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Narrative Review of Ambidexterity and Dynamic Capabilities in Digital and Green Transformations: Pathways to Innovation and Firm Performance

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Abstract: This study examines how dynamic capabilities and related organizational capabilities shape firms' management of exploration and exploitation during digital and green transformation. The evidence base was drawn from 144 Web of Science records; 113 studies were retained as relevant, and 64 formed the principal evidence base for thematic synthesis. The review is structured around three questions: how capability foundations and dynamic capabilities enable innovation ambidexterity; why ambidexterity appears in different theoretical and empirical roles; and what contextual or methodological conditions influence its relationship with organizational outcomes. Across studies, ambidexterity is rarely associated with a single capability. Digital capability, knowledge management, strategic flexibility, learning, leadership and organizational design tend to work together, although exploration and exploitation do not always respond in the same way. The evidence also shows that operational, financial and sustainability outcomes can diverge even when firms pursue both innovation modes. The review therefore separates the theoretical meaning of ambidexterity from the statistical role assigned to it and uses an integrated capability pathway linking capability foundations, dynamic capabilities, innovation ambidexterity and organizational outcomes. It identifies boundary conditions including firm size, governance, environmental turbulence, strategic fit and measurement choice. The review concludes by identifying priorities for longitudinal, configurational, comparative and multilevel research.

Keywords: *Ambidexterity, Dynamic capabilities, Digital transformation, Green ambidextrous innovation, Industry 4.0, Entrepreneurial orientation, Circular economy.*

1. Introduction and Scope

Digital and green transformations force firms to renew existing capabilities without losing the operational discipline needed to exploit what they already know and do well. Digital technologies can change how firms process information, coordinate activities, and develop products and services, while green transformation pushes them to reconsider resource use, environmental impact and longer-term sustainability. The difficulty is that firms need to search for new opportunities without abandoning the refinement and effective use of existing capabilities (Lu et al., 2023; March, 1991).

Given its emphasis on pursuing both exploratory and exploitative innovation at the same time, innovation ambidexterity offers a useful lens through which to view this difficulty. Exploration encompasses experimentation, inquiry, and the creation of novel insights, while exploitation focuses on enhancement, execution, and the amplification of established skills (He & Wong, 2004; March, 1991). Organizational ambidexterity is broader than innovation ambidexterity, as it concerns the organizational arrangements and capabilities through which competing demands for adaptation and alignment are managed (Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2008).

Recent research, however, does not position ambidexterity consistently within explanations of organizational transformation. Li et al. (2025), for example, examine innovation ambidexterity as an outcome of digital platform capability operating through strategic flexibility, whereas Ahmad (2025) positions innovation ambidexterity as an intervening mechanism between AI capability and digital transformation. Gupta et al. (2023), by contrast, investigate innovation ambidexterity as a moderator in the relationship between cognitive computing capability and entrepreneurial quality. These different empirical positions raise an important

conceptual issue: variations in statistical model specification may reflect different questions about capability development and deployment rather than fundamentally different meanings of ambidexterity.

Dynamic capabilities theory provides a useful basis for organizing these relationships. Teece et al. (1997) conceptualize dynamic capabilities as the ability of firms to integrate, build and reconfigure internal and external competences in response to environmental change, while Teece (2007) subsequently distinguishes the processes of sensing opportunities and threats, seizing opportunities and reconfiguring organizational resources. O'Reilly and Tushman (2008) further position ambidexterity as a dynamic capability through which firms manage the competing requirements of exploration and exploitation. Taken together, these perspectives suggest that capability renewal and ambidextrous innovation are closely related, although the precise position of ambidexterity within the capability process requires clearer specification.

Evidence from digital transformation research reinforces the importance of organizational mechanisms that translate technological resources into ambidextrous innovation. Digital platforms, analytics and AI can expand firms' information-processing capacity, but their effects on ambidexterity depend on complementary organizational capabilities. Li et al. (2025) identify strategic flexibility as an intermediary between digital platform capability and innovation ambidexterity, while Liao et al. (2023) highlight the role of dynamic decision-making capability and cross-functional integration in connecting big-data analytics capability with ambidextrous innovation. Ahmad (2025) similarly shows that the relationship between AI capability and innovation ambidexterity depends partly on strategic fit. These studies indicate that technology acquisition alone does not explain how firms develop the capacity to pursue exploration and exploitation simultaneously. Comparable patterns are evident in the green transformation literature, although the relevant capability combinations and outcomes are not identical. Vesal et al. (2022) link innovation ambidexterity with environmental sustainability practices and show that leadership and senior managers' environmental attitudes condition this relationship. Nguyen-Van et al. (2025) report differentiated relationships between green intellectual capital and exploratory and exploitative green innovation, while Duong (2026) identifies relationships among digital platforms, AI capability, green ambidextrous innovation, circular economy practices and sustainable performance. These findings suggest that the contribution of ambidexterity to environmental transformation depends on the foundation of capability supporting it and on the particular organizational outcome under consideration.

