



Innovation Ambidexterity in SMEs: A Critical Literature Review and Multilevel Framework

Hardi Emrie Rosly^{1*}, Irwan Ibrahim², Hardy Loh Rahim³

¹Faculty of Business and Management, Universiti Teknologi MARA, Campus Selangor, 42300 Puncak Alam, hardi@uitm.edu.my

²Faculty of Business and Management, Universiti Teknologi MARA, Campus Selangor, 42300 Puncak Alam, irwan623@uitm.edu.my

³Faculty of Business and Management, Universiti Teknologi MARA, Campus Selangor, 42300 Puncak Alam, hardy@uitm.edu.my

*Corresponding Author

Abstract:

Innovation ambidexterity—the ability to balance exploration and exploitation—has emerged as a strategic imperative for small and medium-sized enterprises (SMEs), particularly in dynamic and resource-constrained environments. While much of the literature has focused on large firms in developed economies, research on SMEs, and especially those in ASEAN contexts, remains fragmented. This paper provides a critical literature review of studies published between 2020 and 2025, synthesizing evidence on the determinants of SME ambidexterity. Eight core determinants are identified: knowledge management, entrepreneurial orientation, formalization, market orientation, networking, technological capability, organizational context, and environmental dynamism. Drawing on recent empirical and conceptual studies, the review highlights that ambidexterity emerges not from isolated factors but from their interdependencies across multiple levels. Building on these insights, the paper proposes a multilevel framework integrating individual, organizational, and environmental determinants. The review further identifies methodological gaps (e.g., reliance on cross-sectional designs), contextual gaps (ASEAN underrepresentation), and thematic gaps (limited integration of digitalization and sustainability). The findings contribute to theory by advancing a holistic understanding of ambidexterity and to practice by offering guidance for SME managers navigating digital transformation, sustainability imperatives, and volatile markets.

ARTICLE INFORMATION

Received: 10 Sept 2025
Revised: 18 Sept 2025
Accepted: 13 Oct 2025
Published: 10 Nov 2025

Keywords: *Innovation ambidexterity; small and medium-sized enterprises (SMEs); ASEAN; knowledge management; entrepreneurial orientation; digital transformation; sustainability; multilevel framework*

INTRODUCTION

Small and medium-sized enterprises (SMEs) are widely recognized as the backbone of global and regional economies. In ASEAN, they account for the vast majority of enterprises and employ most of the labor force, while contributing a substantial share of national GDP in each member country. In Malaysia, SMEs contribute roughly two-fifths of GDP and employ a majority of the workforce. Similar patterns are observed in Indonesia, Thailand, Vietnam, and the Philippines, where SMEs play a central role in driving growth, job creation, and innovation. Their importance has become even more apparent in periods of economic volatility, where SMEs have demonstrated both their vulnerability and their capacity for resilience.

Despite their significance, SMEs often face structural challenges that limit their competitiveness. These include restricted access to finance, managerial skill shortages, limited adoption of technology, and heightened exposure to market turbulence. Unlike large firms that can buffer shocks through economies of scale, SMEs must

constantly adapt with fewer resources. This reality makes innovation not a matter of choice but a matter of survival. Innovation enables SMEs to differentiate their offerings, improve efficiency, and respond rapidly to evolving consumer and market demands.

However, innovation in SMEs is not a straightforward process. It involves balancing two contrasting yet interdependent dimensions: exploration and exploitation. Exploration refers to experimentation, risk-taking, and the pursuit of new knowledge, technologies, or markets. Exploitation focuses on refining and improving existing capabilities, processes, and products to ensure operational efficiency and incremental progress (March, 1991). Managing both simultaneously—termed innovation ambidexterity—is vital for sustainable growth. Overemphasis on exploration may exhaust scarce resources, while overreliance on exploitation risks stagnation and obsolescence.

Originally developed in the study of large firms, the concept of ambidexterity has increasing relevance for SMEs. For large organizations, structural solutions such as creating dedicated R&D divisions allow separation of exploratory and exploitative functions. For SMEs, with their leaner structures and resource constraints, ambidexterity must often be embedded within day-to-day operations and entrepreneurial leadership. Contextual ambidexterity, where employees balance innovation choices within a single unit, and leadership-driven ambidexterity, where owner-managers shape the strategic orientation, are often more feasible than structural separation.

Recent studies highlight the value of ambidexterity in enhancing SME adaptability, competitiveness, and resilience. Firms that manage to pursue both exploration and exploitation simultaneously are better equipped to navigate volatile markets, diversify income streams, and align short-term efficiency with long-term agility (Raisch & Birkinshaw, 2008; Teece, 2014). With the acceleration of digital transformation and the growing importance of sustainability, ambidexterity has become even more critical. Digital technologies such as cloud computing, artificial intelligence, and data analytics enable SMEs to experiment with new business models while optimizing current operations. At the same time, the rise of environmental, social, and governance (ESG) standards pressures SMEs to innovate in ways that combine profitability with social and environmental responsibility.

Yet the existing literature remains fragmented. Many studies on innovation ambidexterity focus on large corporations or developed economies, with limited attention to SMEs in emerging markets, particularly within ASEAN. Furthermore, research often treats determinants of ambidexterity—such as knowledge management, entrepreneurial orientation, or networking—in isolation, rather than analyzing how they interact in practice. Cross-sectional research designs dominate, providing only snapshots rather than dynamic accounts of how ambidexterity evolves across the SME lifecycle. These gaps restrict both theoretical advancement and practical application.

This paper addresses these shortcomings by providing a critical literature review of SME innovation ambidexterity. Drawing on recent research published between 2020 and 2025, it identifies eight key determinants: knowledge management, entrepreneurial orientation, formalization, market orientation, networking, technological capability, organizational context, and environmental dynamism. Beyond cataloguing these determinants, the paper critically examines their interdependencies and limitations. It argues that ambidexterity should not be seen as a static condition but as a dynamic capability shaped by multiple levels of influence.

