

Fostering Supply Chain Agility through Transformational Leadership and Organizational Ambidexterity in the Indonesian Automotive Industry

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ABSTRACT

Indonesia's automotive components industry faces unprecedented supply chain and innovation challenges, driven by the rapid adoption of Industry 4.0, the CASE (Connected, Autonomous, Shared, Electric) paradigm, and intensified global trade tensions. The "Trump Trade War 2.0," marked by a 32% U.S. tariff on Indonesian exports, has disrupted supply chains and heightened the urgency for organizational agility and innovation among Tier-1 suppliers. This study examines how transformational leadership fosters organizational ambidexterity, balancing exploration and exploitation, to enhance innovation performance. Using Partial Least Squares Structural Equation Modeling (PLS-SEM) on data from 100 top leaders in the Indonesian automotive industry, CEOs, Vice Presidents, Directors, and Owners, findings reveal that transformational leadership significantly strengthens ambidexterity, which fully mediates its indirect effect on innovation. However, transformational leadership does not directly impact innovation outcomes, reflecting the mature, process-driven nature of Tier-1 suppliers. These results highlight the crucial role of leadership in developing ambidextrous capabilities to foster innovation and resilience within globally exposed, digitally transforming supply chains in emerging markets.

Keywords: *automotive industry, competitive advantage, innovation performance, organizational ambidexterity, supply chain agility, transformational leadership*

1. INTRODUCTION

The Indonesian automotive components industry is navigating a period of profound transformation, shaped by the convergence of technological disruption, global competition, and shifting geopolitical dynamics. As a key pillar of Indonesia's industrial development, the sector is increasingly integrated into global supply chains, supporting hundreds of Tier-1 suppliers that deliver critical parts to Original Equipment Manufacturers (OEMs) worldwide (Kemenperin.go.id, 2025). This integration has brought both opportunities and vulnerabilities, particularly as the industry faces the dual challenge of Industry 4.0 (IR 4.0) adoption and the accelerating CASE (Connected, Autonomous, Shared, Electric) megatrend, fundamentally altering technological and business landscapes (Kafetzopoulos *et al.*, 2023).

Supply chain management (SCM) is at the heart of these changes, as digitalization and global integration have increased the complexity and the strategic importance of supply chain operations. The adoption of Industry 4.0—characterized by the Internet of Things (IoT), artificial intelligence, and cyber-physical systems—enables real-time data exchange, automation, and smart manufacturing across the automotive value chain, but also demands seamless coordination and agility in supply chain processes (Ren *et al.*, 2023). The CASE paradigm further intensifies these requirements, as suppliers must develop new competencies in electronics, software, and systems integration, moving

beyond traditional manufacturing to end-to-end supply chain visibility and responsiveness (Kafetzopoulos *et al.*, 2023).

The industry's supply chain is further challenged by external shocks such as the "Trump Trade War 2.0." The imposition of reciprocal tariffs, including a 32% duty on Indonesian automotive exports to the United States, has disrupted established trade flows and forced firms to re-evaluate their supply chain strategies and market positioning. These trade tensions increase operational costs and accelerate the need for supply chain agility, risk mitigation, and market diversification (Kafetzopoulos *et al.*, 2023). As a result, Indonesian suppliers are compelled to adopt more resilient and flexible supply chain management practices. By leveraging digital transformation technologies, these suppliers aim to enhance their operational efficiency, improve visibility throughout their supply chains, and ensure a seamless flow of goods and information (Xingmin, 2023).

In this volatile environment, transformational leadership is increasingly recognized as a critical enabler of supply chain adaptation and innovation. Transformational leaders—through vision, intellectual stimulation, and individualized support—create organizational cultures that foster both exploration (innovation and experimentation) and exploitation (operational efficiency), a duality known as organizational ambidexterity (H. Dong *et al.*, 2023). Organizational ambidexterity is vital for supply chain management, as it enables firms to simultaneously exploit existing operational strengths and explore novel solutions, thereby enhancing their ability to adapt to disruptions, integrate digital technologies, and meet evolving customer expectations (Azizi *et al.*, 2025).

Recent empirical studies highlight that in Indonesia's automotive components sector, the influence of transformational leadership on innovation is often indirect, mediated by the firm's ability to balance exploration and exploitation (Kastelli *et al.*, 2024). This underscores the importance of developing absorptive capacity—the ability to acquire, assimilate, and apply new knowledge—across the supply chain, which is a prerequisite for translating digital transformation and leadership vision into tangible innovation outcomes (Cohen & Levinthal, 1990; Jin *et al.*, 2023). Thus, Effective SCM requires technological adoption, organizational learning, and cross-tier collaboration to diffuse innovation and best practices throughout the supply chain.

Given these dynamics, this study integrates transformational leadership and organizational ambidexterity within emerging markets, specifically Indonesia, which has unique market dynamics compared to developed economies. Previous studies have primarily focused on developed markets, making this research essential for addressing the critical gap in understanding these relationships within the Indonesian automotive components supply chain. To explore these relationships, the study is guided by the following questions:

- **RQ1:** How does transformational leadership influence innovation performance, and what mediating role does organizational ambidexterity play in this relationship within the Indonesian automotive components industry?
- **RQ2:** In what ways does transformational leadership impact on the dimensions of organizational learning and innovation within this specific industry?

- **RQ3:** How does organizational ambidexterity foster an environment conducive to innovation performance in the context of transformational leadership practices?

- **RQ4:** Does the relationship between transformational leadership, organizational ambidexterity, and innovation performance vary under the unique conditions of emerging markets, such as Indonesia?

By addressing these questions, the study contributes to the growing literature on leadership, innovation, and supply chain management in emerging markets, emphasizing the mediating role of organizational ambidexterity and absorptive capacity in the digital era (Tortorella *et al.*, 2021). The findings are expected to inform both academic theory and managerial practice, providing actionable insights for industry leaders and policymakers seeking to foster innovation-led growth, supply chain resilience, and global competitiveness in Indonesia's automotive sector.

