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Unraveling Supply Chain Ambidexterity: A Synthesis of Theoretical Development and Empirical Insights

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Abstract: Supply chain ambidexterity (SCX), A strategic approach to balance exploration and exploitation within supply chain operations, has emerged as a critical capability in dynamic and competitive business environments. This study presents a systematic literature review (SLR) to synthesize existing theoretical developments and empirical findings on ambidexterity approach in the field supply chain. Drawing from 202 peer-reviewed articles published between 2015 and 2025, this review identifies the key themes, theoretical progressions, key dimensions, and performance implications associated with SCX. The analysis reveals that SCX has evolved from a loosely defined concept to a structured multidimensional construct, commonly measured through capabilities, and strategic orientations. Empirical studies confirm a positive association between SCX and firm performance, particularly in terms of adaptation, innovation, and resilience. However, the review also uncovers trade-offs, such as resource constraints and structural misalignments, which challenge firms attempting to implement SCX effectively. Furthermore, the review reveals variation in how SCX is conceptualized through its key dimensions, and identifies a lack of longitudinal studies examining its development over time. By integrating theoretical and empirical perspectives, this study contributes a comprehensive understanding of SCX and proposes directions for future research, including cross-industry comparative analysis, dynamic capability integration, and context-sensitive SCX frameworks. The findings aim to support both scholars and practitioners in advancing the strategic deployment of SCX.

Keyword: Strategic Supply Chain Management, Supply Chain Ambidexterity, Exploration, Exploitation

INTRODUCTION

In today's highly dynamic and competitive business environment, the ability to achieve both operational efficiency and innovation is paramount. Ambidexterity—the capacity to simultaneously exploit existing capabilities while exploring new opportunities—has emerged as a critical dynamic capability for sustaining competitive advantage [Lee, S. M., & Rha, J. S. (2016)]. As firms face increasingly complex market challenges and disruptions, leveraging ambidexterity within supply chain management becomes essential for resilience and performance.

Supply chain ambidexterity extends the concept of ambidexterity to the realm of supply chain operations. It is commonly described as the ability of a firm to concurrently exploit current competencies and explore novel strategies within its supply chain. This dual approach is vital for optimizing both short-term performance through efficiency and long-term growth via innovation, ultimately enabling firms to adapt to rapidly changing market conditions [Lee, S. M., & Rha, J. S. (2016), Gu, M., Yang, L., & Huo, B. (2021), Partanen, J., Kohtamäki, M., Patel, P. C., & Parida, V. (2020)].

Despite its importance, the literature on supply chain ambidexterity remains fragmented. There is a lack of consensus regarding its definition, scope, and operationalization, with various studies offering inconsistent interpretations [Benzidia, S., Makaoui, N., & Subramanian, N. (2021), Yalcin, M. G., & Ashraf, M. H. (2024)]. Researchers have noted discrepancies in the understanding of how exploitation and exploration interact and the extent to which these capabilities can be integrated within supply chains [C. R., V., Sridharan, R., Gunasekaran, A., & Ram Kumar, P. N. (2020)]. Such inconsistencies create challenges in synthesizing empirical evidence and developing actionable insights for practitioners.

The concept of ambidexterity serves as a foundational framework for understanding supply chain ambidexterity. It then develops into Organizational ambidexterity, which focuses on balancing exploration and exploitation across an entire organization [Priyanka, Jain, M., & Dhir, S. (2022)] and provides a theoretical lens through which supply chain strategies can be examined. By leveraging this broader concept, researchers can better contextualize the unique challenges and strategic imperatives specific to supply chain operations, such as managing inter-organizational relationships and responding to disruptions.

Empirical studies have demonstrated that implementing ambidextrous practices can lead to significant improvements in operational efficiency, innovation, and competitive advantage [Yalcin, M. G., & Ashraf, M. H. (2024), Munir, M. A., Hussain, A., Farooq, M., Rehman, A. U., & Masood, T. (2024)]. In supply chains, a dual strategy enables firms to mitigate risks, enhance resilience, and foster the development of new products and services [Munir, M. A., Hussain, A., Farooq, M., Rehman, A. U., & Masood, T. (2024), Vega, D., Arvidsson, A., & Saïah, F. (2023), Belhadi, A., Kamble, S. S., Venkatesh, M., Chiappetta Jabbour, C. J., & Benkhati, I. (2022)]. This balanced approach not only improves short-term operational performance but also equips companies to thrive in the long run by adapting to evolving market demands [Ambulkar, S., Ralston, P. M., Polyviou, M., & Sanders, N. (2023), Feizabadi, J., Gligor, D. M., Alibakhshi Motlagh, S., & Srivastava, R. (2024)].