Accordingly, this review addresses three questions. RQ1 asks how organizational capability foundations and dynamic capabilities enable innovation ambidexterity across digital and green transformation contexts. RQ2 examines how the theoretical and empirical role of ambidexterity varies across the reviewed literature and what explains these differences. RQ3 investigates the contextual and methodological conditions that shape the relationship between ambidexterity and organizational outcomes. These questions reflect the need to move beyond a catalogue of antecedents and examine the mechanisms and boundary conditions underlying capability-ambidexterity relationships (O'Reilly & Tushman, 2008; Saleh et al., 2023).

This review contributes by clarifying where ambidexterity sits within a wider capability process and by separating its theoretical meaning from the statistical role assigned to it in individual empirical models. It also compares evidence across digital, green, knowledge-based and strategic settings to identify convergence, divergence and contextual dependence. The aim is not simply to ask whether ambidexterity contributes to innovation and performance, but to explain how capability foundations are converted into ambidextrous action and why similar capability investments can produce different outcomes across contexts (Li et al., 2025; Nguyen-Van et al., 2025; Tran et al., 2025).

2. Review Methodology

Review approach and scope

This study conducts a structured narrative review to explore the association of innovation ambidexterity with dynamic capabilities and other organizational capabilities in digital and green transformation. A narrative approach is appropriate because literature does not have one common model or research design. Some studies consider ambidexterity as an outcome of capability development, others as a mediator, moderator or antecedent of performance. Existing reviews also consider the topic from different angles, including multilevel

determinants of innovation ambidexterity, broader organizational ambidexterity and Industry 4.0 adoption (Chakma et al., 2024; Oduro & De Nisco, 2024; Saleh et al., 2023).

The main evidence base was the Web of Science (WoS). The search was conducted for studies related to ambidexterity and the key capability domains reviewed here: dynamic capabilities, digital transformation, green ambidextrous innovation, Industry 4.0 readiness, entrepreneurial orientation, and the circular economy. These domains represent major streams linking ambidextrous innovation with technological, strategic, and sustainability-related transformation (Li et al., 2025; Nguyenvan et al., 2025; Oduro & De Nisco, 2024).

The recovered WoS dataset included 144 records. Screening was focused on studies substantively dealing with organizational or innovation ambidexterity, i.e. the simultaneous pursuit of exploration and exploitation in an organizational setting. This is consistent with the well-known distinction between exploration as the search for new knowledge and exploitation as the refinement and extension of existing knowledge and capabilities (He & Wong, 2004; March, 1991).

After screening, 113 studies were retained as relevant to the wider domain of review. 31 records were excluded as they did not provide a sufficiently direct connection to the scope of the paper. Of the retained studies, 64 formed the core evidence base for the thematic synthesis, with the remaining 49 used as supporting evidence where they helped to clarify particular constructs, contexts or methodological issues. The distinction between core and supporting studies is based on relevance to the capability-ambidexterity relationships explored in this review and not based on any judgement of methodological superiority.

Foundational works were treated separately from the contemporary WoS evidence base. This includes studies that established the exploration-exploitation distinction, the dynamic capabilities perspective and the major conceptualizations of organizational ambidexterity (Gibson & Birkinshaw, 2004; March 1991; O'Reilly & Tushman, 2008; Teece et al., 1997). Keeping these sources separate prevents the theoretical foundations of the paper from being confused with the screened contemporary evidence.

Evidence organisation and synthesis

The retained studies were organized in an evidence matrix that recorded the main bibliographic details, research context, focal constructs, form of ambidexterity, empirical role of ambidexterity, methodological approach and principal findings. Particular attention was given to whether studies treated ambidexterity as an outcome, mediator, moderator or predictor because this model position often reflects different questions about the same broader capability process (Ahmad, 2025; Gupta et al., 2023; Li et al., 2025).