2. LITERATURE REVIEW

2.1 Upper Echelon Theory

The Upper Echelon Theory (UET), introduced by Hambrick and Mason (1984), posits that the characteristics, experiences, and cognitive frameworks of top executives significantly influence organizational outcomes (Abatecola & Cristofaro, 2020). This theory has been widely applied to understand how leadership traits shape strategic decisions and drive organizational performance. Bromiley & Rau (2017) extended UET by demonstrating how leaders' cognitive biases and decision-making styles influence innovation strategies in volatile environments. In Indonesia's automotive industry, transformational leadership aligns with UET by enabling leaders to balance exploration (innovation) and exploitation (efficiency), critical for navigating hierarchical supply chains and technological disruptions.

2.2 Resource-Based View (RBV)

The Resource-Based View (RBV), conceptualized by Wernerfelt (1984) and expanded by Barney (1991), emphasizes leveraging unique internal resources for sustainable competitive advantages (Barney, 1991). Transformational leadership and organizational ambidexterity are increasingly recognized as critical resources for firms to navigate market volatility. Kafetzopoulos *et al.* (2023) highlights that combining digital tools with Lean practices accelerates innovation cycles, underscoring the importance of integrating leadership capabilities with ambidextrous strategies. In Indonesia's Tier-1 automotive suppliers, RBV principles optimize technical capabilities and collaborative networks, striking a balance between operational efficiency and exploratory R&D.

2.3 Transformational Leadership

Transformational leadership, conceptualized by Bass (1985), has evolved as a key construct for addressing modern industrial challenges (Bass, 1985; Goestjahjanti *et al.*, 2022). This leadership style emphasizes vision, inspiration, intellectual stimulation, and individualized consideration, thereby fostering environments that are conducive to innovation. Recent studies emphasize its relevance in emerging markets. Dong (2023) transformational leadership

positively impacts firm innovation performance by fostering adaptability and creativity, with environmental dynamism and business model innovation as mediating factors. Zuraik & Kelly (2019) demonstrated that transformational leadership by CEOs drives cross-functional collaboration and ambidextrous learning. These findings underscore the pivotal role of transformational leadership in fostering organizational capabilities that support innovation.

2.4 Organizational Ambidexterity

Organizational ambidexterity refers to a firm's ability to balance exploration (innovation) and exploitation (efficiency) to achieve superior performance. Duncan (1976) introduced the concept, highlighting the need for dual structures to manage innovation. Recent studies show ambidexterity enhances strategic flexibility and operational stability, especially if digitally integrated, supporting both adaptability and efficiency in dynamic environments (Chams-Anturi *et al.*, 2022; Tortorella *et al.*, 2021).

2.5 Innovation Performance

Schumpeter's theory of innovation emphasizes "creative destruction," where new technologies disrupt outdated practices to drive economic progress (Sweezy, 1943). This framework is particularly relevant in the automotive sector, where digital tools, such as IoT systems, accelerate innovation cycles. Recent studies have contextualized Schumpeter's framework within modern manufacturing, as seen in the work of Zhao *et al.* (2020) proposed evaluating product, process, and management innovations as key drivers of competitiveness. Highlighted the importance of hierarchical supply chain structures in fostering adaptive leadership for innovation. In Indonesia's automotive industry, balancing exploitation (optimizing existing processes) with exploration (adopting CPS technologies) reflects Schumpeter's assertion that innovation thrives when firms dismantle obsolete practices to embrace new opportunities (Syah *et al.*, 2022).

2.6 PLS-SEM Methodology

Partial Least Squares Structural Equation Modeling (PLS-SEM) is a robust analytical tool widely adopted in exploratory research for its ability to model complex relationships between latent constructs without requiring stringent assumptions about data normality (Hair *et al.*, 2020). Unlike covariance-based SEM (CB-SEM), PLS-SEM prioritizes prediction over model fit, making it ideal for testing mediation effects and advancing theoretical frameworks in emerging research contexts. Its suitability for small-to-moderate sample sizes (e.g., $N = 100$ $N=100$) and non-normal data distributions aligns with the challenges of empirical studies in dynamic industries like automotive manufacturing (Kock & Hadaya, 2018). For instance, Monte Carlo simulations confirm the reliability of PLS-SEM in testing mediation pathways (e.g., organizational ambidexterity, linking leadership to innovation), even with skewed data. The methodology's flexibility extends to handling formative and reflective constructs simultaneously, accommodating hierarchical models where traditional methods falter (Sarstedt *et al.*, 2014). Hair *et al.* (2020) advocate its use for studies requiring predictive accuracy, such as assessing the mediating role of organizational ambidexterity in this research. The "10-times rule" (Shmueli *et al.*, 2019)—recommending a sample size ten times the

largest number of structural paths—was exceeded here ($N = 100$ $N=100$), ensuring sufficient statistical power while adhering to guidelines for exploratory designs (Kock & Hadaya, 2018).

3. HYPHOTHESES

3.1 Transformational Leadership's Effect on Organizational Ambidexterity

Transformational leadership is recognized as a key driver of organizational ambidexterity, as it facilitates both exploration and exploitation activities, enabling organizations to adapt to dynamic environments and achieve sustainable innovation (Kozcu & Özmen, 2021). In their examination of CEO transformational leadership and corporate entrepreneurship within the Chinese context, Pan *et al.* (2021) proposed that organizational ambidexterity is a central mediating mechanism between transformational CEOs and the extent of corporate entrepreneurship observed. Kozcu *et al.* (2021) discovered that transformational leadership positively affects organizational ambidexterity, based on research conducted with 39 construction firms. Generally, existing research upholds the idea that transformational leadership is pivotal in promoting organizational ambidexterity, a key attribute for organizations seeking to navigate evolving markets, drive innovation, and secure a competitive edge. Based on several previous studies, this research proposes a hypothesis:

H1: Transformational leadership has a positive relationship with organizational ambidexterity in the automotive components industry.

