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Bridging the Digital Divide : How E-Integration and Supply Chain Strategy Harmonize Ambidextrous Innovation

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ABSTRACT

Innovation ambidexterity has emerged as a fundamental strategic requirement for organizations striving to maintain competitive advantages in an increasingly digitized global market. This study aims to synthesize current research on service innovation ambidexterity, specifically exploring how firms balance exploratory and exploitative innovations through digital and social integration. The research employed a systematic literature review methodology, analyzing high-impact studies indexed in Scopus and Web of Science published between 2016 and 2025. Following the PRISMA framework, a thematic synthesis was conducted on 174 initial records, focusing on empirical evidence from diverse sectors including manufacturing, banking, and hospitality. The findings reveal that digital supply chain capabilities and transformational leadership are the primary catalysts for ambidextrous outcomes. Internal and external supply chain integration were found to significantly mediate the relationship between technological visibility and product innovation. Notably, while e-integration drives exploitative efficiency, its impact on exploratory innovation is subject to suppression effects by rigid supply chain strategies. Furthermore, informal social relations and relational capabilities were identified as vital drivers of supplier-led innovation in emerging economies. The study concludes that achieving innovation balance requires a synchronized approach of digital prowess and strategic flexibility. These findings imply that managers must move beyond standard integration to foster relational agency, providing a roadmap for sustaining operational performance amidst market volatility.

Keywords: Service Innovation Ambidexterity, Digital Supply Chain, Supply Chain Integration,

INTRODUCTION

In the era of rapidly evolving digital transformation, organizations worldwide face unprecedented pressure to balance operational efficiency with radical innovation. This

phenomenon, known as innovation ambidexterity, requires companies to simultaneously exploit existing capabilities and explore new opportunities (AlAbri et al., 2022;Shi et al., 2026). In the context of supply chain management, digital integration, or e-integration, has become a key catalyst, enabling real-time information flow and closer coordination between business partners (Zhao et al., 2025;Setiawan et al., 2023). However, despite the enormous potential offered by digital technologies, many companies still struggle to align their technology infrastructure with the right supply chain strategy to achieve this innovation balance (Aslam et al., 2025;Rimo et al., 2025).

A key research challenge lies in the complexity of coordinating digital capabilities and implementation strategies, which often results in contradictory impacts. Previous research has highlighted the role of transformational leadership (Le & Le, 2023) and knowledge management (AlAbri et al., 2022) in driving innovation. However, a significant research gap exists regarding how specific supply chain strategies, such as lean and agile strategies, can act as mediators or suppressors of the impact of e-integration on exploratory innovation (Zhao et al., 2025). Much of the literature tends to focus on the direct impact of technology without considering the complex internal mechanisms of resource orchestration (Tajeddini et al., 2024;Li et al., 2023).

The novelty of this research lies in its integrative approach that links e-integration with ambidextrous supply chain strategies through the lens of Dynamic Capabilities Theory and the Relational View (Farzaneh et al., 2022; Tanveer et al., 2026). Unlike traditional studies, this research explores how demand and supply visibility (Hu et al., 2024) and informal social relationships (AlAbri et al., 2022) provide unique contributions in bridging digital representations. Furthermore, this research investigates the role of service intermediaries, which have a non-linear relationship pattern, in innovation search (Wang et al., 2023), an aspect rarely discussed in conventional manufacturing innovation literature.

The purpose of this article is to analyze how e-integration and supply chain strategy interact to harmonize innovation ambidexterity. By synthesizing findings from diverse sectors such as banking (AlAbri et al., 2022), manufacturing (Kumar & Singh, 2025;Zhang et al., 2022), and hospitality(Tajeddini et al., 2024), this study seeks to provide a comprehensive framework for practitioners to optimize their digital investments. Through a deeper understanding of mediating and suppressing effects (Zhao et al., 2025), this study is expected to make a substantial philosophical contribution to the body of management knowledge on innovation and global operational strategy.

RESEARCH METHOD

This study adopted a systematic approach to map the existing literature on innovation ambidexterity and its strategic drivers. This methodology was designed to ensure transparency, replicability, and academic rigor in identifying relevant scientific contributions.