Given these challenges and opportunities, a systematic literature review employing the PICOC framework is warranted. This review aims to map the research landscape, clarify varied definitions, delineate key dimensions, and evaluate the impact of supply chain ambidexterity on business performance. By addressing existing research, the study intends to provide a comprehensive understanding that will inform both academic inquiry and practical implementation of ambidexterity in supply chain management.

METHOD

The Initial Stage

The article selection process follows the general PICOC guidelines [Carrera-Rivera, A., Ochoa, W., Larrinaga, F., & Lasa, G. (2022), Taylor, K. S., Mahtani, K. R., & Aronson, J. K. (2021)]. This approach involves systematically breaking down the research questions (RQs) and identifying relevant searchable keywords to ensure a comprehensive and targeted paper. Specifically, this study seeks to address three RQs: How is supply chain ambidexterity defined and operationalized? What are the key dimensions and underlying factors shaping the concept of supply chain ambidexterity? And what is the impact of implementing supply chain ambidexterity on firm performance?.

Table 1. PICOC elements

<i>Elements</i>	<i>Description</i>
P: Population	Studies involving firms across diverse industries that have adopted supply chain ambidexterity practices directly/indirectly.
I: Intervention	Implementation of ambidextrous strategies that combine exploitation (efficiency, cost reduction) and exploration (innovation, new product/service development) within supply chain management.
C: Comparison	Implementation of ambidextrous strategies that combine exploitation (efficiency, cost reduction) and exploration (innovation, new product/service development) within supply chain management.
O: Outcome	Measurable impacts on operational efficiency, innovation, and competitive advantage.
C: Context	Global and industry-specific settings characterized by dynamic market conditions and evolving competitive pressures

The search process conduct in Emerald, Scopus, and ScienceDirect databases based on the keyword combinations outline below:

1. ("supply chain ambidexterity" OR ambidexterity) AND (exploration OR exploitation OR "dual strategy") AND innovation.
2. "Supply Chain Ambidexterity" OR "Ambidextrous Supply Chain" .
3. "Supply Chain Ambidexterity" OR "Ambidextrous Supply Chain " AND "Innovation Readiness" OR "Impact".

Selection of Inclusion Criteria

The selection criteria are based on publications from 2015 to 2025, with articles written in English. The literature must be either journal articles or conference papers in the selected database (Scopus, Emerald, and ScienceDirect). The selected papers must align with the research questions and focus on supply chain ambidexterity (SCX) or ambidexterity-related topics. Additionally, all selected studies must fulfill the PICOC criteria to ensure methodological rigor and relevance. Only accessible articles that will be listed and going into further process. Snowballing method is used to identify additional relevant studies by examining the references (backward snowballing) or citations (forward snowballing) of key papers. This approach helps expand the literature pool systematically and ensures comprehensive coverage of relevant research.

Screening and Selection Process

A total of 524 articles were initially identified. After removing 86 duplicates, 438 articles remained for preliminary screening. Following a relevance assessment, 218 articles were excluded as they did not pertain to ambidexterity or supply chain ambidexterity. Additionally, 18 articles were inaccessible. Consequently, 202 articles were selected for further analysis, comprising 9 proceeding articles and 193 journal articles. The general process of the systematic literature review (SLR) is illustrated in Figure. 1

