direction significantly influences planning and resource alignment. Subsequently, APO positively impacts BAI ($\beta = 0.58$), reflecting how effective planning supports the development and implementation of IT initiatives. BAI then influences DSS ($\beta = 0.52$), affecting service reliability and operational delivery. Finally, DSS influences MEA ($\beta = 0.49$), emphasizing how operational execution shapes performance monitoring and governance evaluation. These results validate the conceptual logic of the COBIT 5 framework, where governance domains are interlinked in a coherent process. This finding reinforces the idea that weaknesses in upstream domains can cascade and impact downstream effectiveness, highlighting the importance of a holistic governance approach across dealership environments.

5.3. Practical implications

This study provides actionable insights for dealership managers and IT governance practitioners. The disparity between strategic and operational domains suggests that strengthening DSS and MEA should be prioritized. This can be achieved by standardizing IT service management systems, enhancing staff training, and implementing robust monitoring mechanisms. Even though EDM and APO show higher maturity, continuous evaluation, cross-departmental collaboration, and compliance with OEM digital standards remain essential. The findings also emphasize the practicality of using COBIT 5 as a diagnostic and planning tool in after-sales settings. By leveraging COBIT 5's structured process and maturity assessment, dealerships can benchmark their governance practices and formulate targeted improvements that address capability gaps.

5.4. Theoretical contributions

From a theoretical standpoint, this study contributes to the limited empirical research on COBIT 5 in automotive after-sales environments. It extends the applicability of the framework to medium-scale, customer-facing operations and reinforces the internal logic of the COBIT 5 domain structure through data-driven validation. Furthermore, the findings deepen our understanding of how governance practices evolve in dealership settings, which often combine centralized policies with localized execution. To guide future studies, we propose exploring hypotheses such as: "Organizational culture moderates the relationship between EDM and APO maturity" or "Digital competencies positively influence DSS effectiveness in decentralized networks". Methodologically, a mixed-methods research design—combining quantitative surveys with in-depth interviews or case studies—would help uncover contextual enablers of governance maturity. Longitudinal tracking of dealership governance post-intervention (e.g., new digital policy rollouts, CRM training programs) is also recommended to evaluate the sustainability of improvements over time.

6. Conclusion and future work

This study evaluated the implementation and perceived efficacy of IT governance practices based on the COBIT 5 framework within the context of authorized car dealerships in Indonesia. Utilizing a quantitative research approach involving 87 respondents and employing Partial Least Squares Structural Equation Modeling (PLS-SEM), the study assessed governance maturity across five key domains: EDM, APO, BAI, DSS, and MEA.

Strategic governance domains—EDM and APO—achieved the highest competence levels (Level 4 – Predictable), reflecting strong policy formalism, leadership commitment, and effective alignment between IT and business. By contrast, operational domains—BAI, DSS, and MEA—reached Level 3 – Established, indicating the presence of institutionalized practices but also signaling the need for greater consistency and optimization. A noticeable capability gap between strategic planning and operational execution suggests that dealership IT governance would benefit from more focused reinforcement in service delivery and performance monitoring mechanisms.

The structural model confirmed the sequential interdependence of the COBIT 5 domains (EDM → APO → BAI → DSS → MEA), validating the theoretical logic of the framework and underscoring the importance of holistic governance continuity. These findings support the relevance of COBIT 5 as an effective governance and management tool, even in decentralized, customer-oriented environments such as after-sales automotive services.

While this study provides meaningful insights, it is contextually limited to Indonesian dealerships (Toyota, Daihatsu, Isuzu) and may not be fully generalizable to other geographic or organizational contexts. Future research should explore broader applications across brands and regions to evaluate the universality of the findings.

Future work could examine organizational enablers such as digital leadership, cultural alignment, or staff digital competencies as mediators or moderators. Example hypotheses include: "Organizational culture moderates the relationship between EDM and APO maturity" or "CRM adoption positively influences DSS domain performance."

Longitudinal research tracking governance capability improvements over time, post-implementation of digital interventions, would also provide valuable insights. In addition, investigating how governance maturity correlates with business outcomes (e.g., service efficiency, customer satisfaction, compliance) could further establish the strategic value of IT governance in the evolving automotive landscape.

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