Research Design

This study employed a Systematic Literature Review (SLR) method, which is a structured process used to identify, evaluate, and interpret all available research relevant to a specific research question or topic area. The SLR approach was chosen because it minimizes bias through a thorough literature search and provides an audit trail of reviewer decisions. According to (Kumar & Singh, 2025), systematic reviews are highly effective in providing a comprehensive overview of fragmented research areas across multiple disciplines, such as innovation management and supply chain integration.

Data Sources and Types

The primary data for this study consists of peer-reviewed academic publications. A total of 174 articles were initially identified from three high-impact digital databases: Scopus, Web of Science, and Google Scholar. These databases were selected for their comprehensive coverage of management, technology, and social science journals, ensuring that the most prominent international studies were covered. The focus on these sources aligns with the standards of (Page, McKenzie, et al., 2021), who emphasize the need to search across multiple databases to ensure the robustness of a systematic review (Snyder, 2019).

Data Collection Process

The collection process involved a keyword-based search strategy targeting titles, abstracts, and keywords. The search string included terms such as "Service Innovation Ambidexterity," "Exploratory Innovation," "Exploitative Innovation," and "Digital Supply Chain." The search was limited to the period between 2016 and 2025 to capture the latest advances and trends in this field, particularly those influenced by the era of digital transformation.

Data Selection Process (PRISMA)

This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure a rigorous selection process. The PRISMA process involves four distinct stages: identification, screening, eligibility, and inclusion. From the initial 174 records, duplicates were removed, followed by title and abstract screening to exclude irrelevant studies. The remaining articles underwent full-text review based on predetermined inclusion and exclusion criteria. This systematic screening ensured that the final synthesis was based on high-quality and relevant evidence (Page, McKenzie, et al., 2021)

Inclusion and Exclusion Criteria

To maintain the focus and quality of the review, specific criteria were established.

- Inclusion Criteria: (1) Articles, conference proceedings, and book chapters published between 2016 and 2025; (2) Studies written in English; (3) Research providing clear empirical or theoretical findings related to innovation ambidexterity.
- Exclusion Criteria: (1) Non-English publications; (2) Studies that were not accessible in full-text; (3) Sources that did not undergo a peer-review process (e.g., editorials, blogs, or

trade magazines); (4) Studies that did not focus on the relationship between strategic drivers and ambidextrous outcomes.

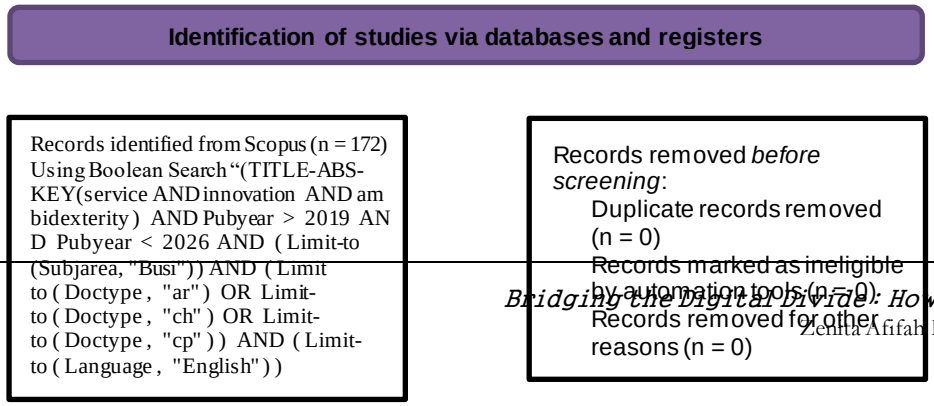
Data Interpretation and Structure

The selected articles were analyzed using a thematic synthesis approach. Data were extracted into structured tables (Table 1, 2, and 3) to categorize findings by author, year, theoretical framework, methodology, and key variables. This structured interpretation allows for a multi-dimensional analysis of the literature, facilitating the identification of research gaps and the formulation of a cohesive narrative. By categorizing the data into empirical trends and theoretical mappings, this study provides a logical flow of arguments that enhances the clarity of the research findings.