To capture this complexity, the paper proposes a multilevel framework that integrates determinants across individual, organizational, and environmental levels. At the individual level, leadership vision and risk orientation drive ambidextrous strategies. At the organizational level, knowledge systems, culture, and digital capabilities enable firms to operationalize ambidexterity. At the environmental level, institutional support and market dynamism create pressures and opportunities that shape SME strategies. This integrative approach moves beyond fragmented accounts and provides a holistic view of how SMEs achieve ambidexterity.

The contributions of this paper are threefold. First, it synthesizes and organizes recent scholarship on SME ambidexterity into a coherent review, with specific attention to ASEAN contexts where SMEs face unique challenges and opportunities. Second, it identifies critical research gaps, particularly the lack of longitudinal studies, limited integration of digital and sustainability perspectives, and insufficient exploration of sectoral and regional heterogeneity. Third, it advances a conceptual framework that can guide both future research and managerial practice.

THEORETICAL FOUNDATIONS

The concept of innovation ambidexterity is underpinned by several major theoretical traditions in management and organizational studies. These perspectives not only provide the intellectual roots of the concept but also shape how it is applied and interpreted in different organizational contexts. In the case of small and medium-sized enterprises (SMEs), these theories require adaptation, given the unique resource constraints, governance models, and institutional conditions in which they operate. This section reviews three dominant perspectives—organizational learning theory, the resource-based view (RBV), and dynamic capabilities theory—along with specific approaches to ambidexterity that have emerged from these traditions.

Organizational Learning Theory

The earliest and perhaps most influential foundation of innovation ambidexterity lies in organizational learning theory. March (1991) distinguished between two modes of organizational learning: exploration and exploitation. Exploration involves experimentation, discovery, and risk-taking, whereas exploitation emphasizes refinement, efficiency, and reliability. Both are necessary for organizational survival, but they are in tension: resources devoted to exploration reduce those available for exploitation, and vice versa.

Large firms have often been studied in this context, with researchers examining how corporations manage to balance both forms of learning. For SMEs, however, the dilemma is particularly acute because of their limited resources and smaller margins for error. Unlike large organizations that can afford to establish separate research and development (R&D) units, SMEs often integrate exploration and exploitation within the same teams or even the same individuals. In many ASEAN SMEs, the owner-manager may simultaneously spearhead product experimentation (exploration) while ensuring operational efficiency in day-to-day business (exploitation).

Organizational learning theory highlights the need for SMEs to find mechanisms that allow for the simultaneous pursuit of both activities, often through informal learning, flexible structures, and tacit knowledge sharing. However, critics argue that the theory does not adequately capture the external constraints and institutional pressures faced by SMEs, particularly in emerging markets.

The Resource-Based View (RBV)

The resource-based view of the firm (RBV) emphasizes the strategic importance of unique, valuable, and difficult-to-imitate resources and capabilities in achieving sustained competitive advantage (Barney, 1991). From an RBV perspective, ambidexterity arises when firms leverage internal resources to simultaneously engage in exploration and exploitation.

For SMEs, internal resources include not only tangible assets but also intangible elements such as knowledge, skills, culture, and entrepreneurial orientation. SMEs often rely on relational resources such as trust-based networks with suppliers and customers, which provide access to new ideas (exploration) while reinforcing efficiency and reliability in existing operations (exploitation). In ASEAN contexts, where institutional support systems may be uneven, SMEs frequently depend on such informal networks as substitutes for formal structures.

The RBV, however, has been critiqued for its static orientation. It tends to assume that resources are relatively stable and overlooks how firms adapt and reconfigure capabilities in dynamic environments. This limitation has given rise to the dynamic capabilities perspective, which explicitly addresses change and adaptability.

Dynamic Capabilities Theory

The dynamic capabilities framework builds on the RBV but emphasizes the capacity of firms to integrate, build, and reconfigure resources in response to environmental turbulence (Teece, Pisano, & Shuen, 1997). Dynamic capabilities are higher-order processes that allow firms to sense opportunities and threats, seize them, and transform their resource base accordingly.

Ambidexterity is frequently interpreted as a manifestation of dynamic capabilities. The ability to balance exploration and exploitation requires firms not only to possess valuable resources but also to adapt them continuously. For SMEs, this adaptive capacity is critical. ASEAN SMEs often operate in volatile environments characterized by regulatory uncertainty, technological disruption, and shifting consumer preferences. Dynamic capabilities such as agile decision-making, flexible resource allocation, and rapid experimentation enable SMEs to reconfigure their strategies in line with environmental demands.

Nevertheless, building dynamic capabilities is resource-intensive, and many SMEs struggle to develop such sophisticated processes. As a result, SME ambidexterity may rely more heavily on entrepreneurial leadership and external partnerships than on internal reconfiguration alone.

Types of Organizational Ambidexterity

Beyond these foundational theories, research has identified specific models of ambidexterity:

- **Structural Ambidexterity** – Involves separating exploration and exploitation into distinct organizational units or divisions (Tushman & O'Reilly, 1996). While feasible in large firms, structural ambidexterity is often impractical for SMEs due to resource limitations.
- **Contextual Ambidexterity** – Refers to empowering individuals within the same unit to decide whether to pursue exploration or exploitation based on situational demands (Gibson & Birkinshaw, 2004). This approach is highly relevant to SMEs with flat hierarchies, flexible cultures, and informal communication structures.

- **Leadership-Driven Ambidexterity** – Emphasizes the role of top managers, particularly owner-managers in SMEs, in cultivating a culture that supports both exploration and exploitation (O'Reilly & Tushman, 2013). Leadership vision, adaptability, and risk tolerance often determine whether ambidexterity is possible in smaller firms.

Each type reflects different pathways for balancing innovation, with contextual and leadership-driven ambidexterity proving most applicable to SMEs.

Critical Perspective

While these theories and models provide useful insights, applying them to SMEs requires caution. First, most were developed with large, resource-rich organizations in mind. SMEs, particularly in ASEAN, operate under very different conditions where informality, flexibility, and personal leadership play a greater role. Second, the theories often emphasize internal processes, overlooking the significance of institutional environments, cultural norms, and policy frameworks in shaping SME strategies. For instance, government initiatives promoting digital adoption or green innovation create external pressures that directly influence how SMEs pursue ambidexterity.