Rather than organizing the study by study, the synthesis groups it around recurring capability domains. These include dynamic capabilities, digital transformation and AI, green transformation and sustainability, knowledge and learning, entrepreneurial orientation, leadership and organizational design, and organizational outcomes. This approach reflects the way recent studies increasingly examine capability combinations rather than isolated resources (Liao et al., 2023; Shafique et al., 2022; Yoshikuni et al., 2025).

When comparing the studies, three patterns were used. Convergence refers to findings that point to a similar mechanism even when the samples or measures differ. Divergence refers to differences in direction, significance or interpretation that cannot reasonably be treated as the same result. Boundary conditions refer to factors such as firm size, governance, turbulence or resource constraints that alter how a relationship works in a particular setting (Guffler et al., 2023; Li et al., 2025; Ng & Ahmed, 2025).

Not every difference between studies was treated as a contradiction. A positive operational effect and a non-significant financial effect, for instance, concern different outcomes. In the same way, a capability may support exploration without having the same effect on exploitation. The comparison therefore considers what was measured, where the relationship was tested and which outcome was involved before judging the findings as inconsistent (Ceptureanu et al., 2026; Islam & Munir, 2023; Nguyen-Van et al., 2025).

A related issue is the position given to ambidexterity in empirical models. Some studies treat it as a dependent variable, others as a mediator, moderator, or predictor. In this review, those statistical positions are not taken to mean that the construct itself has changed. The broader theoretical concern remains how firms manage

exploration and exploitation, even when researchers place that capability at different points in their models (Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2008).

The review aims to integrate theory rather than calculate a common effect size, so the studies are not combined statistically. Systematic reviews and meta-analyses are used where they help explain a wider pattern, but they are not counted as though they were equivalent to individual empirical samples (Chakma et al., 2024; Oduro & De Nisco, 2024; Saleh et al., 2023).

Table 1: Domains and Studies covered by the Review

Domain	Core studies (n)	Role in the review
Performance, resilience and competitive advantage	32	Comparison of organizational outcomes
Green transition, sustainability and circularity	29	Principal transformation domain
Digital transformation, AI and analytics	26	Principal transformation domain
Dynamic capabilities	25	Primary theoretical lens
Knowledge, learning and absorptive capacity	23	Capability conversion mechanisms
Leadership, culture and organizational design	12	Coordination and organizational context
Entrepreneurial orientation and strategic entrepreneurship	7	Strategic direction and initiative
Industry 4.0	5	Digital adoption and readiness context
Internationalization, export and born-global context	2	Contextual extension

3. Ambidexterity and Dynamic Capabilities: Theoretical Integration

Capability foundations and processes of renewal

The dynamic capabilities perspective provides the primary theoretical lens because digital and green transformation require more than the possession of useful resources. Teece et al. (1997) define dynamic capabilities as the ability to integrate, build and reconfigure competencies, while Teece (2007) develops the idea through sensing, seizing and reconfiguring. Complementary theories address different parts of the same problem: resource-based theory explains why resource differences matter, the natural-resource-based view adds environmental constraints and opportunities, and information processing theory highlights the coordination demands created by uncertainty (Barney, 1991; Galbraith, 1974; Hart, 1995; Teece, 2007).

These perspectives are useful for different reasons and should not be treated as interchangeable. Technology, knowledge, human resources and relational capital give firms something to work with, but having them does not automatically mean that renewal is taking place. A digital platform or an AI system may increase information capacity, yet the firm still needs learning, decision, and coordination mechanisms before that capacity becomes innovation activity (Ahmad, 2025; Liao et al., 2023). The same applies in green transformation, where environmental knowledge and green intellectual capital need managerial direction and organizational processes before they contribute to exploratory and exploitative innovation (Nguyen-Van et al., 2025; Vesal et al., 2022).