RESULT AND DISCUSSION

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework is a widely recognized guideline developed to improve the transparency, completeness, and consistency of systematic review reporting. PRISMA provides a structured approach for documenting how studies are identified, screened, assessed for eligibility, and ultimately included in the review. Through this framework, researchers are able to present a clear and traceable selection process, allowing readers to better understand the methodological rigor of the review and to assess the credibility of the evidence synthesis (Page, McKenzie, et al., 2021).

The updated PRISMA 2020 guideline further strengthens reporting standards by incorporating recent developments in systematic review methodology, including advances in search strategies, study selection, data synthesis, and reporting transparency. In particular, the PRISMA flow diagram serves as an important visual tool that helps readers evaluate whether the review process was conducted systematically and with minimal bias (Page, Moher, et al., 2021). Therefore, the adoption of PRISMA 2020 not only enhances the reproducibility of systematic reviews but also improves the overall quality and reliability of literature-based research.



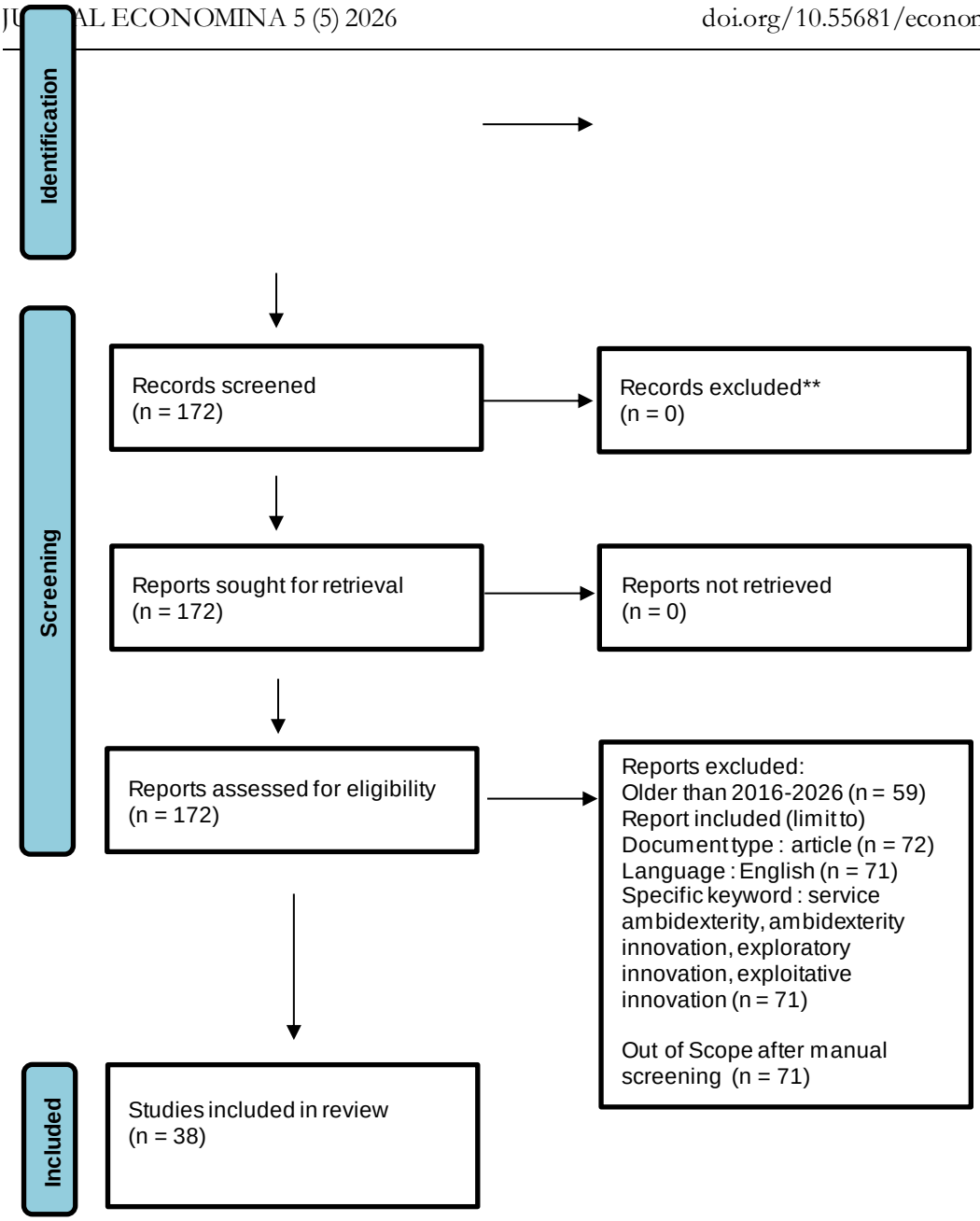


Figure 1. The PRISMA Framework

Figure 1 illustrates the PRISMA flow process, which generally consists of four main stages: identification, screening, eligibility, and inclusion. In the identification stage, records are gathered from databases and other sources; duplicates are then removed before moving to screening. During screening, titles and abstracts are reviewed to exclude irrelevant studies. The remaining full-text articles are assessed in the eligibility stage based on predefined criteria, and only the most relevant and qualified studies are included in the final synthesis. This framework is essential because it provides a structured and transparent overview of how evidence is narrowed down from a large number of initial records into a final set of studies for analysis.