3.2 Transformational Leadership's Effect on Innovation Performance

Transformational leadership has been extensively studied in relation to its impact on innovation performance. Kuknor *et al.* (2021) discovered a positive impact of transformational leadership on the performance of research and development (R&D) project teams within a major R&D institution. Zuraik & Kelly (2019) highlighted that CEO transformational leadership directly influences organizational innovation and indirectly affects innovation climate, emphasizing the positive impact of transformational leadership on fostering innovation. Moreover, Al-Husseini *et al.* (2021) investigated the intermediary function of knowledge sharing in connecting transformational leadership with innovation, highlighting its direct and indirect impact on enhancing innovation. In summary, the existing literature highlights the pivotal role of transformational leadership in promoting innovation and enhancing organizational performance, as it empowers and motivates employees to think creatively and adapt to changing circumstances. Based on several previous studies, this research proposes a hypothesis:

H2: Transformational leadership is positively associated with innovation performance in the automotive components industry.

3.3 Organizational Ambidexterity Effect on Innovation Performance

Organizational ambidexterity is a firm's ability to simultaneously explore new opportunities and exploit existing capabilities. This dual capacity has been

increasingly acknowledged as a vital determinant of organizational innovation performance. Leitão *et al.* (2024) examined the combined impact of organizational ambidexterity and open innovation on enhancing innovation outputs, considering business units with varying degrees of technological intensity (medium-high and high-tech, medium-low and low-tech) across countries with diverse innovation profiles. In another study, Christofi *et al.* (2024) investigated how the balanced and combined aspects of ambidexterity contribute to innovation performance, particularly in addressing global health challenges related to pandemics, including mortality rates, infection risks, and life expectancy. Building on the insights gained from these research efforts across varying technological contexts and global challenges, this research proposes a hypothesis:

H3: *Organizational ambidexterity is positively related to innovation performance in the automotive industry.*

3.4 Transformational Leadership & Innovation Performance Mediated by Organizational Ambidexterity

The mediating role of organizational ambidexterity in the relationship between transformational leadership and innovation performance is well established in the literature. Drawing from Upper Echelon Theory (Mason, 1984) and Resource-Based Theory (Wernerfelt, 1984) Transformational Leadership is theorized to shape organizational systems and cultures that enable firms to balance exploration and exploitation activities—key dimensions of ambidexterity. Empirical studies support this pathway: Zuraik & Kelly (2019) found that CEO transformational leadership drives cross-functional collaboration and ambidextrous learning, subsequently enhancing innovation performance. Al-Husseini *et al.* (2021) demonstrated how transformational leadership creates conditions for knowledge sharing and ambidextrous practices that drive innovation across different organizational contexts. Additionally, Diesel & Scheepers (2019) highlighted how innovation climate mediates between leadership and ambidexterity. Complementary evidence from Christofi *et al.* (2024), Leitão *et al.* (2024), and Katou *et al.* (2023) further strengthens this relationship by demonstrating how balanced ambidexterity enhances innovation outputs across varying technological contexts. Rather than exerting a direct influence, transformational leaders primarily foster innovation by building ambidextrous capabilities within their organizations, making ambidexterity a central mechanism linking leadership to superior innovation performance.

H4: *Organizational ambidexterity mediates the relationship between transformational leadership and innovation performance.*

4. METHODOLOGY

4.1 The Conceptual Framework

The conceptual framework, depicted in Figure 1, outlines the hypotheses under investigation. H1 assesses the contribution of transformational leadership to organizational ambidexterity, while H2 investigates its impact on innovation performance. H3 explores the relationship between organizational ambidexterity and innovation. Lastly, H4 examines the mediating role of organizational

ambidexterity in the relationship between transformational leadership and innovation performance.

4.2 Research Instrument

The research instrument was developed to measure three primary constructs: Transformational Leadership, Organizational Ambidexterity, and Innovation Performance, using validated scales from prior studies. These constructs were operationalized to align with the context of Indonesia's automotive components industry, ensuring relevance and applicability. A structured survey questionnaire served as the primary tool for data collection, designed to capture nuanced responses while adhering to methodological rigor. The measurement of transformational leadership was based on the works of Morales *et al.* (2012), Gautam *et al.* (2019). This construct encompasses four dimensions: Idealized influence, individualized consideration, inspirational motivation, and intellectual stimulation.

Idealized Influence measures the extent to which leaders are admired, trusted, and respected. Leaders with high idealized influence inspire employees to align with organizational goals. Examples include "Employees trust their leaders" and "Leaders act as role models." Individualized Consideration measures leaders' support for individual employee growth by addressing personal needs and fostering development. Examples include "Leaders provide learning opportunities for employees" and "Leaders offer personalized support to employees." Inspirational Motivation captures leaders' ability to articulate a vision that motivates employees to achieve organizational objectives. Examples include "Leaders instill a clear vision in employees" and "Leaders foster enthusiasm among employees." Intellectual Stimulation reflects how leaders encourage creativity, challenge assumptions, and solicit innovative ideas. Examples include "Leaders encourage creative problem-solving" and "Leaders provide new perspectives on challenges."

Organizational ambidexterity was measured using scales adapted from March & Levinthal (1993) and Odette *et al.* (2022). This construct focuses on two dimensions: Exploration and exploitation. Exploration involves innovation, experimentation, and flexibility in navigating uncertain environments. Firms excelling in exploration are adept at developing novel products, processes, or services. Examples include "The company regularly innovates to meet client needs" and "Actively seeks new production technologies." Exploitation reflects efforts to refine existing processes for efficiency, productivity, and operational excellence. Firms that excel in exploitation maximize the value of their current resources while maintaining robust operations. Examples include "The company frequently employs continuous improvement methodologies" and "Refines processes to enhance quality standards."