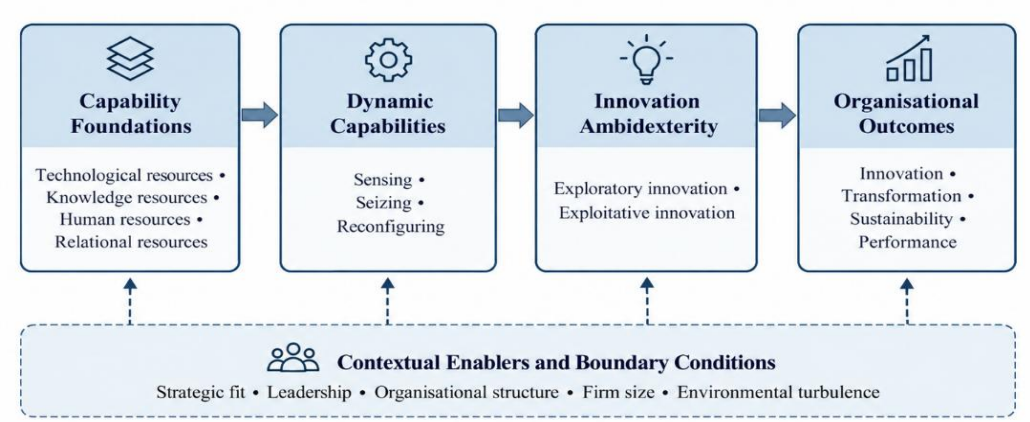
Positioning ambidexterity within the capability process

O'Reilly and Tushman (2008) explicitly describe ambidexterity as a dynamic capability for managing exploration and exploitation. This review keeps that theoretical position but separates it analytically from the broader processes through which resources are renewed. Here, innovation ambidexterity refers to the firm's ability to coordinate exploratory and exploitative innovation, while sensing, seizing and reconfiguring describe how resources are identified, mobilized and changed over time (He & Wong, 2004; March, 1991; Teece, 2007). This distinction becomes useful once the empirical studies are compared. Li et al. (2025) place ambidexterity as an outcome of digital platform capability through strategic flexibility. Ahmad (2025) places it inside the pathway from AI capability to digital transformation, while Gupta et al. (2023) use it as a moderator. The models are different, but they can still be read as addressing different points in the same broader problem: where and how the coordination of exploration and exploitation matters.

Integrated capability pathway

The framework that follows is intentionally simple. Capability foundations provide the resources and established abilities available to the firm. Dynamic capabilities concern how those foundations are mobilized and reconfigured. Innovation ambidexterity concerns how exploration and exploitation are coordinated, while the eventual organizational outcomes depend on context and on the way the capabilities are combined. The sequence should not be read as a fixed causal chain because innovation can feed back into later capability development and some outcomes take longer than others (Qin et al., 2024; Teece, 2007; Tran et al., 2025).

Figure1: Innovation Ambidexterity Sequence



Note. Capability foundations include technological, knowledge, human and relational resources. Dynamic capabilities refer to the processes through which firms sense opportunities, seize them and reconfigure existing resources. Innovation ambidexterity represents the coordination of exploratory and exploitative innovation. Contextual enablers and boundary conditions may influence different stages of the pathway. Accordingly, the arrows represent an organising logic rather than a fixed causal sequence (Teece, 2007; O'Reilly & Tushman, 2008).

Ambidexterity Constructs and Measurement

Ambidexterity is measured in several ways, and these differences matter when studies are compared. Structural ambidexterity separates exploration and exploitation across organizational units, whereas contextual ambidexterity relies more on a work setting that allows people to balance alignment and adaptability within the same organisation (Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2008). Studies also distinguish balanced ambidexterity, which focuses on the relative alignment of exploration and exploitation, from combined ambidexterity, which focuses on the overall intensity of both (He & Wong, 2004; Nofiani et al., 2021).

More recent work extends this logic into specific domains, including green ambidextrous innovation and combinations of technological and business-model innovation. These measures can make the construct more relevant to a particular setting, but they are not directly interchangeable because the activities and outcomes being captured are different (Nguyen-Van et al., 2025; Zhao & Gao, 2024). The same caution applies to empirical role: a study may place ambidexterity as an outcome, mediator, moderator or predictor without changing its theoretical meaning (Ahmad, 2025; Gupta et al., 2023; Li et al., 2025).