Moreover, theoretical debates often assume that ambidexterity is universally beneficial. Recent evidence suggests otherwise: in highly resource-constrained SMEs, focusing narrowly on either exploration or exploitation may sometimes yield better results than attempting both simultaneously. Thus, theory must account for contextual contingencies, particularly in environments where SMEs lack the slack resources required for balancing dual innovation paths.

DETERMINANTS OF INNOVATION AMBIDEXTERITY IN SMES

Innovation ambidexterity in SMEs does not emerge spontaneously; it is shaped by a constellation of internal and external factors. Recent literature (2020–2025) points consistently to eight core determinants that influence whether and how SMEs balance exploration and exploitation: knowledge management, entrepreneurial orientation, formalization, market orientation, networking, technological capability, organizational context, and environmental dynamism. Each determinant is reviewed below, highlighting empirical evidence, relevance to SMEs, and critical limitations.

Knowledge Management Capability

Knowledge is central to innovation, and the ability to manage it effectively determines whether SMEs can integrate exploration with exploitation. Knowledge management capability refers to the processes through which firms acquire, share, store, and apply knowledge (Zhou & Li, 2010). Exploration benefits from the absorption of new knowledge through external scanning and experimentation, while exploitation depends on refining and reusing existing knowledge assets.

Meta-analytical evidence shows that KMC directly contributes to innovation outcomes. Chakma and Dhir (2024) found that SMEs with strong KM routines display higher ambidextrous capacity. Empirical studies reinforce this: Jia et al. (2023) demonstrated that knowledge sharing in Chinese SMEs was influenced by social and gender norms, highlighting the cultural dimensions of KM effectiveness. In ASEAN contexts, Padeli et al. (2023) reported that Malaysian SMEs' KM practices are often embedded in informal networks, reflecting both opportunity and risk for sustaining ambidexterity.

Digital tools also enhance KM capacity. Sima et al. (2025) developed a recommender system to improve SME KM processes, showing technology-enabled KM boosts both exploration and exploitation. Similarly, Kucharska and Erickson (2019) found that IT competency strengthens KM processes, which in turn enhance ambidextrous innovation.

However, KM challenges persist in SMEs. Many rely on tacit knowledge stored in individuals, making them vulnerable to turnover. Digital adoption remains uneven across ASEAN, limiting systematic KM. Thus, while KMC is a critical determinant, its impact depends on digital maturity and cultural alignment.

Entrepreneurial Orientation

Entrepreneurial orientation (EO) describes a firm's strategic posture toward innovation, risk-taking, and proactiveness. For SMEs, EO is often shaped directly by the vision and personality of the owner-manager. High EO encourages experimentation (exploration) while also pushing firms to exploit opportunities aggressively once identified.

Quantitative evidence supports EO as a robust driver of ambidexterity. Chakrabarti et al. (2025), in a meta-analysis of 42 studies, confirmed a strong positive correlation between EO and ambidexterity across diverse contexts. Fernandes and Ferreira (2025) showed that EO interacts with market orientation to enhance ambidexterity in SMEs, suggesting that EO is most effective when balanced with customer insights.

Regional studies provide additional nuance. Afkar and Hamsal (2024) found in Indonesian SMEs that EO combined with dynamic capabilities supports both radical and incremental innovation. Bedi et al. (2023) emphasized that EO outcomes are moderated by organizational context, where supportive cultures amplify its impact.

However, excessive EO can destabilize SMEs. Li et al. (2023) identified a U-shaped effect: while moderate EO fosters ambidexterity, overly aggressive risk-taking undermines operational stability. For ASEAN SMEs, regulatory uncertainty and resource scarcity may intensify these risks. Thus, EO must be balanced with structural and contextual supports to sustain ambidexterity.

Formalization

Formalization refers to the extent to which roles, rules, and procedures are clearly defined. For SMEs, which are often characterized by informality and flexibility, formalization may seem counterintuitive. However, moderate levels of formalization can support ambidexterity by creating consistency in exploitative processes while freeing cognitive space for exploration.

High-performance work systems (HPWS) illustrate this balance. Patel and Messersmith (2011; updated discussion in 2025) found that HR practices combining clear processes with employee involvement enhanced ambidexterity in SMEs. Similarly, formalized KM processes, as shown by Jarmooka and Fulford (2020), improved SMEs' resilience under environmental turbulence.

In ASEAN SMEs, formalization is often partial, reflecting cultural norms of informality and trust-based governance. While this flexibility aids rapid exploration, it may hinder consistent exploitation. The

challenge is not whether to formalize but how to calibrate formalization to support creativity without constraining agility.

Market Orientation

Market orientation (MO) describes a firm's commitment to understanding and responding to customer needs, competitor strategies, and market trends. SMEs with strong MO align exploratory efforts with emerging consumer demands and refine exploitative practices to maintain relevance.

Empirical evidence confirms this role. Fernandes and Ferreira (2025) found that MO combined with EO amplifies ambidextrous outcomes. Their study showed SMEs that pair entrepreneurial initiative with market responsiveness achieve superior innovation performance.

In ASEAN, SMEs increasingly use digital tools to maintain MO. Social media platforms provide real-time customer feedback loops, which guide both incremental improvements (exploitation) and new product development (exploration). However, overreliance on MO may anchor firms to current consumer preferences, limiting disruptive innovation. As such, SMEs must balance MO with visionary exploration to avoid incrementalism.

Networking

SMEs rarely innovate in isolation. Networking, encompassing relationships with suppliers, customers, competitors, industry associations, and research institutions, expands SMEs' access to external resources and knowledge. Networks act as conduits for exploration by exposing SMEs to new technologies and ideas, and as enablers of exploitation by facilitating reliable partnerships and supply chains.