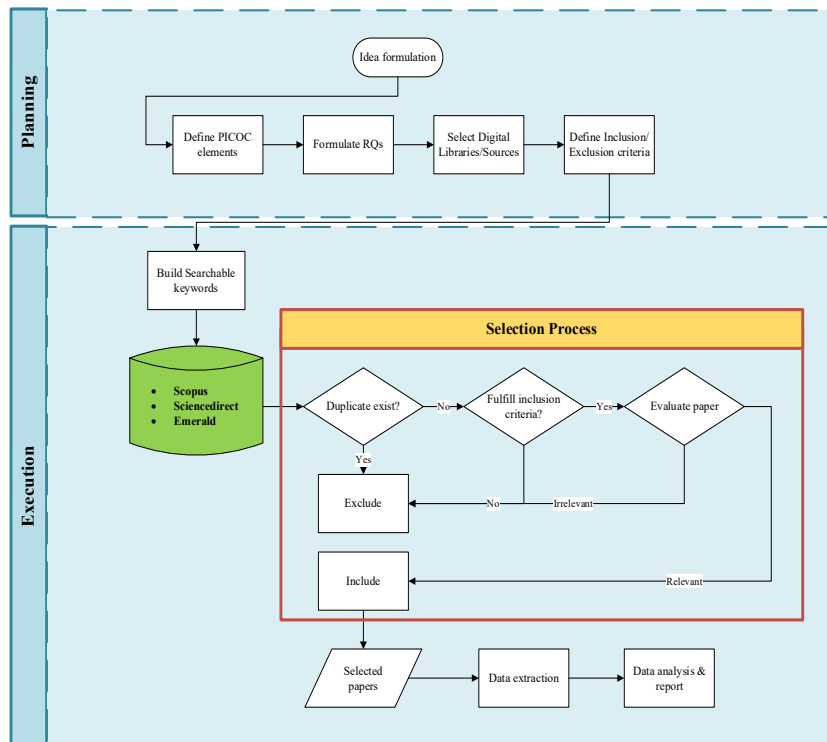


Figure. 1 SLR process

Figure 1 illustrates the general SLR process conducted in this research. Primarily, there are two major phases: the planning phase and the execution phase, each consisting of its own sub-phases. The planning phase focuses on defining the inclusion criteria, ensuring that only relevant studies are considered. Meanwhile, the execution phase involves the screening and selection process, systematically filtering studies until the final set of relevant literature is obtained.

RESULTS AND DISCUSSION

Research Trends

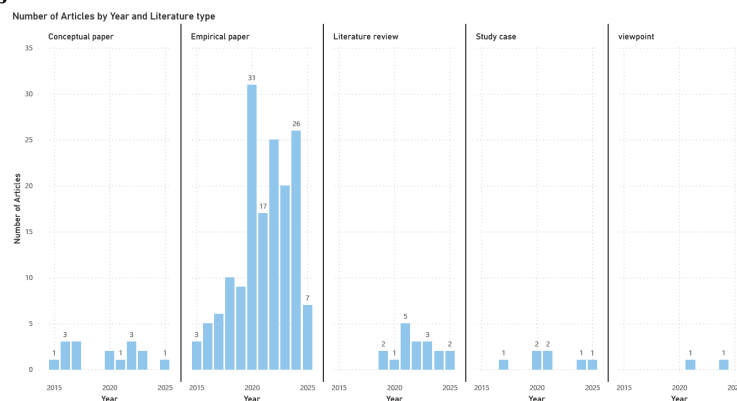


Figure. 2 Article distribution by year and literature type

The bar chart in Figure 2 illustrates the distribution of articles by year and literature type, categorizing publications into Conceptual Papers, Empirical Papers, Literature Reviews, Study Cases, and Viewpoints. Empirical papers are the most prevalent, peaking in 2020 with 31 articles and maintaining a significant presence in subsequent years. In contrast, conceptual papers and literature reviews appear sporadically, with the latter reaching a maximum of five articles in a single year. Study cases and viewpoints remain relatively rare, with only one or two publications per year. A notable decline in publications after 2022 suggests either a shift in

research focus or dataset limitations. These trends indicate a strong preference for empirical research, underscoring an opportunity for further theoretical contributions through conceptual and literature review studies. In this context, conceptual papers discuss theories, frameworks, or models without primary data analysis, while empirical papers involve data collection through surveys, experiments, or case studies. Literature reviews synthesize multiple existing studies, providing a comprehensive overview of a research domain. Finally, viewpoints offer opinions or perspectives without in-depth theoretical or empirical analysis

Table 2. Industry sectors

Sector	Sectoral Studies [Example]
Textile	[Guemes-Castorena, D., & Ruiz, B. (2017)]
SMEs	[Benitez, J., Castillo, A., Llorens, J., & Braojos, J. (2018)]
Pharmaceutical & Healthcare	[Hald, K. S., & Nordio, C. (2021)]
Manufacturing**	[Yan, J., Tsinopoulos, C., & Xiong, Y. (2021)]
Banking and Finance	[Hoang, T.-H., & Le, Q. H. (2024)]
Aerospace & Defense	[Joseph, C., & Wood, D. (2020)]
Agriculture	[Labarthe, P., Coléno, F., Enjalbert, J., Fugeray-Scarbel, A., Hannachi, M., & Lemarié, S. (2021)]
Automotive	[Piccinini, E. (2015)]
Construction & Engineering	[Nigg-Stock, A., Bayrle, N., & Brecht, L. (2023)]
Education	[Cabeza-Pullés, D., Fernández-Pérez, V., & Roldán-Bravo, M. I. (2020)]
Government	[Cao, L., West, B., Ramesh, B., Mohan, K., & Sarkar, S. (2023)]
Hospitality & Tourism	[Pertusa-Ortega, E. M., Tarí, J. J., Pereira-Moliner, J., Molina-Azorín, J. F., & López-Gamero, M. D. (2021)]
Logistic and Transportation	[Park, K. M. (2019)]
Multiple Sectors*	[Li, N., Liu, D., & Boadu, F. (2023)]
Technology***	[Acosta-Prado, J. C. (2019)]