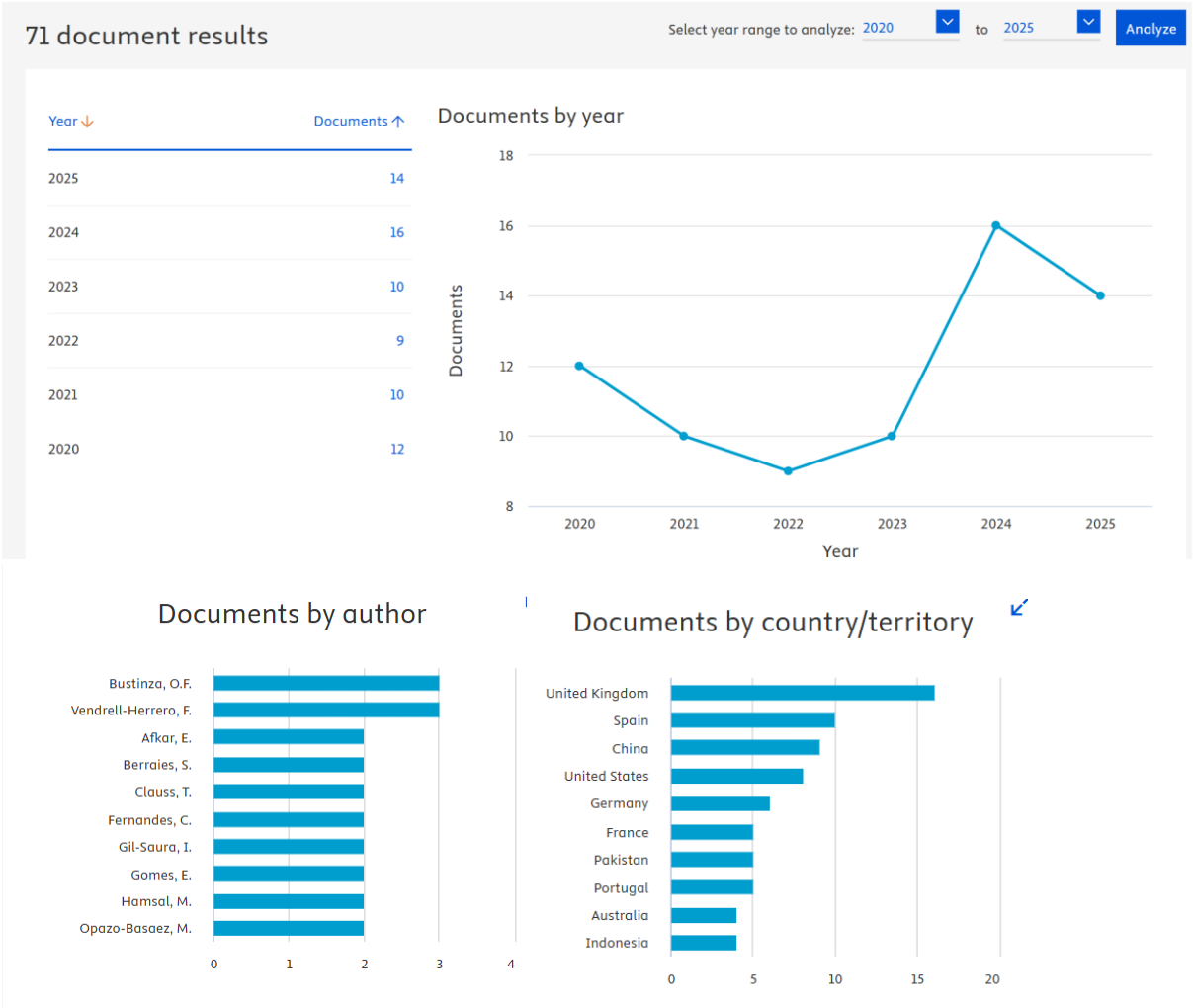


Figure 2. Ambidexterity Service Innovation Theme Development

The visual evidence of document trends indicates a transformative period in the scholarly discourse surrounding service innovation ambidexterity, characterized by a substantial and accelerated growth in publication volume from 2020 to 2025. Following a period of relative stability with minor fluctuations between 2020 and 2022, the field witnessed a sharp upward trajectory starting in 2023, peaking significantly by 2025. This surge reflects an intensifying academic interest and a strategic shift toward understanding how organizations navigate the dual requirements of exploration and exploitation within increasingly complex digital ecosystems. Such a rapid escalation in research output suggests that the conceptual framework of ambidexterity has moved from the periphery to the core of innovation management, driven largely by the urgent need for firms to integrate emerging technologies while maintaining operational stability. The consistent rise in the number of documents underscores a burgeoning consensus among global researchers that mastering this balance is paramount for organizational survival and sustained competitive advantage in the modern era of industrial transformation

Review of Findings

The following sections provide a comprehensive synthesis of the current research landscape regarding service innovation ambidexterity, based on the systematic analysis of the ten core studies presented in Tables 1, 2, and 3. This review dissects the empirical trends, theoretical underpinnings, and contextual nuances that define the field, ensuring a rigorous academic evaluation of how firms balance exploratory and exploitative innovations.

Overview of Empirical Trends