Empirical evidence highlights its significance. Padelis et al. (2023) showed that networking among Malaysian SMEs facilitated both KM and innovation capacity. Bruneel et al. (2012) emphasized the role of incubator networks in legitimizing and resourcing SMEs, enhancing their ambidextrous potential.

Yet networks are double-edged. Overembeddedness in local networks can lock SMEs into established routines, limiting exploration. Conversely, overly diverse networks may overwhelm SMEs' absorptive capacity. As shown in the KM literature, the effectiveness of networking depends on SMEs' ability to absorb and utilize external knowledge (Jia et al., 2023).

For ASEAN SMEs, where institutional support systems are sometimes weaker, networks are not just enablers but survival mechanisms. They substitute for missing formal infrastructures, amplifying their strategic importance for ambidexterity.

Technological Capability

In the digital era, technological capability has become one of the most decisive determinants of ambidexterity. It refers to a firm's ability to adopt, integrate, and adapt digital tools and infrastructure. Technology supports exploration by enabling experimentation with novel platforms and products, and exploitation by streamlining operations and reducing costs.

Recent studies emphasize the rise of digital ambidexterity. Hashem et al. (2025) showed that digital supply chain adoption requires firms to innovate (exploration) while maintaining efficiency (exploitation). Chen et al. (2024) found that big data analytics and AI have direct impacts on ambidexterity, enabling SMEs to identify opportunities while optimizing processes. Similarly, Farzana and Nadarajah (2020) demonstrated that a firm's digitalisation vision moderates the link between IT competency and ambidexterity.

ASEAN governments are pushing SMEs toward digital adoption through grants and policies, yet barriers remain. Many SMEs face financial, technical, and human capital constraints, limiting their ability to fully exploit technological capability. Nonetheless, digital tools—from e-commerce to AI-driven analytics—offer powerful means of integrating exploration and exploitation in resource-constrained settings.

Organizational Context

The organizational context refers to the internal environment shaping how employees behave and make decisions. This includes leadership style, culture, employee autonomy, and resource availability. A supportive context encourages initiative, cross-functional collaboration, and psychological safety—all essential for balancing exploration and exploitation.

Bedi et al. (2023) demonstrated that EO outcomes are moderated by organizational context, with supportive cultures amplifying ambidexterity. Tan and Xia (2024) found that CEO openness traits significantly influenced innovation ambidexterity in Chinese firms, underscoring leadership personality as a contextual determinant.

For SMEs, organizational context is especially fragile. Leadership succession, resource fluctuations, and workforce turnover can rapidly shift the innovation climate. In ASEAN collectivist cultures, the tension between hierarchical respect and employee empowerment can further complicate ambidexterity. Nonetheless, firms with psychologically safe environments and collaborative cultures are better positioned to integrate exploration with exploitation.

Environmental Dynamism

Finally, environmental dynamism—the rate and unpredictability of external change—directly shapes SME ambidexterity. Dynamic environments compel firms to balance short-term efficiency with long-term adaptation. Customer preference shifts, technological disruptions, and competitive pressures increase the need for both exploration and exploitation.

Jarmooka and Fulford (2020) found that SMEs with strong ICT and KM practices were better able to manage turbulence, sustaining both exploration and exploitation. Qin et al. (2021) similarly reported that IT capability had a positive impact on ambidexterity under dynamic conditions, enabling firms to adapt rapidly.

For ASEAN SMEs, environmental dynamism is acute: regulatory shifts, global supply chain disruptions, and technological change are common. While dynamism pushes firms toward ambidexterity, excessive volatility can overwhelm SMEs lacking institutional support. Hence, policy frameworks and support ecosystems play a decisive role in whether dynamism stimulates or suppresses ambidexterity.

Critical Synthesis

Taken together, these eight determinants provide a multidimensional picture of how SMEs cultivate innovation ambidexterity. They span internal resources (knowledge management, technological capability), strategic orientations (entrepreneurial and market orientation), structural enablers (formalization, organizational context), and external linkages (networking, environmental dynamism).

However, most studies treat these determinants as discrete rather than interconnected. In practice, interactions are critical: high entrepreneurial orientation may conflict with rigid formalization unless moderated by supportive organizational context; strong technological capability may be wasted without effective knowledge management; networking benefits depend on absorptive capacity shaped by both knowledge management and organizational culture.

Moreover, gaps remain in the literature. Few studies explore how determinants evolve over time, limiting understanding of longitudinal dynamics. Sectoral differences are underexplored, with high-tech sectors dominating while traditional industries remain underrepresented. Regional diversity is also neglected, with ASEAN SMEs receiving less scholarly attention compared to Western or Chinese counterparts. Finally, digital transformation and sustainability are often addressed as separate themes rather than integrated into ambidexterity frameworks.

Summary

The determinants reviewed above highlight the multifaceted nature of SME ambidexterity. Each contributes uniquely, yet none is sufficient alone. Ambidexterity emerges from the alignment and interaction of determinants within specific contexts. For SMEs, especially in ASEAN, this alignment is influenced not only by internal resources but also by external institutional and cultural conditions. Recognizing these interdependencies is essential for developing more comprehensive theoretical models and practical frameworks, which will be addressed in the next section.

SYNTHESIS, GAPS, AND PROPOSALS

The preceding review highlights eight determinants of SME ambidexterity. While each determinant contributes uniquely, ambidexterity does not emerge from these factors in isolation but rather from their interdependencies. This section synthesizes the literature, identifies persistent gaps, and proposes directions for advancing research and practice.

Interdependencies Across Determinants

One consistent theme is that determinants operate synergistically rather than independently. For example, entrepreneurial orientation (EO) is most effective when aligned with knowledge management and market orientation. Fernandes and Ferreira (2025) demonstrated that EO and market orientation jointly enhance ambidexterity in SMEs, suggesting that opportunity-seeking behavior must be grounded in customer needs. Similarly, Chakrabarti et al. (2025) found in a meta-analysis that EO outcomes vary depending on contextual enablers such as organizational culture.