Table 2: Ambidexterity Constructs

Distinction	Core meaning	Main implication for comparison	Representative sources
Structural ambidexterity	Exploration and exploitation are separated across organizational units or structures.	Appropriate when organizational design is the main concern	O'Reilly and Tushman (2008)
Contextual ambidexterity	Individuals balance alignment and adaptability	More appropriate for behavioral and	Gibson and Birkinshaw (2004)

	within an enabling organizational context	managerial-context studies	
Balanced ambidexterity	Emphasizes similarity or alignment between exploration and exploitation	Equal low activity should not be confused with strong ambidexterity	He and Wong (2004); Nofiani et al. (2021)
Combined ambidexterity	Captures the joint magnitude of exploration and exploitation	Sensitive to how the two activities are aggregated	Nofiani et al. (2021)
Domain-specific ambidexterity	Exploration and exploitation are applied within a particular innovation domain	Green, technological and business-model innovation should not be treated as identical.	Nguyen-Van et al. (2025); Zhao and Gao (2024)
Empirical model role	Ambidexterity appears as an antecedent, mediator, moderator or dependent variable	Statistical positions do not define a new theoretical form	Ahmad (2025); Gupta et al. (2023); Li et al. (2025)

Measurement can also change the story that a study tells. A balance score may look favorable even when both exploration and exploitation are low, while a combined or multiplicative measure can hide which side is driving the result. For questions about fit, imbalance or nonlinear combinations, polynomial, response-surface and configurational approaches can therefore be more informative than a simple main-effect model (Duong, 2026; Nofiani et al., 2021).

Ambidexterity, Digital Transformation and AI

From digital capability to ambidextrous innovation

Digital transformation has become one of the main settings in which innovation ambidexterity is examined because firms increasingly need to use digital technologies for both new opportunity development and improvement of existing operations. However, the evidence does not support a simple assumption that greater digitalization automatically produces greater ambidexterity. What appears more consistently is the need for organizational mechanisms that translate technological capability into coordinated exploratory and exploitative activity (Li et al., 2025; Liao et al., 2023).

Li et al. (2025), using evidence from Chinese manufacturing firms, show that digital platform capability contributes to innovation ambidexterity through strategic flexibility. This is important because the platform itself is not treated as sufficient. Firms need the ability to adjust strategic choices and redeploy resources before digital capability can be converted into exploratory and exploitative innovation. The finding therefore fits the capability pathway discussed earlier: technological resources provide possibilities, but organizational processes determine how those possibilities are used (Li et al., 2025).

A similar pattern appears in research on big-data analytics. Liao et al. (2023) identify dynamic decision-making capability as an important mechanism connecting analytics capability with innovation ambidexterity, while cross-functional integration influences the relationship. The implication is fairly practical: generating more information does not necessarily improve innovation if the organisation cannot interpret the information, coordinate decisions across functions and act on it. In this sense, digital capability increases the firm's information capacity, while organizational capability determines whether the information becomes useful for exploration and exploitation (Liao et al., 2023).

AI capability and the role of organizational fit

Research on artificial intelligence extends this issue because AI can support both experimentation and operational improvement, but its effects are highly dependent on how it is embedded within the organisation. Ahmad (2025), studying family-owned small hotels, reports that innovation ambidexterity forms part of the relationship between AI capability and digital transformation. More importantly, strategic fit strengthens the relationship between AI capability and ambidexterity, suggesting that the usefulness of AI depends partly on whether technological capability is aligned with organizational priorities and resources (Ahmad, 2025).

In their comparative study of firms in India and China, Gupta et al. (2023) provide a different view of the same broader issue. They examine innovation ambidexterity as a moderator between cognitive computing capability and entrepreneurial quality and report that the moderating effect is not identical across the two national settings. This suggests that ambidexterity cannot be assumed to play the same role in every institutional or organizational environment. It is also a useful reminder that Ahmad (2025) and Gupta et al. (2023) should not be cited as if they tested the same mechanism; one examines an intervening pathway, while the other examines whether ambidexterity changes the strength of a relationship.

Digitalization does not affect exploration and exploitation equally.
One of the more striking results in recent studies is that digitalization does not necessarily have a simple linear relationship with ambidextrous innovation. Using panel data from Chinese high-technology SMEs, Qin et al. (2024) report a U-shaped relationship between digitalization and innovation ambidexterity, with performance feedback changing the shape of that relationship. This suggests that the benefits of digitalization may change as firms move through different levels of digital development rather than increasing steadily from the beginning (Qin et al., 2024).

Duan et al. (2024) provide another indication that the two innovation modes can respond differently. Their study of knowledge-intensive business service firms reports a positive relationship between digital transformation and radical innovation, but an inverted U-shaped relationship with incremental innovation. Although radical and incremental innovation are not perfect substitutes for exploration and exploitation, the findings still show that digital transformation can have different implications for different forms of innovation (Duan et al., 2024).