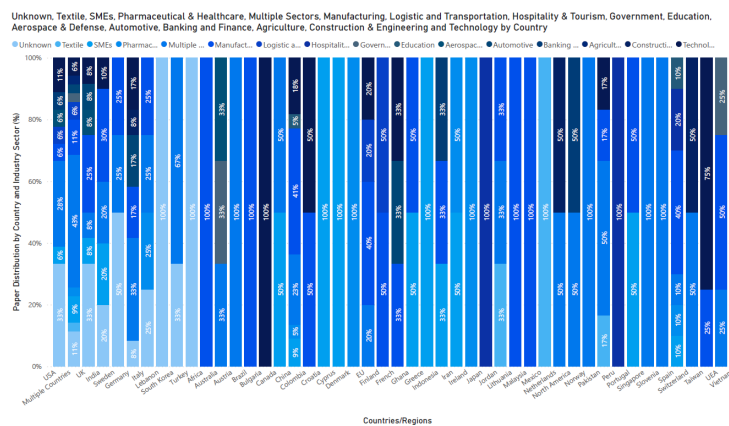


Figure. 3 Article distribution by year and literature type

Figure 4 presents the distribution of research papers by country/region and industry sector, offering insights into the concentration of academic discourse across different geographies. Table 4 represent an example of previous research in various sectors. The research reveals notable sectoral diversity, with Multiple sectors, Manufacturing, and Technology emerging as dominant themes across multiple regions. Countries such as Germany, the USA, and China exhibit a balanced industry representation, while others, including Japan, Peru, and Iran, display a more sector-specific focus. Several regions, notably Europe (EU) and North America, highlight strong sectoral concentrations, suggesting research specialization. Additionally, multi-country studies contribute a significant portion, reflecting the growing trend toward cross-border ambidexterity. Figure 4 underscores the varied research priorities across economies, reflecting both regional industrial strengths and academic focus areas. The findings provide a strategic lens for developing and formulating ambidexterity strategies in the supply chain domain, enabling a deeper understanding of how different sectors and regions approach balance and adaptability in dynamic environments.

SCX - Theoretical Development

Ambidexterity is the strategic capability to simultaneously pursue exploration and exploitation [Benzidia, S., Makaoui, N., & Subramanian, N. (2021)], while effectively managing the tension between contradictory activities [Benitez, J., Castillo, A., Llorens, J., & Braojos, J. (2018)]. The main objective of ambidexterity is to achieve a sustainable competitive advantage in a dynamic environment by developing and utilizing current competencies and experiences [Fourné, S. P. L., Rosenbusch, N., Heyden, M. L. M., & Jansen, J. J. P. (2019)]. Exploration involves searching for new ideas, technologies, paradigms, and knowledge through experimentation, risk-taking, flexibility, and radical innovation to drive adaptation and long-term growth [Huang, S., Battisti, M., & Pickernell, D. (2021)]. It also requires distinct structures, strategies, and cultures to foster breakthrough innovations and sustain future-oriented competitive advantages [Pertusa-Ortega, E. M., Tarí, J. J., Pereira-Moliner, J., Molina-Azorín, J. F., & López-Gamero, M. D. (2021)]. Through structured learning, variation, and testing, firms can develop new competencies, create alternative solutions, and enhance absorptive capacity while effectively managing uncertainty [Huang, S., Battisti, M., & Pickernell, D. (2021)]. Exploitation enhances efficiency by refining established processes, leveraging existing knowledge, standardizing best practices and optimizing resource utilization to maximize performance [Benitez, J., Castillo, A., Llorens, J., & Braojos, J. (2018)]. It focuses on incremental improvements, risk reduction, and structured learning, ensuring stability while fostering continuous development [Joseph, J., Firmin, S., Oseni, T., & Stranieri, A. (2023)]. By reinforcing organizational routines, improving knowledge application and leveraging established technologies, exploitation contributes to long-term strategic success [Pertusa-Ortega, E. M., Tarí, J. J., Pereira-Moliner, J., Molina-Azorín, J. F., & López-Gamero, M. D. (2021)].