Innovation performance was measured using scales from Hong *et al.* (2019), focusing on three dimensions: product innovation, process innovation, and management innovation. Product Innovation evaluates the development of new or improved products that deliver enhanced customer value through novel features or improved quality. Example items include: "New products outperform competitors in the market" and "The company has increased its product innovation output." Process Innovation measures improvements in production or delivery methods to enhance

operational efficiency through the use of advanced techniques or technologies. Example items include: "The company adopts advanced production technologies" and "New processes enhance production efficiency." Management Innovation captures novel management practices that enhance organizational performance by fostering environments that encourage innovation. Example items include: "The company implements reward schemes for innovators" and "The organizational structure is updated to support innovation."

A 6-point Likert scale was used for all constructs in the study, where participants were asked to rate their level of agreement with various statements on a scale from 1 to 6. In this scale, a score of 1 corresponds to "Strongly Disagree," while a score of 6 indicates "Strongly Agree." This design intentionally excludes a neutral option, encouraging respondents to make more decisive choices and express a clear stance on each item. By eliminating the neutral midpoint, the forced-choice format actively reduces central tendency bias, a common issue in survey responses where individuals may avoid extreme options and gravitate toward the middle of the scale (Taherdoost, 2020). This approach enhances the discriminant validity of the constructs measured by minimizing the potential for social desirability bias. Respondents may feel pressured to give more socially acceptable answers; however, the lack of a neutral option

helps mitigate this effect (Podsakoff *et al.*, 2003). Overall, implementing a 6-point Likert scale facilitates more precise and decisive feedback from participants, contributing to the integrity and accuracy of the data collected.

To ensure the reliability and validity of the measures used in this study, we employed several key methodologies, including content validity, reliability tests, convergent validity, and discriminant validity.

- **Content Validity:** Items were derived from established literature and thoroughly reviewed by industry experts to reflect the measured constructs accurately.
- **Reliability Tests:** We assessed internal consistency using Cronbach’s alpha. All constructs exceeded the threshold of 0.70, indicating strong reliability.
- **Convergent Validity:** Average Variance Extracted (AVE) values were calculated, with all constructs exceeding 0.50, demonstrating that a significant portion of the variance in the observed items is attributable to the underlying constructs.
- **Discriminant Validity:** All constructs' Heterotrait-Monotrait ratio (HTMT) was below 0.85, confirming that they are distinct. Additionally, the Fornell-Larcker criterion showed that the square root of the AVE for each construct surpassed inter-construct correlations, further supporting their uniqueness.

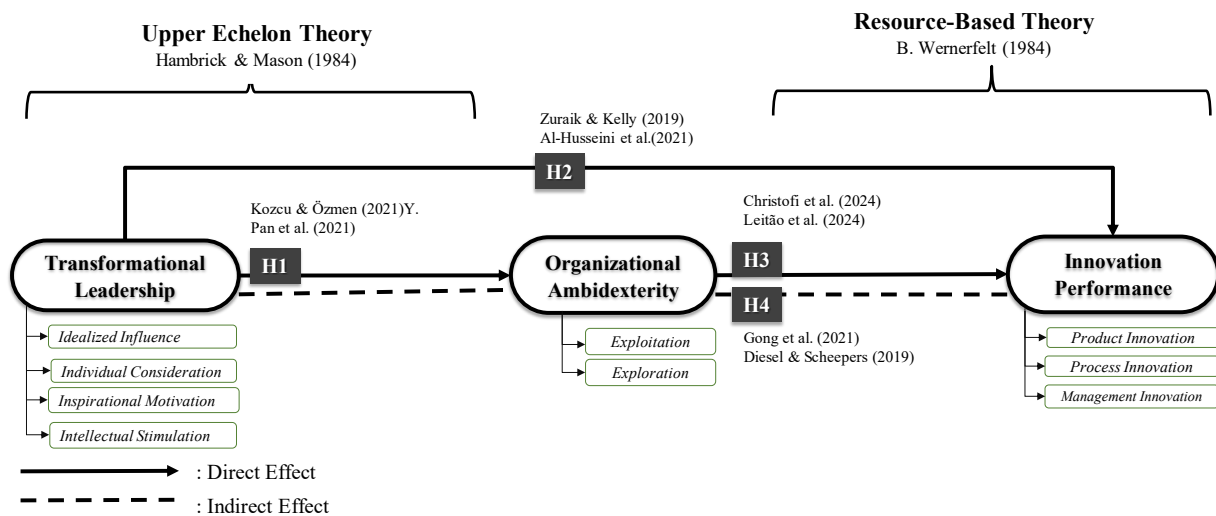


Figure 1 The conceptual framework

4.3 Population and Sample

The population for this study consists of 319 Tier-1 automotive component suppliers listed in the Indonesian Ministry of Industry database (Kemenperin.go.id, 2025). These Tier-1 suppliers are critical players in the automotive supply chain, directly supplying Original Equipment Manufacturers (OEMs). They represent the most technically capable and strategically significant companies in the sector. The focus on Tier-1 suppliers ensures that the research captures insights from organizations that have a substantial impact on supply chain dynamics and innovation practices (Kemenperin.go.id, 2025).

The sample was drawn from top management personnel, including CEOs, Main Directors, Vice Presidents, and Owners. These respondents were selected because they possess comprehensive knowledge of their organization’s

leadership practices, innovation strategies, and operational performance. By targeting decision-makers at the strategic level, the study ensures that the collected data reflects insights into organizational dynamics and the role in fostering innovation (Hanoum, 2021; Hanoum & Islam, 2021; Morales *et al.*, 2012).

