



DOI: <https://doi.org/10.38035/jimt.v7i6>
<https://creativecommons.org/licenses/by/4.0/>

The Role of Supply Chain Integration in Mediating the Effect of IT Ambidexterity on Supply Chain Resilience in Logistics Service Providers in Indonesia

Sekar Widyastuti Pratiwi¹, Apsada Juhri², Siska Amonalisa Silalahi³, Veronica⁴, Wahyu Poncotoyo⁵

¹Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia, sekarwidy10@gmail.com

²Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia

³Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia

⁴Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia

⁵Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia

Corresponding Author: sekarwidy10@gmail.com¹

Abstrak: Ketahanan rantai pasok di sektor logistik membutuhkan pemahaman mendalam tentang bagaimana kapabilitas digital diterjemahkan menjadi ketangguhan operasional. Penelitian ini menguji fungsi mediasi Supply Chain Integration (SCI) dalam hubungan antara IT Ambidexterity (ITA) dan Supply Chain Resilience (SCR) pada penyedia jasa logistik di Indonesia. Berdasarkan data survei dari 91 anggota ASPERINDO Jakarta yang dianalisis menggunakan Partial Least Square Structural Equation Modeling (PLS-SEM), hasil menunjukkan bahwa ITA berpengaruh positif dan signifikan terhadap SCI maupun SCR. Yang lebih penting, SCI terbukti menjadi jalur perantara yang bermakna, melalui mana sifat ketahanan dari kapabilitas IT diteruskan ke mitra rantai pasok. Temuan ini memperkuat pemahaman bahwa keseimbangan digital — antara penyempurnaan aset IT yang ada dan eksplorasi teknologi baru — menciptakan konektivitas antarorganisasi yang memperkuat rantai pasok terhadap gangguan. Implikasi praktisnya bagi perusahaan logistik adalah bahwa investasi IT strategis sebaiknya diarahkan untuk mendorong integrasi, bukan sekadar otomasi operasional.

Kata Kunci: IT Ambidexterity; Integrasi Rantai Pasok; Ketahanan Rantai Pasok; Mediasi; Penyedia Jasa Logistik

Abstract: Achieving supply chain resilience in the logistics sector demands a nuanced understanding of how digital capabilities translate into operational robustness. This study examines the mediating function of Supply Chain Integration (SCI) in the relationship between IT Ambidexterity (ITA) and Supply Chain Resilience (SCR) within Indonesian logistics service providers. Drawing on survey responses from 91 members of ASPERINDO Jakarta and employing Partial Least Square Structural Equation Modeling (PLS-SEM), the findings reveal that ITA exerts a positive and significant influence on both SCI and SCR. More critically, SCI emerges as a meaningful intermediary through which the resilience-enhancing properties of IT capabilities are channeled to supply chain partners. These results advance the understanding

that digital balance — the simultaneous refinement of existing IT assets and pursuit of new technological frontiers - generates the inter-organizational connectivity that fortifies supply chains against disruption. The findings carry practical significance for logistics firms navigating Indonesia's complex regulatory and infrastructure landscape, suggesting that strategic IT investment should be oriented toward enabling integration rather than mere operational automation.

Keywords: IT Ambidexterity, Supply Chain Integration, Supply Chain Resilience, Mediation, Logistics Service Providers

INTRODUCTION

Heightened volatility in the global business environment - stemming from health crises, climate-related events, and shifting geopolitical configurations - has elevated Supply Chain Resilience (SCR) to a strategic priority across industries. Scholars define SCR as an organization's capacity to prepare for, absorb, and rebound from disruptions while maintaining continuity of core operations (Shen & Sun, 2023; Ali, Mahfouz, & Arisha, 2017). Within Indonesia's logistics sector, the pressure to build resilient supply chains has intensified in tandem with the government's push toward trade digitalization, most notably through the implementation of the Indonesian National Single Window (INSW) since 2010 (Hapsari, Suharyono, & Abdillah, 2015). Despite these initiatives, many logistics providers continue to struggle with limited digital maturity and weak inter-organizational coordination, leaving them exposed to market shocks.

A growing body of evidence points to IT Ambidexterity (ITA) — the organizational competence to concurrently exploit mature IT systems for efficiency gains while exploring emergent technologies for adaptive advantage (Heckmann & Maedche, 2018) — as a significant driver of supply chain performance. Recent empirical work by Pratiwi, Atmaja, and Fasya (2025), conducted within Indonesia's express logistics sector, demonstrated that both Supply Chain Orientation and IT Ambidexterity positively influence SCR, with Supply Chain Integration serving as a key mediating mechanism. Building on that foundation, the present study isolates and deepens the analysis of the ITA–SCR relationship, with particular attention to the integrative process through which digital capabilities are converted into resilience outcomes.