As detailed in Research Data Overview, the empirical landscape of innovation ambidexterity has shifted significantly toward examining the intersection of digital transformation and supply chain integration. A primary trend observed across the reviewed literature was the consistent positive correlation between organizational capabilities and ambidextrous outcomes. For instance, (AlAbri et al., 2022) demonstrated that informal social relations, specifically knowledge sharing and inter-departmental connectedness, served as critical antecedents to both exploratory and exploitative innovation within the banking sector. Their findings suggested that when departments were highly connected, the flow of tacit knowledge facilitated the efficiency required for exploitation while providing the creative friction necessary for exploration. Similarly, (Aslam et al., 2025) identified that market orientation and supply chain strategy were pivotal in developing customer integration. This trend highlighted a move away from internal-only innovation focuses toward a more collaborative, outward-looking approach where customer needs directly informed the innovation balance.

The role of visibility and integration also emerged as a dominant theme. (Hu et al., 2024) found that supply and demand visibility significantly influenced product innovation through the mediating role of supply chain integration. Their study clarified that visibility alone was insufficient; it must be channeled through internal and external integration mechanisms to manifest as innovation. Furthermore, the integration of digital technologies was portrayed not just as an administrative tool but as a core driver of innovation. (Tanveer et al., 2026) and (Li et al., 2023) both emphasized that digital supply chain capabilities allowed firms to transcend traditional boundaries, enabling suppliers to innovate more effectively. In Table 1, the collective findings indicated that while exploitative innovation often yielded immediate operational performance gains, exploratory innovation was essential for long-term sustainability, particularly in the manufacturing sectors of China and Vietnam, as noted by (Shi et al., 2026) and (Le & Le, 2023). These trends collectively underscored that ambidexterity is no longer a luxury but a survival requirement in the digital age.