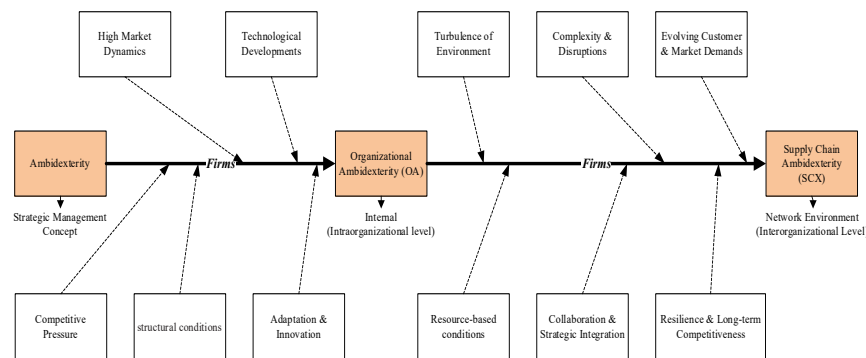


Figure. 4 Theoretical Progression of SCX

The Concept of Ambidexterity (CoA) was initially introduced in strategic management to describe a firm's ability to balance competing objectives effectively [Khan, Z., Amankwah-Amoah, J., Lew, Y. K., Puthusserry, P., & Czinkota, M. (2022)]. This concept evolved into Organizational Ambidexterity (OA), emphasizing how firms integrate exploration and exploitation through distinct structures, processes, leadership role and cultures [Priyanka, Jain, M., & Dhir, S. (2022)]. OA highlights the necessity of managing tensions between radical innovation (exploration) and operational efficiency (exploitation) for long-term sustainability [Sarmiento, M., Simões, C., & Lages, L. F. (2024)]. It employs mechanisms such as structural separation, contextual integration, and leadership-driven coordination to navigate these competing demands [Fourné, S. P. L., Rosenbusch, N., Heyden, M. L. M., & Jansen, J. J. P. (2019)]. The implementation of ambidexterity in organizations is driven by the need to manage internal structural conditions, respond to market dynamics, and leverage technological advancements to foster adaptation and innovation [Hoang, T.-H., & Le, Q. H. (2024)]. As globalization and interdependencies among firms intensify, the focus has shifted from individual organizations to supply chains, leading to the emergence of Supply Chain Ambidexterity (SCX) [Guemes-Castorena, D., & Ruiz, B. (2017)]. This transformation represents a strategic shift from an internal organizational focus to a supply chain ecosystem perspective. Firms recognize that competitive advantage is no longer solely determined by internal capabilities but also by their ability to manage and collaborate effectively with supply chain partners. A turbulent and dynamic environment, resource-based conditions, market pressures, and the growing need for collaboration and strategic integration drive this transition [Li, N. (2023)]. SCX applies exploration and exploitation principles across multiple firms, emphasizing collaboration, agility, and resource-sharing [Lee, S. M., & Rha, J. S. (2016)]. It requires effective inter-organizational relationship management, capability development, and sustainable competitive advantage in increasingly complex supply networks [Yalcin, M. G., & Ashraf, M. H. (2024)].

Achieving supply chain ambidexterity necessitates balancing exploration and exploitation to simultaneously drive innovation and operational efficiency. Firms must develop dynamic capabilities that enhance adaptability, agility, and resilience, enabling them to navigate an increasingly uncertain business landscape [Lee, S. M., & Rha, J. S. (2016)]. Structural alignment is critical for coordinating exploratory and exploitative functions while fostering cross-functional collaboration [Aslam, H., Khan, A. Q., Rashid, K., & Rehman, S. (2020)]. Advanced digital technologies, including AI, blockchain, and big data analytics, enhance visibility, predictive decision-making, and supply chain optimization [Wamba, S. F., & Queiroz, M. M. (2022)]. Establishing strong inter-organizational partnerships facilitates knowledge sharing, joint innovation, and improved risk management across supply networks [Lee, S. M., & Rha, J. S. (2016)]. Ambidextrous leadership is essential, fostering a culture of continuous learning while balancing short-term efficiency with long-term adaptability [Souza-Luz, A. R., & Gavronski, I. (2020)]. Firms must embed contextual ambidexterity into decision-making processes, ensuring flexibility and efficiency in response to market shifts [90]. Supply chain governance should integrate both contractual and relational mechanisms to maintain trust and enforce strategic alignment among partners [Nowacki, C., & Monk, A. (2020)]. SCX also relies on logistics to connect Corporate Environmental Performance (CEP) and Corporate Financial Performance (CFP) by integrating supply chain functions and optimizing resource alignment [Ashraf, M. H., Yalcin, M. G., Zhang, J., & Ozpolat, K. (2022)]. Performance measurement systems should quantify the impact of exploitative efficiencies and exploratory innovations on supply chain performance through rigorously defined and contextually relevant metrics [Rojo, A., Llorens-Montes, J., & Perez-Arostegui, M. N. (2016)]. Ultimately, achieving supply chain ambidexterity requires a holistic strategy that integrates technology, leadership, collaboration, and adaptability to sustain a competitive advantage in an increasingly volatile environment.