Supply Chain Integration (SCI) — encompassing the synchronized exchange of information, aligned operational processes, and collaborative decision-making across supply chain actors (Liu, Tan, Mao, & Gong, 2021) — is widely recognized as a prerequisite for achieving high-performance supply chains in turbulent environments. The logic connecting ITA to resilience through SCI is intuitive: firms with balanced IT capabilities construct more robust digital bridges to their partners, and these bridges accelerate information flow and collective response capacity when disruptions occur. However, empirical investigation of this specific mediated pathway within the Indonesian logistics context remains sparse. This study therefore addresses the question of whether and to what extent SCI mediates the relationship between ITA and SCR among ASPERINDO member logistics providers in Jakarta, contributing both theoretical clarity and sector-specific managerial insights.

METHOD

Logistic Management

Logistics management constitutes the discipline responsible for designing and overseeing the end-to-end movement of goods, encompassing procurement, warehousing, inventory control, transportation, and reverse flows, with the ultimate aim of delivering value to customers at optimal cost and speed (Alacsel, 2024). As the operational backbone of the supply chain,

logistics management determines how efficiently an organization transforms inputs into outputs and delivers them to end consumers (Novelia & Fitriana, 2015). In the context of Indonesian express logistics, effective logistics management is a prerequisite for competitive positioning, particularly as digital transformation reshapes service expectations and operational benchmarks.

Supply Chain Management

Supply chain management (SCM) orchestrates the entire value creation journey, from raw material sourcing through production and onward to final delivery, integrating diverse organizational units and external partners into a coherent system (Tarigan, Florencia, Cahyadi, & Widjaja, 2023). Its complexity arises from the multiplicity of actors, geographic dispersion, and the necessity of coordinating product flows, information streams, and financial transactions simultaneously (Arwin, Aulia, & Uzliawati, 2023). For Indonesian logistics providers operating in a fragmented and rapidly digitalizing market, mastery of SCM principles is foundational to sustaining competitiveness and responding to evolving customer demands.

IT Ambidexterity

IT Ambidexterity (ITA) captures an organization's dual-mode engagement with its technology portfolio: on one hand, deepening and refining existing IT infrastructure to maximize current operational returns (exploitation), and on the other, actively scouting and adopting novel digital solutions to secure future competitive advantage (exploration) (Heckmann & Maedche, 2018). The tension between these two orientations is productive rather than contradictory — firms that successfully manage both create a technology ecosystem that is simultaneously stable and adaptive. In supply chain contexts, this translates into the capacity to maintain reliable digital connections with existing partners while building the technical flexibility to onboard new partners and respond to unexpected shifts. Chang, Wong, Eze, and Lee (2019) further demonstrated that IT ambidexterity, particularly when combined with cloud computing capabilities, creates sustained competitive advantages. Pratiwi et al. (2025) confirmed that ITA exerts a direct positive effect on supply chain integration among Indonesian logistics providers, underscoring its structural importance in enabling coordination across the chain.

Supply Chain Integration

Supply Chain Integration (SCI) denotes the degree to which firms and their supply chain counterparts jointly govern their activities, share timely and accurate information, and co-manage processes toward mutually agreed performance targets (Liu et al., 2021). SCI typically encompasses four distinct dimensions: supplier integration, customer integration, process integration, and information integration. Collectively, these dimensions determine the fluidity of material, information, and financial flows across organizational boundaries. Scholars consistently identify SCI as a strategic lever for navigating environmental uncertainty (Siagian, Tarigan, & Jie, 2021) and for building the long-run competitive position of firms (Huo, Qi, Wang, & Zhao, 2014). Asante-Darko, Saruchera, and Osei (2025) further established that SCI mediates the link between sustainable supply chain practices and firm performance, reinforcing its role as a structural integrator that translates capability investments into measurable outcomes.

Supply Chain Resilience

Supply Chain Resilience (SCR) is defined as a supply chain's capacity to withstand adverse events and restore operational equilibrium, ideally reaching a performance level equal to or superior to its pre-disruption state (Shen & Sun, 2023). Rather than a fixed property, SCR is a dynamic, context-sensitive capability that evolves in response to organizational learning

and environmental change (Ali et al., 2017). It is operationalized across three temporal phases: readiness — the proactive identification and mitigation of potential disruption sources; response — the speed and efficiency of reaction when disruptions materialize; and recovery — the reconstruction and restoration of supply chain functions following the event. In their study of Indonesian logistics providers, Pratiwi et al. (2025) found that both strategic orientation and digital capability significantly contribute to SCR, with integration acting as the critical conduit — a finding this study builds upon by focusing specifically on the IT ambidexterity pathway.