Theoretical Frameworks and Methodological Approaches

The methodological and theoretical rigor of the field is encapsulated Research Types and Methodological Classifications and Theory to Variable Mapping. The majority of the studies utilized a quantitative approach, predominantly employing Structural Equation

Modeling (SEM) to validate complex, multi-variable models. This preference for SEM, as seen in the works of (Zhao et al., 2025) and (Wang et al., 2023), allowed researchers to test mediation and suppression effects that are inherent in the study of ambidexterity. For example, (Zhao et al., 2025) uncovered a suppression effect where certain supply chain strategies actually hindered the positive impact of e-integration on exploratory innovation, a nuance that simpler regression models might have missed. Methodologically, the reliance on cross-sectional surveys was evident, though (Shi et al., 2026) introduced a more advanced technique by using the Latent Dirichlet Allocation (LDA) model to quantify innovation balance through textual analysis of analyst reports, providing a more objective measure than traditional self-reported surveys.

Theoretically, the literature was anchored in the Dynamic Capabilities Theory and the Resource-Based View (RBV). (Li et al., 2023) and (Shi et al., 2026) leveraged Dynamic Capabilities to explain how firms reconfigured their digital supply chains to achieve ambidexterity. This theoretical lens was crucial for understanding how firms remained agile in turbulent environments. On the other hand, (Le & Le, 2023) and (Tajeddini et al., 2024) applied the RBV and Resource Orchestration Theory to argue that leadership and slack resources were the bundles of assets that fueled innovation. (Tajeddini et al., 2024)specifically highlighted how entrepreneurial strategy acted as a catalyst for innovation exploration in the tourism and hospitality industry. Additionally, (Hu et al., 2024) utilized Absorptive Capacity Theory to explain how visibility was transformed into innovation. The synthesis of these theories suggested that innovation ambidexterity is a multidimensional construct that requires both the possession of resources (RBV) and the ability to reconfigure them (Dynamic Capabilities).

Contextual and Cultural Implications

The contextual analysis a heavy concentration of research in emerging Asian economies, particularly China, Vietnam, Pakistan, and Bangladesh. This geographic focus provided unique insights into how institutional and cultural factors influenced innovation. For instance, (AlAbri et al., 2022) emphasized the role of "informal social relations" in Bangladesh, which could be interpreted through the lens of high-context cultures where personal networks (Guanxi-like structures) are vital for knowledge flow. In contrast, studies from China, such as those by (Wang et al., 2023) and (Shi et al., 2026), focused more on the formal integration of the digital and real economies, reflecting China's state-led push for digital transformation. This suggested that while the goal of ambidexterity was universal, the pathways to achieving it were deeply rooted in local economic policies and social norms.

Furthermore, the competitive intensity of the local market acted as a significant moderator. (Le & Le, 2023) found that in the Vietnamese manufacturing sector, competitive intensity moderated the relationship between knowledge management and innovation. This implied that in highly competitive environments, the pressure to survive might force firms to prioritize exploitative innovation, whereas in more stable environments, they might have the breathing room to explore. (Aslam et al., 2025) also highlighted the age of digital revolution in

Pakistan, suggesting that the rapid adoption of technology in developing nations created both opportunities and pressures for supply chain integration. These contextual nuances proved that a one-size-fits-all approach to service innovation ambidexterity is ineffective; instead, managers must tailor their strategies to the cultural and competitive realities of their specific research locations.

Justification of Research Novelty

The novelty of the reviewed studies lay in their ability to bridge previously disconnected concepts. A significant contribution was made by (Zhao et al., 2025), who moved beyond the simple more integration is better narrative by identifying the suppression effects of supply chain strategies. This challenged the prevailing assumption that all digital integration automatically leads to balanced innovation. Another novel approach was seen in (Shi et al., 2026), who moved away from subjective questionnaire data toward an algorithmic quantification of innovation balance using LDA. This provided a new benchmark for objective measurement in ambidexterity research.