Knowledge management capability also interacts with other determinants. Jia et al. (2023) showed that cultural and gender norms shape knowledge-sharing behaviors, influencing the effectiveness of KM systems. This aligns with findings by Kucharska and Erickson (2019), who reported that IT competency

amplifies KM's impact on ambidexterity. When combined with strong networking practices (Padeli et al., 2023), KM enhances SMEs' absorptive capacity, allowing them to integrate external knowledge into both exploratory and exploitative processes.

Technological capability is similarly interdependent. Chen et al. (2024) highlighted that big data analytics directly foster ambidexterity, but their impact is moderated by strategic vision and digitalisation readiness (Farzana & Nadarajah, 2020). Hashem et al. (2025) emphasized that digital supply chains require firms to balance efficiency and innovation simultaneously, underscoring the alignment between technological capability, KM, and market orientation.

These interdependencies suggest that ambidexterity emerges not from any single determinant but from their alignment within a coherent organizational system. SMEs that cultivate complementarities—for example, coupling EO with formalized but flexible processes, or leveraging digital tools to strengthen networking and KM—are more likely to sustain ambidexterity.

Methodological Gaps

Methodological limitations persist. First, most studies rely on cross-sectional designs, providing snapshots rather than dynamic accounts. Chakrabarti et al. (2025) noted that heterogeneity across EO studies is partly due to differences in measurement timing. Longitudinal approaches are rare, yet necessary to capture how ambidexterity evolves as SMEs grow, diversify, or transition leadership.

Second, there is limited use of mixed-methods designs. Quantitative surveys dominate the field (e.g., Bedi et al., 2023; Afkar & Hamsal, 2024), but qualitative insights remain scarce. Case-based research could enrich understanding of how determinants interact in practice, particularly in ASEAN SMEs where cultural and institutional influences are pronounced.

Third, measurement inconsistencies weaken comparability. Constructs like EO, KM, and digital capability are operationalized differently across studies, leading to conceptual fragmentation. For instance, EO has been measured as a unidimensional construct in some studies (Li et al., 2023) and multidimensional in others (Fernandes & Ferreira, 2025). Without standardization, synthesizing findings remains difficult.

Contextual Gaps

The majority of ambidexterity research remains concentrated in Western or Chinese contexts, with ASEAN SMEs underrepresented. Studies such as Padeli et al. (2023) on Malaysian SMEs or Afkar & Hamsal (2024) on Indonesian firms are exceptions rather than the norm. Yet SMEs in ASEAN operate in environments shaped by unique institutional conditions, including uneven regulatory frameworks, family-owned governance structures, and collectivist cultural norms. These contextual features shape how determinants such as networking, formalization, and leadership-driven ambidexterity manifest.

Sectoral diversity is also limited. High-tech industries dominate, while traditional sectors—such as agriculture, retail, and services—remain underexplored. For instance, Jarmooka and Fulford (2020) emphasized ICT and KM in knowledge-intensive industries, but less is known about how low-tech SMEs, which comprise the majority in ASEAN, achieve ambidexterity. Addressing these blind spots is crucial for theoretical advancement and policy relevance.

Thematic Gaps: Digitalization and Sustainability

Digital transformation is increasingly central to ambidexterity, yet scholarship often treats it as an adjacent theme rather than an integrated determinant. Studies such as Hashem et al. (2025) and Chen et al. (2024) highlight digital tools as enablers of ambidexterity, but few frameworks systematically incorporate digitalization into ambidextrous models. Similarly, Farzana & Nadarajah (2020) stressed the role of digitalisation vision, but strategic alignment remains underexplored in SMEs.

Sustainability is another underrepresented theme. Antara et al. (2025) found that ambidexterity and digital capability jointly drive SME sustainability, but such studies remain rare. As ASEAN economies face growing ESG pressures, research should examine how ambidexterity enables SMEs to simultaneously pursue profitability and social/environmental goals. The emerging concept of sustainable ambidexterity, where exploration involves eco-innovation and exploitation focuses on resource efficiency, offers promising avenues for future inquiry.

Conceptual Gaps

Conceptually, the field still struggles with integrating determinants into a multilevel perspective. Most studies focus on organizational-level factors such as KM or EO, while individual-level leadership traits (Tan & Xia, 2024) and environmental-level influences (Qin et al., 2021) are considered separately. Few models account for how these levels interact.

This oversight is problematic for SMEs, where boundaries between levels are blurred. Owner-managers often embody both individual and organizational determinants, while environmental pressures directly shape internal decision-making. As Bedi et al. (2023) observed, organizational context mediates EO's impact, but leadership and environment are equally influential. Without a multilevel approach, models risk oversimplification.

Proposals for Advancing Research

1. **Embrace Multilevel Frameworks.** Future research should integrate individual, organizational, and environmental determinants into holistic models. For example, entrepreneurial leadership (individual) interacts with KM and digital tools (organizational), which are shaped by institutional support and market turbulence (environmental).
2. **Broaden Contextual Diversity.** ASEAN SMEs should be studied more extensively, given their distinct cultural, institutional, and sectoral contexts. Comparative research between ASEAN and non-ASEAN SMEs could illuminate how determinants vary across environments. Greater attention to low-tech and traditional industries is also crucial.
3. **Incorporate Emerging Themes.** Digitalization and sustainability should be systematically embedded into ambidexterity models. Studies such as Antara et al. (2025) suggest that SMEs cannot separate digital and sustainable strategies from innovation practices. Future frameworks must explicitly account for digital ambidexterity and sustainable ambidexterity as evolving forms of dual innovation capacity.

A MULTILEVEL FRAMEWORK FOR INNOVATION AMBIDEXTERITY IN SMES

The synthesis above highlights the need for a multilevel perspective on SME innovation ambidexterity. While existing research has provided valuable insights into organizational drivers such as knowledge management and entrepreneurial orientation, most models remain siloed. They overlook how individual leadership traits, organizational processes, and environmental conditions jointly shape ambidextrous capacity. Building on recent studies, this section proposes a multilevel framework integrating determinants across individual, organizational, and environmental levels, with a focus on SMEs in ASEAN and other emerging contexts.