Hypothesis

Drawing on the conceptual foundations above and supported by the empirical evidence from Pratiwi et al. (2025), this study proposes the following hypotheses: H1: IT Ambidexterity exerts a positive direct effect on Supply Chain Resilience. H2: IT Ambidexterity exerts a positive direct effect on Supply Chain Integration. H3: Supply Chain Integration exerts a positive direct effect on Supply Chain Resilience. H4: IT Ambidexterity positively influences Supply Chain Resilience through the mediating role of Supply Chain Integration.

Research Design and Method

A quantitative, cross-sectional design was adopted to test the proposed mediation model. The target population comprised member firms of ASPERINDO (Asosiasi Perusahaan Jasa Pengiriman Ekspres, Pos, dan Logistik Indonesia) operating in Jakarta. Respondent eligibility required direct involvement in logistics operations and active deployment of IT systems in supply chain activities. Sample size was calculated via Slovin's formula, yielding 65 target companies; 91 usable questionnaire responses were ultimately obtained. Data collection employed a structured 5-point Likert scale instrument (1 = Strongly Disagree, 5 = Strongly Agree), with items adapted from validated scales used in prior literature. PLS-SEM was selected as the analytical technique given its suitability for complex mediation models with reflective constructs. The analysis proceeded in two stages: measurement model evaluation (outer loadings, AVE, Fornell-Larcker criterion, cross-loadings, Cronbach's Alpha, and Composite Reliability) followed by structural model assessment (R^2 , f^2 , bootstrapped path coefficients, and indirect effects). This methodological approach mirrors that of Pratiwi et al. (2025), ensuring comparability of constructs and enabling the present study to function as a focused extension of their broader model.

RESULTS AND DISCUSSION

Respondent Characteristics

Tabel 1. Respondent Characteristics

Variable	Classification	Total (%)
Position	Staff	47.25%
	Supervisor / Manager	52.75%
Work Duration	<1 year	14.29%
	1–3 years	24.18%

Sumber: data Riset

Measurement Model Assessment

The measurement model was evaluated along three dimensions: convergent validity, discriminant validity, and reliability. Regarding convergent validity, all indicator outer loadings ranged between 0.884 and 0.933, comfortably exceeding the 0.70 threshold; AVE values were 0.836 (ITA), 0.843 (SCI), and 0.798 (SCR), all surpassing the 0.50 minimum. Discriminant validity was confirmed through both the Fornell-Larcker criterion — where each construct's

square root of AVE exceeded its correlations with other constructs — and cross-loading analysis showing each item loading highest on its designated factor. Reliability coefficients (Cronbach's Alpha and Composite Reliability rho_c) ranged from 0.935 to 0.960, well above the 0.70 benchmark. Collectively, these results affirm that the measurement instrument is both valid and reliable for structural model testing, consistent with standards applied in related work such as Pratiwi et al. (2025).

Tabel 2. Validity, AVE, and Reliability Summary

Construct		Outer Loading Range	AVE	Cronbach's Alpha	CR (rho_c)
IT Ambidexterity		0.888–0.933	0.836	0.935	0.953
Supply Chain Integration	Chain	0.911–0.928	0.843	0.938	0.956
Supply Chain Resilience	Chain	0.884–0.913	0.798	0.949	0.960

Sumber: Output SmartPLS, 2025

Structural Model Assessment and Hypothesis Testing

The structural model demonstrated strong predictive performance. ITA accounted for 82.8% of variance in SCI ($R^2 = 0.828$, adj. = 0.826), while the combined model explained 91.7% of SCR variance ($R^2 = 0.917$, adj. = 0.915). Effect sizes (f^2) revealed that SCI carries a large influence on SCR ($f^2 = 0.458$), while ITA's effects were small-to-moderate on SCI ($f^2 = 0.093$) and SCR ($f^2 = 0.140$), consistent with its role as an upstream capability whose impact is largely channeled through integration. Table 3 presents the full hypothesis test results.