Key Dimensions and Metrics of SCX

The key dimensions and metrics of SCX provide a structured approach to evaluating the balance between exploration and exploitation within supply chain operations. These dimensions help organizations measure adaptability, efficiency, and overall performance, ensuring a strategic alignment between innovation and operational stability.

Table 3. Key Dimensions and Metrics of SCX

Key Dimension	Metrics	References
Dynamic Capabilities	Number of successful strategic initiatives launched Market share growth Profitability improvement	[Lee, S. M., & Rha, J. S. (2016)]
Network Capability	Number of collaborations with partners Level of trust in relationships Effectiveness of information sharing	[Partanen, J., Kohtamäki, M., Patel, P. C., & Parida, V. (2020)]
Sustainability Performance	Carbon emissions Water usage Employee satisfaction	[Tseng, M.-L., Bui, T.-D., Lim, M. K., Fujii, M., & Mishra, U. (2022)]
Supply Chain Agility	New product cycle time Flexibility in production volume Ability to fulfill urgent orders	[Kumar, S., & Singh, V. (2025)]
Risk Management	Recovery time from disruptions Level of redundancy in the supply chain Ability to quickly shift sources or routes Number of alternative suppliers and logistics providers Time to restore operations after a disruption Inventory buffer levels	[Ambulkar, S., Ralston, P. M., Polyviou, M., & Sanders, N. (2023)]
Big Data Analytics Capability	Data processing speed Accuracy of predictive analytics Real-time visibility of supply chain performance	[Stekelorum, R., Laguir, I., Lai, K., Gupta, S., & Kumar, A. (2021)]
Exploration Capability	Investment in R&D and innovation projects Adoption of emerging technologies Number of new supplier or market developments	[Tseng, M.-L., Bui, T.-D., Lim, M. K., Fujii, M., & Mishra, U. (2022)]

Exploitation Capability	Cost reduction through process improvements Efficiency gains in logistics and operations Standardization of best practices across supply chain	[Tseng, M.-L., Bui, T.-D., Lim, M. K., Fujii, M., & Mishra, U. (2022)]
Digital Transformation	Adoption rate of AI, blockchain, and IoT in supply chain Percentage of automated decision-making processes Efficiency improvements from digital tools	[Benzidia, S., Makaoui, N., & Subramanian, N. (2021)]
Collaboration and Integration Capability	Level of supplier-buyer integration Frequency of cross-functional teams Degree of data sharing across supply chain partners	[Stekelorum, R., Laguir, I., Lai, K., Gupta, S., & Kumar, A. (2021)]
Financial Performance	Return on investment (ROI) from ambidextrous initiatives Revenue growth attributed to supply chain innovation Cost savings from efficiency-driven projects	[Ambulkar, S., Ralston, P. M., Polyviou, M., & Sanders, N. (2023)]

Dynamic capabilities serve as the foundation for SCX, enabling firms to sense market shifts, seize opportunities, and reconfigure resources efficiently. Supply chain agility enhances responsiveness and flexibility, yet without robust risk management, it may expose firms to operational vulnerabilities. Exploration drives innovation and long-term competitiveness, while exploitation ensures process efficiency and resource optimization, necessitating a dynamic balance for sustained performance. Effective collaboration across supply chain stakeholders fosters knowledge sharing and capability development, reinforcing both agility and resilience. Risk management mitigates disruptions, aligning with sustainability goals by integrating environmental and social considerations into decision-making. Sustainability benefits from a synergy between exploration-driven innovation and exploitation-based operational efficiency. Ultimately, these interdependent factors create a resilient, adaptive, and competitive supply chain ecosystem capable of navigating complexity and uncertainty.