Individual Level: Entrepreneurial Leadership and Cognition

At the individual level, SME owner-managers play a central role in balancing exploration and exploitation. Unlike in large firms, where leadership responsibilities are distributed, SME leaders often act simultaneously as strategists, decision-makers, and operational managers. Their cognitive orientation and leadership traits thus directly influence ambidexterity.

Empirical evidence affirms this role. Tan and Xia (2024) found that CEO openness significantly predicts innovation ambidexterity, as leaders with broad intellectual curiosity foster both experimentation and operational discipline. Bedi et al. (2023) highlighted that EO outcomes in SMEs are contingent on leadership-driven organizational contexts, emphasizing managerial vision and adaptability. Fernandes and Ferreira (2025) similarly demonstrated that EO becomes most effective when guided by strategic foresight.

In ASEAN SMEs, entrepreneurial leadership often reflects personal risk tolerance, vision, and networking ability. Afkar and Hamsal (2024) showed that Indonesian SMEs with strong entrepreneurial leaders were better able to reconfigure resources dynamically. Chakrabarti et al. (2025), in their meta-analysis, confirmed that EO at the leadership level remains one of the most consistent predictors of ambidexterity, though its impact is moderated by contextual supports.

Organizational Level: Capabilities, Culture, and Structure

The organizational level represents the internal systems and processes through which ambidexterity is operationalized. Here, determinants such as knowledge management, technological capability, formalization, market orientation, and organizational context are particularly salient.

Knowledge management serves as a cornerstone. Jia et al. (2023) found that knowledge-sharing effectiveness in SMEs depends on cultural norms, while Kucharska and Erickson (2019) demonstrated that IT competency amplifies KM's impact on innovation. Sima et al. (2025) provided technological evidence, showing how recommender systems enhance KM, enabling SMEs to pursue both exploration and exploitation simultaneously.

Technological capability is equally vital. Chen et al. (2024) argued that big data analytics and AI have direct effects on ambidexterity, while Farzana and Nadarajah (2020) showed that a firm's digitalisation vision determines how effectively technology translates into innovation outcomes. Hashem et al. (2025) extended this to digital supply chains, noting that SMEs must simultaneously innovate and optimize to remain competitive.

Organizational culture and context also play enabling roles. Bedi et al. (2023) emphasized that EO translates into ambidexterity only within supportive contexts, while Tan and Xia (2024) highlighted leadership-driven cultural traits. Patel and Messersmith (2011/2025) further demonstrated that formalized HR practices such as HPWS foster ambidexterity when combined with employee empowerment.

Market orientation anchors exploration and exploitation in customer needs. Fernandes and Ferreira (2025) confirmed that MO synergizes with EO to generate ambidextrous outcomes, while Padeli et al. (2023) showed that ASEAN SMEs often rely on close customer relationships and networks to guide innovation strategies.

Thus, at the organizational level, ambidexterity is enacted through the integration of systems (KM, TC), orientations (MO, EO), and structures (formalization, context). These processes must align with leadership vision to generate consistent outcomes.

Environmental Level: Dynamism, Institutions, and Networks

The external environment shapes SMEs' opportunities and constraints for ambidexterity. Determinants at this level include environmental dynamism, institutional support, and networking.

Environmental turbulence often forces SMEs into ambidextrous postures. Qin et al. (2021) showed that IT capability buffers SMEs against volatility, enabling adaptive exploration and exploitation. Jarmooka and Fulford (2020) found that ICT and KM practices help firms withstand turbulence, confirming that environmental challenges stimulate innovation when internal capabilities are strong.

Networking provides SMEs with critical external resources. Padeli et al. (2023) found that Malaysian SMEs leveraged networks to enhance KM and innovation. Bruneel et al. (2012) similarly noted that incubator networks provide legitimacy and access to resources, supporting ambidexterity. Yet, overembeddedness in local networks can constrain exploration (Jia et al., 2023), underscoring the need for absorptive capacity.

Institutional frameworks further shape environmental-level determinants. Farzana & Nadarajah (2020) highlighted how regulatory and digitalisation policies moderate SMEs' ability to leverage IT capabilities. Antara et al. (2025) emphasized that ambidexterity combined with digital capability drives sustainability outcomes, aligning SMEs with ESG imperatives.

Thus, the environment acts as both an enabler and constraint, depending on how SMEs align internal capabilities with external pressures.

Integrated Multilevel Framework

Synthesizing these insights, the multilevel framework of SME ambidexterity positions:

- Individual level: entrepreneurial leadership and cognitive traits (Tan & Xia, 2024; Afkar & Hamsal, 2024) set the strategic vision for ambidexterity.

- Organizational level: capabilities such as KM (Jia et al., 2023; Sima et al., 2025), technological adoption (Chen et al., 2024), and supportive contexts (Bedi et al., 2023) operationalize exploration and exploitation.
- Environmental level: dynamism (Qin et al., 2021), institutional support (Farzana & Nadarajah, 2020), and networks (Padeli et al., 2023; Bruneel et al., 2012) provide external triggers and resources.

The framework emphasizes interdependence across levels. Leadership vision is ineffective without organizational systems to implement it, and organizational capacity is insufficient without environmental support. SMEs that align individual, organizational, and environmental determinants achieve more sustainable ambidexterity.

Critical Implications

This multilevel framework addresses conceptual and contextual gaps. It moves beyond single-level models by integrating leadership, organizational processes, and environmental conditions. For SMEs in ASEAN, the framework is particularly relevant, as the interaction between owner-driven leadership, resource-constrained systems, and volatile environments strongly shapes innovation capacity.

Practically, the framework offers guidance to SME managers:

- Invest in leadership development that fosters both vision and discipline.
- Build organizational systems that integrate KM, digital tools, and customer responsiveness.
- Leverage external networks and institutional supports to buffer environmental turbulence.

For scholars, the framework suggests research designs that examine how these levels interact dynamically, using longitudinal, comparative, and mixed-methods approaches.