This distinction becomes even clearer when innovation configurations are examined rather than individual dimensions. Zhao and Gao (2024) find that different combinations of technological and business-model exploration and exploitation are associated with different performance outcomes under digital transformation. Some configurations are more favorable than others, which means that the value of ambidexterity depends partly on where exploration and exploitation take place, rather than simply on whether both are present (Zhao & Gao, 2024).

Industry 4.0 as readiness and adoption context
Industry 4.0 research provides a related but slightly different perspective because some studies examine the organizational capabilities needed to adopt advanced digital technologies, while others examine the consequences of adoption. Oduro and De Nisco (2024), using meta-analytic structural equation modelling, identify innovation ambidexterity as part of the relationship between Industry 4.0 adoption and firm performance. Their findings support the view that technology adoption may create value partly through the firm's ability to pursue both exploratory and exploitative innovation (Oduro & De Nisco, 2024).

Hashem (2024) approaches Industry 4.0 readiness by examining how absorptive capacity, learning capability and innovation ambidexterity relate to adoption. The study reports different patterns for exploration and exploitation, suggesting that readiness is better understood as a set of organizational conditions that shape how firms absorb new technologies and translate them into innovation activity rather than as another label for ambidexterity.

Overall, digital evidence shows a fairly consistent pattern at the level of mechanism: technology creates new informational and operational possibilities, but complementary organizational capabilities shape whether those possibilities are converted into ambidextrous innovation. The effects are not uniformly linear, and exploration and exploitation do not always respond in the same way. Digital transformation is therefore better understood as a capability-development process than as a technological input that automatically improves innovation and performance (Liao et al., 2023; Qin et al., 2024; Zhao & Gao, 2024).

4. Green Ambidextrous Innovation and Circular Transition

Green transformation as a capability problem
Despite having underlying objectives being different, green transformation creates a similar exploration-

exploitation tension just as digital transformation. In trying to face the daunting task of improving innovation and productivity, firms would also have to deal with environmental pressures, resource constraints and sustainability expectations. The value of ambidexterity therefore depends on whether exploratory and exploitative innovation can be directed towards environmental goals rather than treated as general innovation activity (Hart, 1995; Nguyen-Van et al., 2025).

One useful example is by Vesal et al. (2022) which linked innovation ambidexterity with environmental sustainability practices and showed that leadership and senior managers' environmental attitudes condition the relationship. Suggesting that opportunities for more sustainable practices may be created through ambidextrous innovation, managerial interpretation and commitment still shape how the opportunities are realized (Vesal et al., 2022).

This matters because the presence of green innovation should not automatically be treated as evidence of improved sustainability performance. Studies use different outcomes, including environmental practices, operational efficiency, perceived sustainability, circularity and financial performance. These measures capture different stages or consequences of green transformation and should not be bundled into a single claim about sustainable performance without qualification (Ceptureanu et al., 2026; Duong, 2026; Vesal et al., 2022).

Green intellectual capital and leadership

According to a report by Nguyen-Van et al. (2025), it is suggested that knowledge resources may be especially relevant for identifying and developing new environmental opportunities, but less decisive for improving established operations. Their report found that there is an association between green intellectual capital and exploratory green innovation, but the relationship becomes weaker and non-significant with exploitative green innovation. This report presents a good example that green intellectual capital can serve as a capability foundation that can affect the two innovation modes differently.

Leadership also matters because environmental innovation requires firms to support experimentation while maintaining operational discipline. Nguyen-Van et al. (2025) report that green ambidextrous leadership is associated with green innovation and sustainable performance, while Vesal et al. (2022) show that leadership conditions the relationship between innovation ambidexterity and sustainability practices. Taken together, the findings suggest that leadership does more than sit alongside other antecedents; it can shape how existing capabilities are directed towards environmental objectives.

Digital capability and green ambidexterity

The relationship between digital capability and green transformation is becoming increasingly important because digital technologies can support information exchange, resource tracking, optimization and coordination across sustainability-related activities. Duong (2026) examines this relationship directly by linking digital platform capability and AI capability with green ambidextrous innovation, circular economy practices and sustainable performance in SMEs.