Tabel 3. Hypothesis Test Results

Hyp.	Relationship	β	STDEV	T-Stat	p-value	Decision
H1	IT Ambidexterity → Supply Chain Resilience	0.294	0.101	2.919	0.004	Accepted
H2	IT Ambidexterity → Supply Chain Integration	0.303	0.119	2.538	0.011	Accepted
H3	Supply Chain Integration → Supply Chain Resilience	0.512	0.117	4.387	0.000	Accepted
H4	ITA → SCI → SCR (Indirect / Mediation)	0.155	0.070	2.220	0.013	Accepted

Sumber: Output SmartPLS, 2025

1. H1 confirmed: ITA exerts a meaningful direct effect on SCR ($\beta = 0.294$, $p = 0.004$), affirming that organizations which skillfully navigate the exploitation–exploration tension in their IT portfolios develop inherent adaptive advantages. The ability to keep critical IT systems running reliably while simultaneously scanning for transformative technologies produces a form of organizational readiness that directly bolsters resilience. This finding aligns with Kumar and Singh (2025), who identified supply chain ambidexterity as a central driver of resilience and agility in the digital era, and extends the empirical work of Pratiwi et al. (2025) by isolating the ITA–SCR direct pathway within the ASPERINDO Jakarta context.

2. H2 confirmed: ITA positively and significantly influences SCI ($\beta = 0.303$, $p = 0.011$), indicating that digital balance generates the connective infrastructure through which supply chain actors share data, align processes, and coordinate decisions. Firms that invest in both operational IT optimization and digital innovation build richer, more reliable communication channels with their partners, lowering transaction costs and accelerating joint problem-solving.

This pathway is consistent with Chang et al. (2019), who found that ambidextrous IT use enhances competitive positioning through absorptive capacities that facilitate inter-firm learning.

3. H3 confirmed: SCI is the single most powerful direct predictor of SCR in this model ($\beta = 0.512$, $p < 0.001$, $f^2 = 0.458$). When logistics partners are tightly integrated through shared information systems, synchronized processes, and collaborative governance, the collective chain gains the situational awareness and response coordination necessary to absorb and rebound from disruptions rapidly. Modgil, Gupta, Stekelorum, and Laguir (2022) similarly documented that integrated, digitally-enabled chains possess superior risk sensing and adaptive capacity. The magnitude of the SCI $\rightarrow$ SCR effect in the present study exceeds both ITA's direct effects, reinforcing integration as the primary structural mechanism of resilience.

4. H4 confirmed: The indirect effect of ITA on SCR via SCI is positive and significant ($\beta = 0.155$, $p = 0.013$), establishing SCI as a partial mediator. The partial — rather than full — mediation pattern indicates that ITA influences SCR through two distinct routes: a more direct route tied to inherent organizational agility, and a structural route through the integration architecture that IT capabilities create. This dual-channel dynamic enriches the findings of Pratiwi et al. (2025), who established SCI as a key mediator in a broader model combining SCO and ITA, by demonstrating that the integration channel alone accounts for a significant and distinct portion of ITA's resilience contribution.

CONCLUSION

This study set out to determine whether Supply Chain Integration mediates the relationship between IT Ambidexterity and Supply Chain Resilience in Indonesian logistics service providers, and all four hypotheses were supported. Three conclusions are warranted. First, ITA independently strengthens both SCI ($\beta = 0.303$) and SCR ($\beta = 0.294$), confirming that the capacity to concurrently exploit and explore digital technologies is a genuine source of supply chain resilience. Second, SCI functions as the most potent direct predictor of SCR ($\beta = 0.512$), identifying cross-partner integration as the structural foundation upon which resilience is built. Third, SCI partially mediates the ITA–SCR relationship ($\beta = 0.155$), indicating that the integration pathway amplifies but does not fully account for ITA's resilience-building influence. These findings extend the work of Pratiwi et al. (2025) by disentangling the ITA-specific contribution to SCR and demonstrating that the IT–integration–resilience chain operates as a coherent mechanism even in isolation from other strategic antecedents. For Indonesian logistics providers, the practical guidance is clear: digital investment must be designed not merely to optimize internal processes but to cultivate the inter-organizational connectivity that sustains resilience when disruptions arise. Future research should explore longitudinal dynamics of these relationships and examine boundary conditions such as firm size, technology maturity level, and regulatory environment.