The minimum sample size for this study was determined based on guidelines for Partial Least Squares Structural Equation Modeling (PLS-SEM). Sarstedt *et al.* (2014) proposed two criteria for determining the minimum sample size: First, ten times the highest number of formative indicators for a single construct. Second, ten times the maximum number of structural paths are directed at a single latent variable. This study's most complex construct (innovation performance) has four structural paths. According to Sarstedt *et al.* (2014), the second criterion, the

minimum required sample size, is 40 respondents. However, to enhance statistical power, improve precision in data analysis, and account for potential non-response bias, the sample size was increased to 100 respondents. This approach aligns with Hair *et al.* (2020) assertion that larger sample sizes improve model robustness and reliability in PLS-SEM analysis.

A purposive sampling strategy was used to select companies that met specific criteria. First, only mid-sized to large enterprises with 100 or more employees were chosen to ensure adequate resources for advanced business practices. Additionally, companies needed to be operational for at least five years, indicating organizational maturity and allowing for insights into established practices. Finally, only those engaged in research and development (R&D) or innovation initiatives were included, reflecting their commitment to enhancing innovation performance. By focusing on these specific characteristics, the study aims to gather meaningful data from companies that are likely to have valuable insights and experiences to share regarding innovation in their fields.

To ensure the validity and reliability of the data collected, this study implemented strategies to mitigate potential non-response and self-selection biases. Non-response bias was addressed by following up with non-respondents through reminders to encourage survey participation. This approach aimed to improve the response rate and ensure that the sample was representative of the population. An ANOVA test was conducted to compare early and late responses to assess whether non-respondents differed significantly from respondents. The results indicated no significant differences ($p > 0.05$), suggesting minimal non-response bias (Podsakoff *et al.*, 2003). This step ensured that the findings were not skewed due to differences between those who responded promptly and those who required follow-up. Self-selection bias, where respondents may provide socially desirable answers, was mitigated by emphasizing anonymity throughout the survey. Anonymity encouraged participants to provide honest and unbiased responses. Additionally, objective metrics such as innovation key performance indicators (KPIs) were included in the study to reduce reliance on subjective perceptions and ensure more accurate data collection.

Multiple validation techniques were employed to enhance the robustness of the findings. A non-parametric bootstrapping procedure with 5,000 subsamples was conducted to validate path coefficients and mediation effects in Partial Least Squares Structural Equation Modeling (PLS-SEM), assessing statistical significance in PLS-SEM as it does not rely on normality assumptions Hair *et al.* (2020). This technique provided stable confidence intervals for all estimated parameters, ensuring the reliability of the model's results. Subgroup Analysis based on company size and leadership experience confirmed consistent relationships between transformational leadership, organizational ambidexterity, and innovation performance, enhancing generalizability within Indonesia's automotive components industry. This step reinforced the generalizability of the findings within Indonesia's automotive components industry.

To ensure methodological rigor, this study is grounded in well-established guidelines that provide a solid foundation

for examining the intricate relationships between transformational leadership, organizational ambidexterity, and innovation performance. By carefully implementing various bias mitigation strategies, such as randomized sampling and diverse participant selection, the research aims to minimize potential distortions that could compromise the validity of the findings, including response bias and the risk of misinterpreting survey questions. Consequently, the methodological framework adopted in this study enhances the credibility and interpretability of the findings, providing valuable insights into how transformational leadership can drive ambidexterity and innovation within organizations.

4.4 Data Collection

This research targeted top management personnel and practitioners from Indonesia's automotive components industry as respondents. The primary data collection method was a structured survey, with questionnaires serving as the principal tool to measure respondents' perceptions of the indicators relevant to the constructs being studied. The questionnaire was meticulously designed to ensure alignment with the study's objectives and constructs, incorporating indicators derived from established theoretical frameworks, prior literature, and expert opinions to guarantee content validity.

The dissemination of questionnaires was conducted through multiple channels to maximize reach and response rates. Respondents received the questionnaires via email or dedicated questionnaire links. Additionally, the researcher leveraged networks and associations within the automotive components manufacturing industry, such as GIAMM (Automobile and Motorcycle Equipment Industry Association) and PIKKO (Automotive Component Small and Medium Industries Association), to facilitate broader distribution. Collaboration with these associations provided access to a diverse pool of respondents across different companies in the industry, enhancing the credibility and reliability of the data collected.

To further ensure the accuracy and reliability of survey responses, discussions were planned with representatives from the automotive component company leadership. These discussions served as a validation step to corroborate survey findings and gather additional insights from industry experts. By engaging directly with company leaders, the researcher aimed to enrich the data collected and address any ambiguities or discrepancies in the responses. This multi-pronged approach to data collection aligns with established guidelines for survey-based research, ensuring methodological rigor while capturing nuanced perspectives from key stakeholders in Indonesia's automotive components industry.

5. RESULT

5.1 Descriptive Statistics

The demographic analysis of the 100 valid responses collected from senior management in Indonesia's automotive components industry provides significant insights into the characteristics of the sample. Table 1 shows that 87% of respondents were male, while only 13% were female, highlighting the gender imbalance typical of leadership roles in this sector. Furthermore, 73% of respondents had worked in their respective companies for over five years, with 26% having more than ten years of

experience. This suggests that the sample primarily consists of seasoned professionals with extensive industry knowledge.

The distribution of respondents' positions reflects a strong representation of top-tier management, with 14% serving as President Directors, 14% as Vice President Directors, and 72% as Directors. Additionally, 44% of the companies surveyed employed between 101 and 500 individuals, illustrating the dominance of mid-sized enterprises within Indonesia's automotive components sector. This demographic profile aligns with industry norms reported by Kemenperin Website (2025) Tier-1 suppliers play a pivotal role in supporting Original Equipment

Manufacturers (OEMs) through their technical capabilities and scale. The data highlights critical contextual factors affecting transformational leadership practices and innovation outcomes. The dominance of male respondents may introduce gender-related biases in leadership styles and decision-making processes, necessitating caution when generalizing findings to more diverse organizational settings. Furthermore, while the sample size exceeds the minimum threshold required for PLS-SEM analysis (Sarstedt *et al.*, 2014). Future studies could investigate whether differences in leadership age groups or tenure affect the effectiveness of transformational leadership and its influence on organizational ambidexterity.