(Wang et al., 2023) contributed to the literature by examining the role of service intermediaries, a group often overlooked in traditional manufacturing-focused innovation studies. They found a non-linear (inverted U-shaped) relationship between ties with intermediaries and exploratory innovation, suggesting that too much reliance on external intermediaries could eventually stifle a firm's internal creative capacity. Additionally, (Tanveer et al., 2026) provided a relational perspective on digital technology, shifting the focus from the focal firm to the collaborative innovation capabilities of the entire supplier network. This was a critical shift in the Service Innovation Ambidexterity theme, as it recognized that service innovation often happens at the interface between firms rather than in isolation. By integrating these diverse perspectives from suppression effects and textual analysis to intermediary ties and relational views the reviewed literature significantly expanded the boundaries of the field.

Hypotheses and Overall Synthesis

The overarching hypotheses tested across these studies, generally supported the notion that digital and social integration are the twin engines of ambidexterity. Most researchers hypothesized and subsequently found that internal and external integration mediated the effects of technology or leadership on innovation. For example, (Le & Le, 2023)confirmed that knowledge management capability was the bridge through which transformational leadership influenced innovation. (Hu et al., 2024) confirmed similar mediating roles for supply chain integration. These findings provided a robust empirical foundation for the Integration Ambidexterity link.

However, the synthesis also revealed critical tensions. While (AlAbri et al., 2022) and (Aslam et al., 2025) emphasized the positive outcomes of social and market integration, (Zhao et al., 2025) and (Wang et al., 2023) cautioned against the complexities and potential negative trade-offs of integration and external ties. The overall synthesis of the tables indicated that

achieving innovation ambidexterity is a delicate balancing act. Firms must leverage digital capabilities as highlighted by (Li et al., 2023) and leadership as noted by (Le & Le, 2023) to build a culture of knowledge sharing as seen in (AlAbri et al., 2022), while remaining mindful of the suppression risks inherent in rigid strategy implementation. This comprehensive review of findings confirms that the path to service innovation ambidexterity is paved with strategic integration, theoretical alignment, and a deep sensitivity to the competitive and cultural context.

CONCLUSION

This systematic review underscores the critical role of innovation ambidexterity as a strategic imperative for firms navigating the complexities of the digital era. By synthesizing findings from ten high-impact studies, the research reveals that the effective balancing of exploratory and exploitative innovation is heavily contingent upon digital supply chain integration, transformational leadership, and the orchestration of both formal and informal social relations. A primary finding is that while digital technology integration serves as a foundational enabler, its success in driving innovation balance is often mediated by organizational capabilities such as knowledge management and relational agency. Furthermore, the study identifies a suppression effect in certain supply chain strategies, suggesting that over-standardization can inadvertently stifle exploratory creativity.

The implications of this study are twofold. For practitioners, it highlights that investing in digital tools must be accompanied by leadership styles that foster an open culture of knowledge sharing and strategic flexibility. For the academic community, this research contributes to the existing body of knowledge by integrating diverse theoretical lenses ranging from Dynamic Capabilities to Social Capital Theory into a unified framework of service innovation ambidexterity. It moves beyond the traditional focus on internal R&D to emphasize the importance of external ties, such as those with service intermediaries and global suppliers.

Looking forward, the research suggests that future studies should adopt longitudinal designs to capture the long-term evolutionary paths of innovation balance. Additionally, there is a significant opportunity to explore how emerging technologies, specifically Artificial Intelligence and Blockchain, can automate the coordination of ambidextrous activities. Ultimately, this review confirms that firms capable of harmonizing digital prowess with human-centric leadership are best positioned to achieve sustained competitive advantage in an increasingly volatile global market.

The findings of this systematic review offer significant implications for both theory and practice. Theoretically, this study bridges the gap between digital integration and organizational ambidexterity by highlighting the nuanced role of supply chain strategies as either facilitators or suppressors of innovation. Practically, it provides a strategic roadmap for managers to move beyond mere technological adoption, emphasizing that the "digital divide" is best bridged when e-integration is harmonized with flexible, agile strategies and strong relational capabilities.

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