This relationship also supports the argument made in the previous section: digitalization does not automatically generate ambidexterity. In the green context, technological capability still needs to be complemented by knowledge, leadership and organizational processes that give environmental direction to innovation. A digitally capable firm may therefore be better positioned to support green transformation, but digital capability alone does not guarantee that it will pursue both exploratory and exploitative environmental innovation effectively (Duong, 2026; Nguyen-Van et al., 2025).

Circular economy and the limits of balance

Circular economy research adds another layer to the ambidexterity discussion because it makes the consequences of innovation configuration more visible. Duong (2026) reports that balanced green innovation is associated with stronger circular economy practices, while some imbalances are linked to different performance effects. The configuration that supports circularity may therefore not be the same configuration that maximizes another organizational outcome.

Ceptureanu et al. (2026) provide a related example. Their study of Romanian manufacturing SMEs reports a

positive relationship between eco-innovation ambidexterity and operational performance, but no significant relationship with financial performance. This distinction matters because an innovation capability can improve operations without producing an immediate financial return (Ceptureanu et al., 2026).

Resource constraints and green transformation

Green transformation often requires investment in technology, knowledge and new processes at the same time, making resource constraints particularly relevant for SMEs. This creates a more difficult trade-off between experimentation and efficiency. Duong (2026) shows that digital and green capabilities can support circular and sustainable outcomes, but the benefits depend on how resources are configured across exploratory and exploitative innovation.

The SME context also highlights the danger of treating ambidexterity as a simple recommendation to 'do both.' Firms with limited resources may not be able to sustain exploration and exploitation at the same intensity at all times. The more realistic question is whether they can allocate resources in a way that allows necessary experimentation without undermining operational stability (Ceptureanu et al., 2026; Duong, 2026).

Synthesis of the green evidence

Across the green literature, environmental outcomes depend on more than innovation activity alone. Knowledge resources, leadership, digital capability and organizational conditions influence whether exploratory and exploitative green innovation can be developed and whether those activities translate into circularity, operational improvement or broader sustainability gains (Duong, 2026; Nguyenvan et al., 2025; Vesal et al., 2022).

The evidence is not uniform. In some settings, green intellectual capital appears to favor exploration more than exploitation; balanced innovation may support circular practices but not every performance outcome, and operational gains may emerge without corresponding financial improvements. These differences suggest that green ambidexterity is better treated as a context-dependent capability than as a universally favorable organizational condition (Ceptureanu et al., 2026; Duong, 2026; Nguyenvan et al., 2025).

Entrepreneurial Orientation, Knowledge and Organizational Enablers

Entrepreneurial orientation and learning

Entrepreneurial orientation can direct attention towards new opportunities, but it does not by itself establish ambidexterity. Nofiani et al. (2021) show that the EO-performance relationship depends on how exploration and exploitation are configured, while Ritala et al. (2021) show that entrepreneurial behavior in digital strategy implementation is also shaped by relational capital. Strategic learning provides a further mechanism: Islam and Munir (2023) find that it mediates the relationship between strategic entrepreneurship and exploratory innovation but not exploitative innovation, indicating that the two innovation modes may require different forms of organizational support.

Knowledge capability and transformation

Knowledge management capability is rarely sufficient on its own; what matters is whether the organisation has mechanisms for sharing and recombining knowledge. Shafique et al. (2022) show that connectedness strengthens the relationship between knowledge management capability and ambidexterity, while centralization weakens it. Zhou et al. (2025) similarly link platform governance with ambidexterity through knowledge transformation. The point is simple but important: knowledge creates little innovation value if the organisation cannot move, interpret and recombine it.

The evidence also cautions against treating knowledge capability as a single homogeneous construct. Erhan et al. (2024) show that different knowledge processes can have different indirect relationships with ambidexterity, while Hashem et al. (2024) report different effects across exploratory and exploitative dimensions in digital supply-chain adoption. This suggests that particular learning and knowledge mechanisms matter at different stages of innovation.

Leadership, structure and relational coordination

Leadership and organizational design shape the conditions under which other capabilities can be used. Duan

et al. (2022) show that transactional leadership can weaken the relationship between knowledge redundancy and innovation ambidexterity, while Shafique et al. (2022) identify opposite effects for connectedness and centralization. Xia et al. (2024) further show that high ambidexterity can emerge through different configurations of leadership, digitalization and institutional conditions, suggesting that there is no single organizational formula for supporting both exploration and exploitation.