Table 1 Respondents' demographic characteristics (n = 100)

	Demographic	Frequency	Percentage
Gender	Male	87	87%
	Female	13	13%
Service year in the company	More than 10 years	26	26%
	5 - 10 years	38	38%
	Less than 5 years	36	36%
Position in organization	President Director	14	14%
	Vice President Director	14	14%
	Director	72	72%
Number of employee	More than 5000 employees	5	5%
	1001 - 5000 employees	18	17%
	501 - 1000 employees	21	21%
	101 - 500 employees	44	44%
	Less than 100 employees	12	12%

Table 2 Descriptive statistics and convergent validity test

Dimension	Number of Items	Mean	Standard Deviation	Outer Loading	Cronbach's Alpha	Rho A	Composite Reliability	AVE
Idealized influence	5	5,342	0.743	0.704 - 0.862	0.862	0.866	0.897	0.595
Individualized consideration	4	5,415	0.761	0.782 - 0.879	0.852	0.856	0.9	0.693
Inspirational motivation	3	5,435	0.71	0.754 - 0.902	0.81	0.813	0.897	0.747
Intellectual stimulation	3	5,200	0.914	0.712 - 0.872	0.793	0.793	0.878	0.674
Exploitation	4	5,278	0.779	0.781 - 0.872	0.853	0.853	0.901	0.697
Exploration	3	5,185	0.87	0.843 - 0.923	0.915	0.915	0.948	0.857
Product Innovation	4	4,887	0.87	0.906 - 0.943	0.915	0.918	0.946	0.815
Process Innovation	3	4,990	0.871	0.857 - 0.938	0.884	0.884	0.929	0.816
Management Innovation	3	4,957	0.944	0.821 - 0.866	0.792	0.792	0.878	0.706

Variable	Number of Items	Mean	Standard Deviation	Outer Loading	Cronbach's Alpha	Rho A	Composite Reliability	AVE
Innovation Performance	4	5,356	0.778	0.864 - 0.924	0.937	0.939	0.941	0.842
Organizational Ambidexterity	2	5,201	0.813	0.932 - 0.947	0.925	0.927	0.938	0.883
Transformational Leadership	3	4,944	0.896	0.887 - 0.942	0.947	0.951	0.945	0.811

5.2 Measurement Model Analysis

5.2.1 Descriptive Statistics and Convergent Validity Test

The descriptive statistics reveal that all constructs scored above 4.887 on average across a six-point Likert scale, indicating that transformational leadership, organizational ambidexterity, and innovation performance are well practiced within the sampled companies (Table 2). Among these dimensions, Inspirational Motivation recorded the highest mean (5.435), underscoring its critical role in fostering ambidexterity and driving innovation performance.

The outer model evaluation confirmed indicator validity with outer loadings exceeding 0.70 across all dimensions (Sarstedt *et al.*, 2014). Reliability metrics—including Cronbach's alpha (≥ 0.761), Rho A (≥ 0.792), and composite reliability (≥ 0.860)—surpassed the acceptable threshold of 0.70, demonstrating strong internal consistency (Hair *et al.*, 2020). Convergent validity was established with AVE values ranging from 0.595 to 0.854, exceeding the minimum criterion of $AVE > 0.50$. The use of a forced six-point Likert scale was justified to minimize central tendency

bias and encourage more nuanced responses (Taherdoost, 2020). This approach aligns with exploratory research practices where precision in response distribution is critical for uncovering subtle variations in perceptions of leadership and innovation practices.

5.2.2 Discriminant Validity (HTMT & Fornell Locker)

Discriminant validity was assessed using both HTMT ratios and the Fornell-Larcker criterion, as detailed in Table 3. The HTMT values for all pairs of constructs remained below the critical threshold of 0.90. Notably, the highest HTMT value observed was 0.877, indicating a close relationship between Innovation Performance and Organizational Ambidexterity, as identified by Henseler (2015). The Fornell-Larcker analysis further reinforced that the square root of AVE for each construct not only exceeded its respective correlations with other constructs but also provided a strong indication of the distinctiveness of each measure, validating discriminant validity (Hair *et al.*, 2020).

Table 3 presents a comprehensive view of these results, where the diagonal entries display the square root of AVE for each construct. Values above the diagonal indicate the HTMT ratios, and the values positioned below the diagonal represent the correlations among the various constructs. This systematic analysis supports the conclusion that discriminant validity has been adequately established. We thoroughly evaluated cross-loadings in conjunction with the HTMT ratios to enhance the methodological rigor of our analysis. This dual assessment provides a more comprehensive evaluation of discriminant validity, essential for confirming that our constructs are distinct (see Figure 2 for a visual representation of our findings). By integrating these two methods, we ensure the robustness of the measurement model. This approach also addresses concerns regarding HTMT values close to the accepted threshold. Overall, this multifaceted strategy enables a more nuanced understanding of the relationships between constructs, ultimately enhancing the credibility of our research outcomes.