REFERENCES

- Alacsel, S. (2024). Penerapan Sistem Informasi Manajemen pada PT. Prima Indonesia Logistik. *AKADEMIK: Jurnal Mahasiswa Humanis*, 4(1), 122–131. <https://doi.org/10.37481/jmh.v4i1.719>
- Ali, A., Mahfouz, A., & Arisha, A. (2017). Analysing supply chain resilience: integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management*, 22(1), 16–39. <https://doi.org/10.1108/SCM-06-2016-0197>
- Arwin, M., Aulia, D., & Uzliawati, L. (2023). Implementasi Blockchain Dalam Bidang Akuntansi dan Supply Chain Management: Studi Literatur. *Progress: Jurnal Pendidikan, Akuntansi Dan Keuangan*, 6(2), 76–90.
- Asante-Darko, D., Saruchera, F., & Osei, V. (2025). To what extent does supply chain integration mediate the relationship between sustainable supply chain management

- practices and firm performance. Benchmarking. <https://doi.org/10.1108/BIJ-04-2024-0287>
- Chang, Y., Wong, S. F., Eze, U., & Lee, H. (2019). The effect of IT ambidexterity and cloud computing absorptive capacity on competitive advantage. *Industrial Management and Data Systems*, 119(3), 613–638. <https://doi.org/10.1108/IMDS-05-2018-0196>
- Hapsari, K. T., Suharyono, & Abdillah, Y. (2015). Implementasi Sistem Indonesia National Single Window (INSW) sebagai upaya pendorong kelancaran arus barang ekspor dan impor. *Jurnal Administrasi Bisnis (JAB)*, 1(1), 1–10.
- Heckmann, I., & Maedche, A. (2018). IT ambidexterity for business processes: The role of IT explorative and exploitative capabilities. *Business & Information Systems Engineering*, 60(1), 55–67.
- Huo, B., Qi, Y., Wang, Z., & Zhao, X. (2014). The impact of supply chain integration on firm performance: The moderating role of competitive strategy. *Supply Chain Management*, 19(4), 369–384. <https://doi.org/10.1108/SCM-03-2013-0096>
- Kopanaki, E. (2022). Conceptualizing Supply Chain Resilience: The Role of Complex IT Infrastructures. *Systems*, 10(2). <https://doi.org/10.3390/systems10020035>
- Kumar, S., & Singh, V. (2025). Strategic navigation of supply chain ambidexterity for resilience and agility in the digital era: A review. *International Journal of Production Economics*, 281. <https://doi.org/10.1016/j.ijpe.2024.109213>
- Liu, S., Tan, J., Mao, H., & Gong, Y. (2021). Does national culture matter? Understanding the impact of supply chain integration in multiple countries. *Supply Chain Management*, 26(5), 610–628. <https://doi.org/10.1108/SCM-03-2020-0099>
- Modgil, S., Gupta, S., Stekelorum, R., & Laguir, I. (2022). AI technologies and their impact on supply chain resilience during COVID-19. *International Journal of Physical Distribution and Logistics Management*, 52(2), 130–149. <https://doi.org/10.1108/IJPDLM-12-2020-0434>
- Novelia, U., & Fitriana, O. (2015). Manajemen Logistik di Giant Ekstra. *Jurnal Utilitas*, 1(1), 94.
- Pratiwi, S. W., Atmaja, B., & Fasya, A. D. W. (2025). The role of supply chain integration in mediating the effect of supply chain orientation and IT ambidexterity on supply chain resilience in logistics service providers in Indonesia. *Acta Innovations*, 636. <https://www.actainnovations.com/index.php/pub/article/view/636>
- Shen, Z. M., & Sun, Y. (2023). Strengthening supply chain resilience during COVID-19: A case study of JD.com. *Journal of Operations Management*, 69(3), 359–383. <https://doi.org/10.1002/joom.1161>
- Siagian, H., Tarigan, Z. J. H., & Jie, F. (2021). Supply chain integration enables resilience, flexibility, and innovation to improve business performance in COVID-19 era. *Sustainability (Switzerland)*, 13(9), 1–19. <https://doi.org/10.3390/su13094669>
- Silva, M. E., Alves, A. P. F., Dias, P., & Nascimento, L. F. M. (2022). The role of orientation towards sustainability in supply chains: Insights from empirical experiences. *Benchmarking*, 29(1), 305–324. <https://doi.org/10.1108/BIJ-07-2017-0184>
- Tarigan, R. E., Florencia, G., Cahyadi, V., & Widjaja, A. E. (2023). Model Penerapan Supply Chain Management Terhadap Kinerja Dan Daya Saing Perusahaan. *Business Analytics and Artificial Intelligence for Supporting Business Sustainability*, 2023, 106–114.
- Yadav, U. S., & Tripathi, R. (2024). Impact of innovation, entrepreneurial orientation and entrepreneurial leadership on supply chain resilience in handicraft industry: moderating role of supply chain orientation. *Benchmarking*. <https://doi.org/10.1108/BIJ-09-2023-0615>