SCX and Firm Performance: An Empirical Perspective

Balancing exploitation and exploration activities is essential in supply chain networks for several reasons. It enables firms to achieve long-term success by enhancing operational efficiency while fostering innovation and adaptability [Cao, R. Q., Elking, I., & Gu, V. C. (2023)]. Exploitation improves short-term profitability by optimizing existing resources and streamlining supply chain processes, whereas exploration drives long-term competitiveness by identifying new opportunities and responding to market shifts [Feizabadi, J., Gligor, D. M., Alibakhshi Motlagh, S., & Srivastava, R. (2024)]. An imbalance between these two dimensions can lead to organizational traps, where excessive exploitation results in rigidity and stagnation, while excessive exploration leads to inefficiencies and failure to capitalize on innovations [Syed, T. A. (2020)]. Firms that effectively integrate both approaches can enhance supply chain flexibility, sustain competitive advantage, and manage risks in dynamic business environments.

Furthermore, SCX ensures that firms remain agile and resilient, allowing them to optimize current operations while continuously evolving to meet future challenges

SCX enhances firm performance by synchronizing the benefits of exploration and exploitation, enabling companies to achieve sustainable competitive advantage [Chen, C.-T., Chen, S.-C., Khan, A., Lim, M. K., & Tseng, M.-L. (2024)]. Firms with strong SCX capabilities can effectively respond to dynamic market changes, leading to improvements in cost efficiency, product quality, delivery speed, and operational flexibility [Cheah, S. C., & Tan, C. L. (2024)]. SCX also supports Green Supply Chain Management (GSCM) by ensuring smooth adaptation to evolving environmental and regulatory requirements [Kumar, S., & Singh, V. (2025)]. Empirical studies confirm that SCX contributes to superior business performance by fostering innovation, increasing market share, and enhancing profitability [Lee, S. M., & Rha, J. S. (2016)]. Moreover, SCX strengthens supply chain resilience by mitigating the impact of disruptions through effective risk management and the rapid reconfiguration of supply chain networks [Kumar, S., & Singh, V. (2025)]. To maintain optimal performance, firms must integrate SCX as a dynamic capability that balances short-term efficiency with long-term adaptability. Ultimately, SCX serves as a key driver of business sustainability, allowing firms to navigate uncertainty, build robust supply chain networks, and sustain competitive advantage in a rapidly evolving global market.

Challenges and Trade-offs in Achieving Ambidexterity

Balancing efficiency and innovation presents a significant challenge for firms striving to achieve ambidexterity. One of the primary difficulties lies in resource conflicts, as both exploitation (efficiency) and exploration (innovation) compete for limited financial, human, and technological resources [Pertusa-Ortega, E. M., Tarí, J. J., Pereira-Moliner, J., Molina-Azorín, J. F., & López-Gamero, M. D. (2021)]. While exploitation focuses on optimizing existing processes and reducing costs, exploration requires investments in experimentation and new market development, making it difficult to effectively allocate resources between these competing demands. Additionally, structural and cultural misalignment complicates the integration of both strategies because exploitation thrives in stable, efficiency-driven environments, whereas exploration requires flexibility, risk-taking, and tolerance for failure [Brix, J. (2020)]. Managing this duality often leads to leadership struggles because different managerial styles are needed to oversee efficiency-driven and innovation-driven initiatives [Brix, J. (2020)]. Furthermore, firms must navigate cultural resistance because employees accustomed to process optimization and standardized routines may resist the uncertainty and disruption associated with innovation [Brix, J. (2020)].

Firms must carefully manage trade-offs between short-term performance and long-term adaptability to achieve an ambidextrous organization or supply chain. One approach is structural ambidexterity, where separate units handle exploitation and exploration independently, allowing each to develop its own competencies while potentially creating coordination challenges [Gärtner, Q., Dorth, A., & Reinhart, G. (2022)]. Alternatively, contextual ambidexterity requires employees to balance both activities within the same unit, demanding strong leadership and a supportive work environment to integrate exploration and exploitation effectively [Gärtner, Q., Dorth, A., & Reinhart, G. (2022)]. Another strategy, temporal ambidexterity, involves firms alternating between exploration and exploitation over time. While this approach may delay the benefits of innovation, it enables a more focused allocation of resources and reduces organizational strain [Gärtner, Q., Dorth, A., & Reinhart, G. (2022)].