Table 3 Discriminant validity (HTMT dan Fornell Lacker Criterion)

	Innovation Performance	Organizational Ambidexterity	Transformational Leadership
Innovation Performance	0.918	0.877	0.601
Organizational Ambidexterity	0.817	0.94	0.721
Transformational Leadership	0.566	0.678	0.9

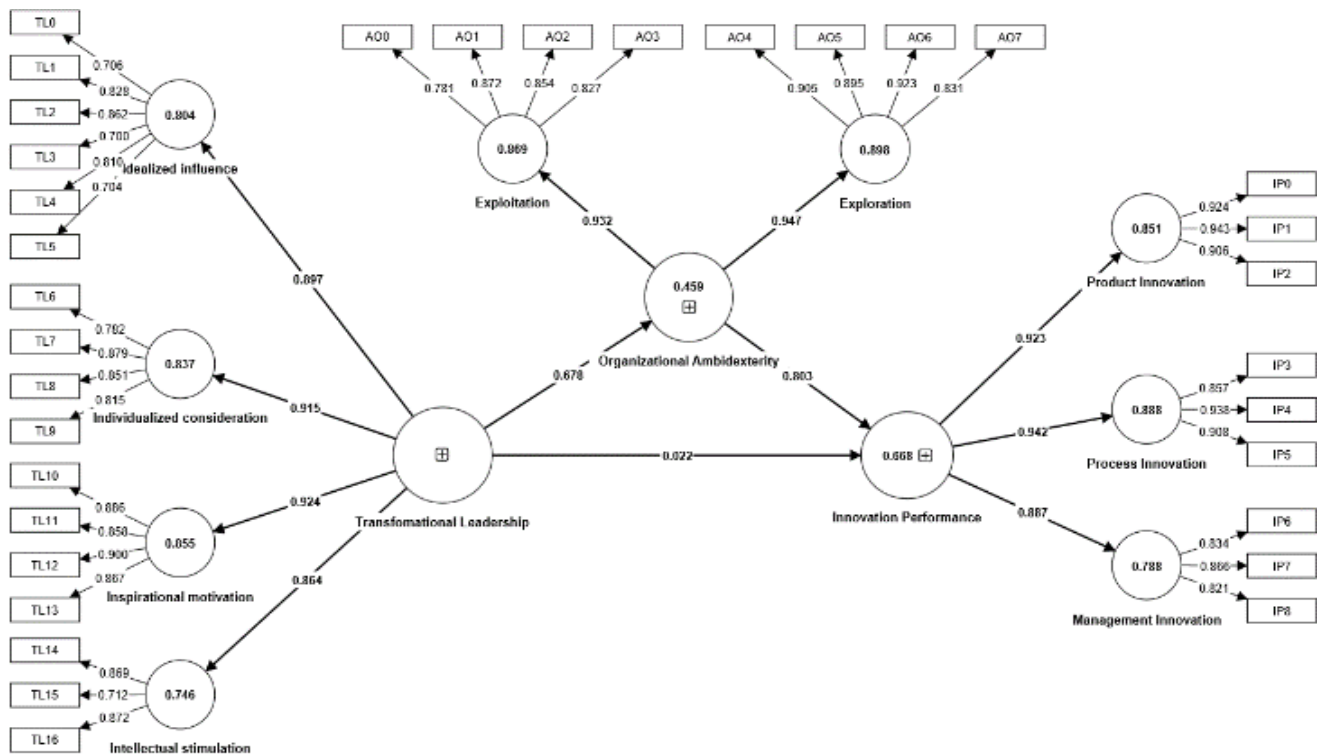


Figure 2 PLS model estimation

5.3 Structural Model Analysis

The structural model analysis yielded significant insights into the hypothesized relationships among the studied variables, as summarized in Table 4.

- **H1:** *Transformational Leadership → Organizational Ambidexterity.* Transformational leadership had a strong and positive influence on organizational ambidexterity ($\beta = 0.678, p < 0.001$), confirming H1. This aligns with prior studies emphasizing leadership’s role in fostering exploration-exploitation balance (Pan *et al.*, 2021). The large effect size ($f^2 = 0.850$) underscores the centrality of leadership in enabling ambidextrous practices.
- **H2:** *Transformational Leadership → Innovation Performance.* Contrary to expectations, transformational leadership did not have a direct effect on innovation performance ($\beta = 0.022, p = 0.783$), leading to the rejection of H2. This contrasts with findings from dynamic sectors like ICT (Al-Husseini *et al.*, 2021) but aligns with Judge & Piccolo’s (2004) meta-analysis, suggesting mature industries rely more on systemic factors than direct leadership effects.

- **H3:** *Organizational Ambidexterity → Innovation Performance.* Organizational ambidexterity strongly predicted innovation performance ($\beta = 0.803, p < 0.001$), supporting H3. The very large effect size ($f^2 = 1.051$) highlights ambidexterity’s pivotal role in driving innovation, particularly through exploration-oriented strategies (Zuraik & Kelly, 2019).
- **H4:** *Mediation Role of Ambidexterity.* Organizational ambidexterity fully mediated the relationship between transformational leadership and innovation performance ($\beta = 0.544, p < 0.001$), confirming H4 as full mediation. This aligns with Lachowicz *et al.*’s (2018) framework, where mediation effect sizes ($f^2 = 0.296$) are classified as substantial. These results emphasize that while transformational leadership does not directly enhance innovation performance in mature industries, such as automotive components manufacturing, it exerts a significant indirect effect through organizational ambidexterity.

Table 4 Structural model analysis.

Hypothesis	Hypothesis Statement	Original Sample (O)	T Statistics ((O/STDEV))	P Values	F Square	R Square	Q ² Predict
H1	Transformational Leadership → Organizational Ambidexterity	0.678	10,786	0	0.85	0.459	0.446
H2	Transformational Leadership → Innovation Performance	0.022	0.275	0.783	0.001		
H3	Organizational Ambidexterity → Innovation Performance	0.803	10,796	0	1,051	0.668	0.304
H4	Transformational Leadership → Organizational Ambidexterity → Innovation Performance	0.544	7,177	0	0.296		

The model demonstrated strong predictive relevance based on multiple fit indices. First, the goodness-of-fit index (GoF) was calculated at 0.687, which is classified as high according to Sarstedt's *et al.* (2019). Second, the standardized root mean square residual (SRMR) value was acceptable at 0.094, meeting the threshold for an acceptable fit model as suggested by Henseler *et al.* (2015). Third, predictive accuracy was validated using PLS Predict analysis, where RMSE and MAE values for both Innovation Performance and Organizational Ambidexterity were lower in the PLS model compared to linear models ($p < 0.05$), in line with Shmueli *et al.*'s guidelines (2019). Additionally, CVPAT results confirmed superior predictive power compared to naive benchmarks such as indicator averages (IA) and conservative linear model forecasts, as demonstrated by Sharma *et al.* (2021). These findings underscore the robustness of PLS-SEM in handling non-normal data within small sample sizes while ensuring reliable predictions.