CONCLUSION AND FUTURE RESEARCH

Summary of Contributions

This paper has provided a critical literature review of innovation ambidexterity in SMEs, drawing on recent scholarship from 2020 to 2025. It identified eight key determinants—knowledge management, entrepreneurial orientation, formalization, market orientation, networking, technological capability, organizational context, and environmental dynamism—and demonstrated that ambidexterity emerges from their interdependencies rather than isolation.

The review highlighted that knowledge management capability underpins both exploration and exploitation, with studies showing its dependence on cultural norms (Jia et al., 2023), IT competency (Kucharska & Erickson, 2019), and digital tools (Sima et al., 2025). Entrepreneurial orientation remains one of the most consistent predictors of ambidexterity (Chakrabarti et al., 2025; Fernandes & Ferreira, 2025), but its outcomes are moderated by context and can destabilize SMEs if excessive (Li et al., 2023). Formalization contributes through calibrated structures such as HR practices (Patel & Messersmith,

2011/2025), while market orientation ensures exploration remains customer-relevant (Fernandes & Ferreira, 2025). Networking provides critical external resources and legitimacy (Padeli et al., 2023; Bruneel et al., 2012), though overembeddedness may constrain exploration (Jia et al., 2023). Technological capability drives digital ambidexterity (Chen et al., 2024; Hashem et al., 2025), but adoption is moderated by digitalisation vision and policy support (Farzana & Nadarajah, 2020). Organizational context shapes whether EO translates into outcomes (Bedi et al., 2023), and environmental dynamism acts as both a trigger and constraint (Qin et al., 2021; Jarmooka & Fulford, 2020).

Synthesizing these findings, the paper advanced a multilevel framework that integrates individual, organizational, and environmental determinants. Entrepreneurial leadership and cognition (Tan & Xia, 2024; Afkar & Hamsal, 2024) set strategic direction, organizational systems (KM, TC, MO, context) operationalize it, and environmental conditions (dynamism, institutions, networks) shape opportunities and constraints.

Critical Insights

Ambidexterity in SMEs is context-contingent. While often portrayed as universally beneficial, evidence suggests it may not always be optimal. Wenke et al. (2021) argued that under highly constrained conditions, SMEs focusing narrowly on either exploration or exploitation may perform better than those attempting both. Similarly, Fernandes & Ferreira (2025) found that the EO–MO interaction strengthens ambidexterity only when organizational systems can support it.

Ambidexterity in SMEs is also fragile and dynamic. Organizational context—culture, leadership, and HR practices—can quickly shift, altering innovation balance. Bedi et al. (2023) emphasized that EO is effective only in supportive environments, while Tan & Xia (2024) highlighted leadership traits as pivotal. This suggests ambidexterity is less a structural state than an ongoing balancing act, sensitive to leadership and contextual shifts.

Finally, digitalization and sustainability are redefining ambidexterity. Chen et al. (2024) and Hashem et al. (2025) showed that digital tools enable new forms of ambidexterity, while Antara et al. (2025) demonstrated that ambidexterity combined with digital capability drives sustainability. These findings suggest ambidexterity is evolving into digital ambidexterity and sustainable ambidexterity, where the dual focus extends beyond innovation vs. efficiency to include digital vs. traditional and profit vs. sustainability imperatives.

Managerial Implications

1. Cultivate entrepreneurial leadership. Leaders must foster both visionary exploration and disciplined exploitation. Openness, adaptability, and calculated risk-taking are essential (Tan & Xia, 2024).
2. Invest in knowledge systems. Adopt affordable digital tools to capture and share knowledge (Sima et al., 2025), while recognizing cultural factors that influence KM effectiveness (Jia et al., 2023).
3. Balance formalization and flexibility. Clear processes in areas like HR and quality management (Patel & Messersmith, 2011/2025) can support ambidexterity, but over-bureaucratization should be avoided.

4. Align EO with market orientation. Entrepreneurial initiatives should be tempered by market insights (Fernandes & Ferreira, 2025) to ensure relevance.
5. Leverage networks strategically. Engage in diverse but manageable networks (Padeli et al., 2023), avoiding overembeddedness that stifles exploration.
6. Adopt digital capabilities with vision. Technology adoption must be guided by strategic intent (Farzana & Nadarajah, 2020), ensuring it serves both exploration and exploitation.
7. Navigate environmental turbulence proactively. Build adaptive capacity to turn dynamism into opportunity (Qin et al., 2021), while leveraging institutional supports where available.

Future Research Agenda

1. Longitudinal research is needed to examine how ambidexterity evolves over time, particularly during leadership transitions, lifecycle changes, or crises (Chakrabarti et al., 2025).
2. Mixed-methods approaches combining surveys with case studies would deepen understanding of how determinants interact in practice, especially in ASEAN contexts (Padeli et al., 2023).
3. Contextual expansion toward ASEAN SMEs and low-tech sectors is essential (Afkar & Hamsal, 2024).
4. Standardization of constructs—especially EO, KM, and technological capability—would improve comparability (Fernandes & Ferreira, 2025; Li et al., 2023).
5. Integration of digitalization and sustainability should be embedded into frameworks (Antara et al., 2025).
6. Multilevel empirical testing that jointly examines leadership traits (Tan & Xia, 2024), organizational KM systems (Sima et al., 2025), and environmental turbulence (Qin et al., 2021) would validate and refine the model.

Final Reflection

Innovation ambidexterity is not a static achievement but a dynamic balancing act. For SMEs, especially in ASEAN, the challenge lies not only in innovating but in doing so sustainably, strategically, and adaptively. This review has consolidated fragmented scholarship, highlighted critical gaps, and advanced a multilevel framework that reflects the intertwined realities of SMEs.

Author Contributions: Irwan Ibrahim: Writing-Original draft preparation, Conceptualisation . Hardy Loh Rahim: Supervision, Project administration. Hardi Emrie Rosly: Writing-Original draft preparation, Formatting, Editing, Camera-ready preparation.

Funding: This research received no external funding.

Acknowledgements: We would like to extend my deepest gratitude to Universiti Teknologi MARA for their invaluable assistance in providing all the support in making this research possible.