Despite these strategies, several potential risks remain. Resource conflicts can intensify as departments compete for funding and talent, creating inefficiencies if not managed properly [Pertusa-Ortega, E. M., Tarí, J. J., Pereira-Moliner, J., Molina-Azorín, J. F., & López-Gamero, M. D. (2021)]. Leadership struggles may emerge when decision-makers prioritize one approach

over another, leading to an imbalance that hinders long-term sustainability [Brix, J. (2020)]. Cultural resistance can slow innovation efforts if employees are not encouraged to embrace both efficiency and creativity. Lastly, firms face the risk of falling into competency traps, where excessive focus on exploitation leads to rigidity and an inability to adapt, or failure traps, where excessive exploration results in underdeveloped ideas that fail to generate value [Syed, T. A. (2020)]. Successfully balancing these elements requires firms to cultivate a strategic mindset that integrates efficiency and innovation while remaining agile in response to market changes [Ojha, D., Acharya, C., & Cooper, D. (2018)].

Overcoming the challenges and trade-offs associated with achieving ambidexterity requires a strategic and multifaceted approach. Building dynamic capabilities is essential because firms must develop the ability to sense, seize, and reconfigure resources in response to changing market conditions [Lee, S. M., & Rha, J. S. (2016)]. Leaders play a crucial role in this process by fostering social intelligence, which enhances creativity through exploration activities while mitigating cultural resistance to change. Additionally, supportive organizational processes, such as knowledge-sharing platforms, recognition programs, and cross-functional collaboration, help employees embrace both efficiency and innovation. Firms must also cultivate a paradoxical mindset among senior managers to enable them to navigate contradictions and make balanced decisions between short-term operational efficiency and long-term strategic adaptability [Ojha, D., Acharya, C., & Cooper, D. (2018)].

Additionally, organizations should encourage experimentation and agility, challenge rigid business practices, and integrate innovative methodologies. Establishing a culture that supports both risk-taking and structured efficiency is equally important, ensuring that employees feel empowered to explore new ideas while maintaining operational discipline. Firms must develop strong coordination mechanisms that align different units and departments, prevent silos, and ensure that exploration and exploitation efforts contribute to shared strategic goals [Constant, F., Calvi, R., & Johnsen, T. E. (2020)]. Effective leadership is critical in managing these tensions because leaders must strategically allocate resources to optimize both existing capabilities and emerging opportunities. By addressing these challenges through structured strategies, firms can successfully achieve ambidexterity, enhancing their long-term resilience, competitiveness, and overall performance

CONCLUSION

Supply chain ambidexterity (SCX) is a critical capability that enables firms to balance exploration (innovation and opportunity-seeking) and exploitation (efficiency and resource optimization) to achieve long-term sustainable performance. However, implementing ambidexterity presents inherent challenges, including resource trade-offs, structural complexities, and leadership tensions. Firms must navigate these challenges by leveraging different forms of ambidexterity (structural, contextual, and temporal) and aligning them with their organizational strategy. Furthermore, technological advancements such as Industry 4.0, Big Data Analytics (BDA), and artificial intelligence (AI) serve as key enablers, facilitating firms in managing complex information flows and enhancing both exploratory and exploitative activities. Successful ambidexterity requires organizations to view exploration and exploitation as adaptive outcomes rather than isolated activities, ensuring strategic alignment with evolving market conditions.

Achieving ambidexterity requires adaptive leadership that effectively balances short-term efficiency with long-term innovation. Leaders must foster an organizational culture that encourages experimentation and risk-taking while maintaining a strong foundation of operational excellence. Additionally, resource allocation must be optimized, ensuring that both exploration and exploitation receive adequate investment to support business sustainability. The integration of SCX into supply chain management (SCM) requires managers to implement innovative techniques to respond to market fluctuations while maintaining operational

efficiency. Managing tensions between exploration and exploitation is crucial because failure to do so may lead to competency traps—where excessive exploitation hinders adaptation—or failure traps, where continuous exploration prevents tangible performance gains. Furthermore, firms must consider different dimensions of ambidexterity, such as structural, sequential, and contextual approaches, to reduce tensions and enhance organizational agility. Implementing integration mechanisms, such as cross-functional collaboration and strategic purchasing involvement, ensures that exploration and exploitation are effectively synchronized within decision-making processes. Additionally, firms should adopt knowledge-driven strategies that facilitate the co-development of exploratory and exploitative knowledge to accelerate innovation and market responsiveness.

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