6. THEORETICAL & MANAGERIAL IMPLICATIONS

6.1 Theoretical Implications

This study makes a significant contribution to strategic management theories, particularly the Upper Echelon and Resource-Based View theories. The findings support the Upper Echelon Theory (Mason, 1984), highlighting how top managers’ attributes influence organizational outcomes.

Transformational leadership, characterized by inspirational motivation and intellectual stimulation, fosters organizational ambidexterity, enabling firms to balance exploration and exploitation strategies effectively (Gumusluoglu & Ilsev, 2009). This synergy between leadership and ambidexterity enriches the theoretical understanding of how leaders drive innovation performance in mature industries, such as the automotive components sector.

The rejection of Hypothesis 2—that transformational leadership has no direct impact on innovation performance—offers a novel perspective. While prior studies have demonstrated direct relationships between leadership and innovation (Al-Husseini *et al.*, 2021; Judge & Piccol, 2004). This study suggests mature industries rely more on systemic factors such as established corporate cultures and supply chain interdependencies. The rejection of Hypothesis 2 may be attributed to the maturity of Tier-1 suppliers' corporate culture, which limits the direct impact of innovation from leadership alone. This suggests that collaborative efforts across organizational hierarchies are key drivers for innovation performance, rather than leadership acting in isolation. This aligns with Darawong (2020), who emphasized the importance of collaborative ecosystems in driving innovation in stable sectors.

To further investigate the nuances of transformational leadership's effect on innovation performance, we conducted subgroup analyses categorized by leadership experience, differentiating between those with 10 years or less

experience and those with more than 10 years. Our analysis demonstrated a positive relationship between transformational leadership and innovation performance in both groups. This consistency across leaders with varying levels of experience underscores the reliability and robustness of our findings, suggesting that transformational leadership can effectively foster innovation regardless of a leader's tenure in their role.

Moreover, this research contributes to the literature on organizational ambidexterity by demonstrating its pivotal role in enhancing innovation performance. Exploration-oriented practices emerged as the most significant factor driving innovation outcomes, supporting theories by March (1993) and Tushman & O'Reilly (2013). These results highlight the importance of striking a balance between exploratory and exploitative strategies to maintain competitive advantages in dynamic markets.

6.2 Managerial Implications

The managerial implications of this study are highly relevant for leaders in Indonesia's automotive components industry and similar emerging markets. First, managers should prioritize fostering organizational ambidexterity to enhance innovation performance. Transformational leadership behaviors, such as inspirational motivation and intellectual stimulation, are critical for encouraging both exploration (e.g., new product development) and exploitation (e.g., process optimization). Training programs focused on developing these leadership attributes can help managers create environments conducive to ambidextrous practices.

Second, while transformational leadership does not directly impact innovation performance, its indirect effect through organizational ambidexterity highlights the need for systems that support both dimensions of ambidexterity. Managers should invest in technologies and processes that facilitate continuous improvement while enabling experimentation with new ideas. For example, adopting Industry 4.0 technologies can enhance operational efficiency while fostering creativity in product development.

Third, collaboration across organizational networks is essential for driving innovation. Managers should leverage partnerships with suppliers, customers, and research institutions to create ecosystems conducive to exploration-oriented innovations. By aligning internal capabilities with external resources, firms can achieve sustainable advantages.

Ultimately, these findings can inform policymakers on how to foster innovation ecosystems in emerging markets by supporting leadership development programs and promoting ambidextrous organizational practices. For instance, offering incentives for research and development and technology adoption can help firms balance exploration and exploitation, driving national innovation performance.

7. CONCLUSION

This study investigated how transformational leadership fosters organizational ambidexterity to enhance innovation performance within Indonesia's automotive components industry. The findings reveal that while transformational leadership significantly boosts organizational ambidexterity (H1), it does not directly impact innovation performance (H2). Instead, organizational ambidexterity mediates this relationship (H4), with

exploration-oriented practices crucial in driving innovative outcomes (H3).

These results highlight the importance of integrating transformational leadership behaviors with systemic ambidextrous practices to achieve superior innovation performance in mature industries. Inspirational motivation emerged as a key factor influencing ambidexterity, emphasizing its role in fostering employee creativity and adaptability. The study contributes theoretically by enriching Upper Echelon Theory and Resource-Based View Theory through empirical evidence from an emerging market context. It also offers practical recommendations for managers seeking to balance exploration and exploitation strategies within their organizations. Future research could explore these dynamics across various industries or cultural contexts to further validate the findings. Longitudinal studies may also provide deeper insights into how leadership and ambidexterity evolve over time to impact innovation performance.

This study offers valuable insights into transformational leadership and organizational ambidexterity in emerging markets; however, several limitations should be acknowledged, which can guide future research directions. First, the sample is limited to Tier-1 suppliers in Indonesia's automotive components industry. Future studies should expand the sample to include other tiers of suppliers and industries beyond automotive components. This expansion will help determine if the observed relationships remain consistent across different sectors, thus providing greater generalizability in various supply chain contexts. Additionally, larger sample sizes would enhance the robustness and statistical power of the findings. Second, the study's cross-sectional design limits our ability to make causal inferences. While we can observe relationships between variables at a single point in time, we cannot determine whether changes in one variable directly cause changes in another. Future research should focus on longitudinal studies to establish causal relationships and understand how transformational leadership and organizational ambidexterity influence innovation performance over the long term. This approach would improve the reliability of the results and provide more comprehensive insights into the relationships examined in this study.

CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest regarding this article's research, authorship, and/or publication.

DATA AVAILABILITY STATEMENTS

Data is available and can be provided upon request.

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