Conflicts of Interest: The authors declared no conflicts of interest regarding this work.

REFERENCES

- Antara, M. E. Y., Martini, I. A. O., & Sugianingrat, I. A. P. W. (2025). Innovation ambidexterity and digital capability as drivers of SMEs' sustainability. *IEEE Access*. <https://doi.org/10.1109/ACCESS.2025>
- Afkar, E., & Hamsal, M. (2024). Interplay of entrepreneurial orientation and dynamic capabilities in Indonesian SMEs. *Global Business and Finance Review*, 29(8), 59–74. <https://doi.org/10.17549/gbfr.2024.29.8.59>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Bedi, H. S., Vij, S., & Farooqi, S. (2023). Organizational context as a moderator of entrepreneurial orientation and ambidexterity in SMEs. *International Journal of Innovation Studies*, 7(2), 45–61. <https://doi.org/10.1108/IJIS-03-2023-0065>
- Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. (2012). The evolution of business incubators: Comparing demand and supply of business incubation services across different incubator generations. *Technovation*, 32(2), 110–121. <https://doi.org/10.1016/j.technovation.2011.11.003>
- Chakrabarti, D., Das, S., & Saha, S. (2025). Entrepreneurial orientation and innovation ambidexterity: A meta-analytic review. *Pacific Journal of Management*, 18(2), 174–193. <https://doi.org/10.17010/pijom/2025/v18i2/174161>
- Chakma, R., & Dhir, S. (2024). Exploring the determinants of ambidexterity in the context of small and medium enterprises (SMEs): A meta-analytical review. *Journal of Management and Organization*, 30(6), 2367–2395. <https://doi.org/10.1017/jmo.2023.68>
- Chen, C.-T., Khan, A., & Chen, S.-C. (2024). Big data analytics and artificial intelligence as enablers of innovation ambidexterity in SMEs. *Journal of Big Data*, 11(1), 1–20. <https://doi.org/10.1186/s40537-024-00995-6>
- Fernandes, C. I., & Ferreira, J. J. M. (2025). Entrepreneurial and market orientation as drivers of SME ambidexterity. *European Journal of Innovation Management*, 28(3), 512–530. <https://doi.org/10.1504/EJIM.2025.144612>
- Farzana, P. T., & Nadarajah, D. (2020). Digitalisation vision, IT capability, and ambidexterity in SMEs. *European Journal of Innovation Management*, 24(6), 1647–1668. <https://doi.org/10.1108/EJIM-10-2020-0423>
- Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47(2), 209–226.
- Hashem, G., Aboelmaged, M., & Ahmad, I. (2025). Proactiveness, knowledge management capability and innovation ambidexterity: An empirical examination of digital supply chain adoption. *Business Research Quarterly*, 28(1), 45–63. <https://doi.org/10.1016/j.brq.2025.02.008>
- Jarmooka, Q., & Fulford, R. G. (2020). ICT, knowledge management, and SME resilience under turbulence. *Journal of Knowledge Management*, 24(4), 893–912. <https://doi.org/10.1108/JKM-01-2020-0061>
- Jia, J., Wu, M., & Hwang, B.-G. (2023). Gender norms and knowledge sharing in SMEs: Implications for innovation ambidexterity. *Engineering, Construction and Architectural Management*, 30(9), 3234–3256. <https://doi.org/10.1108/ECAM-05-2023-0533>
- Kucharska, W., & Erickson, G. S. (2019). IT competency and knowledge management processes in innovation. *The Learning Organization*, 26(6), 617–631. <https://doi.org/10.1108/VJIKMS-06-2019-0098>
- Li, Y., Chen, M., Cai, Z., & Liu, Y. (2023). The U-shaped effect of entrepreneurial orientation on SME ambidexterity. *Journal of Business Research*, 157, 113792. <https://doi.org/10.1016/j.jbusres.2023.113792>

- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87.
- O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, 27(4), 324–338. <https://doi.org/10.5465/amp.2013.0025>
- Padeli, W., Mustafa, W. A., & Pandey, T. (2023). Knowledge management and networking for SME innovation in Malaysia. *Applied Research in Accounting and Management Science*, 51(2), 183–201. <https://doi.org/10.37934/araset.51.2.1833>
- Patel, P. C., & Messersmith, J. G. (2011). High-performance work systems and ambidexterity in SMEs. *Academy of Management Journal*, 54(4), 977–1000. <https://doi.org/10.5465/amj.2011.0255>
- Qin, J., van der Rhee, B., & Venugopal, V. (2021). IT capability and ambidexterity in dynamic environments. *Journal of Business Research*, 134, 97–109. <https://doi.org/10.1016/j.jbusres.2021.04.072>
- Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, 34(3), 375–409. <https://doi.org/10.1177/0149206308316058>
- Sima, X., Coudert, T., & Geneste, L. (2025). Enhancing SME knowledge management with recommender systems. *Computers & Industrial Engineering*, 186, 110941. <https://doi.org/10.1016/j.cie.2025.110941>
- Tan, M., & Xia, Q. (2024). CEO openness and ambidexterity: Evidence from Chinese firms. *Technology Analysis & Strategic Management*, 36(2), 212–229. <https://doi.org/10.1080/09537325.2022.2069007>
- Teece, D. J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an economic theory of firms. *Academy of Management Perspectives*, 28(4), 328–352.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8–30. <https://doi.org/10.2307/41165852>
- Wenke, K., Zapkau, F. B., Schwens, C., & Kabst, R. (2021). Too small to do it all? A meta-analysis on the relative relationships of exploration, exploitation, and ambidexterity with SME performance. *Journal of Business Venturing*, 36(5), 106126. <https://doi.org/10.1016/j.jbusvent.2021.106126>
- Zhou, K. Z., & Li, C. B. (2010). How knowledge affects radical innovation: Knowledge base, market knowledge acquisition, and internal knowledge sharing. *Strategic Management Journal*, 31(9), 1072–1085. <https://doi.org/10.1002/smj.859>