EO, learning, knowledge management, leadership, structure and relational capital therefore make more sense as a connected set of enablers than as separate predictors. Their value depends on how firms combine them and on whether the organisation allows enough room for experimentation without losing the coordination needed to implement what works (Ritala et al., 2021; Shafique et al., 2022; Xia et al., 2024).

Cross-Study Synthesis and Boundary Conditions

Convergence and divergence across the evidence

After extensive work on the literature, one common thread emerges. That is, ambidexterity is rarely the result of a single capability. Digital capability, knowledge management, leadership and organizational structure appear to work through complementary mechanisms. Li et al. (2025), Liao et al. (2023) and Shafique et al. (2022), for example, point to strategic flexibility, decision capability, integration and connectedness as mechanisms that help explain how broader capabilities are converted into ambidextrous innovation.

As a result, technology-centered explanations have a limit on ambidexterity. AI, analytics and digital platforms can widen what a firm is able to do, but they do not by themselves create ambidexterity. Ahmad (2025) points to strategic fit, while the green studies by Vesal et al. (2022) and Nguyen-Van et al. (2025) bring leadership and knowledge into the picture. A more compelling conclusion is not that technology is irrelevant when it comes to ambidexterity, but that its value depends on the organizational conditions through which it is used.

The trickier task is dealing with findings that look inconsistent at first glance. Qin et al. (2024) report a nonlinear, U-shaped relationship between digitalization and ambidexterity; Duan et al. (2024) report different patterns for radical and incremental innovation; and Ceptureanu et al. (2026) find operational gains without a corresponding financial effect. Going through the literature suggests that the differences are partly due to measurement choices, outcomes and sectoral settings rather than simple disagreement. Forcing them into a single positive-versus-negative conclusion would oversimplify how ambidexterity works in practice.

Firm context and environmental boundaries

Although not always in the same direction, the context of the firm changes particular parts of the capability pathway. SMEs often face tighter resource constraints, which can make the simultaneous pursuit of exploration and exploitation more difficult, while larger firms may have greater scope for reconfiguration (Duong, 2026; Ng & Ahmed, 2025). Family firms increase another layer of interaction because governance, cohesion and strategic alignment shape how competing innovation demands are handled. Guffler et al. (2023) emphasize paradoxical tensions and family cohesion, while Ahmad (2025) highlights strategic fit in family-owned small hotels. This shows that the type of firm does not necessarily give an automatic advantage or liability whenever ambidexterity is pursued but it does change the conditions under which it is practiced.

The external environment is equally difficult to generalize. Li et al. (2025) find that market turbulence strengthens the relationship between digital platform capability and strategic flexibility, whereas Yoshikuni et al. (2025) report insignificant moderating effects for environmental uncertainty in parts of the analytics-ambidexterity relationship. Crisis and internationalization studies add useful process details, but they are less represented in the core evidence and are better treated as contextual extensions than as major streams (Misbauddin et al., 2024).

Integrated interpretation

Overall, the literature shows that there is no universal relationship between organizational capabilities and ambidexterity but rather points towards a contextual relationship between them. Technology, knowledge and human capital provide a foundation, while strategic flexibility, learning, decision-making and reconfiguration help firms use those resources. Ambidexterity revolves around how exploration and exploitation are managed within that process, and the eventual outcome depends on context, firm configuration and measurement. This

interpretation also helps explain why empirical studies place ambidexterity in different statistical positions without assuming that each position represents a different construct (Ahmad, 2025; Li et al., 2025; Teece, 2007).

Table 3: Areas of Convergence and Divergence

Area	Evidence of convergence	Main divergence	Key boundary conditions
Digital capability	Organizational mechanisms are needed to convert technology into ambidexterity	Linear and nonlinear effects differ across studies	Strategic fit, flexibility, turbulence, integration
AI and analytics	Technology value depends on complementary organizational capabilities	Ambidexterity appears as mediator, moderator or outcome	National context, strategic alignment, decision capability
Green transformation	Knowledge, leadership and digital capability support green innovation	Exploration and exploitation respond differently; operational and financial outcomes diverge	Resource constraints, leadership, circularity goals
Knowledge and learning	Knowledge processes support ambidextrous innovation	Different knowledge processes affect exploration and exploitation differently	Connectedness, centralization, learning capability
Leadership and structure	Organizational design shapes capability use	Leadership effects are not uniformly positive	Governance, structural configuration, institutional setting
Performance outcomes	Ambidexterity can contribute to organizational value	Effects vary across operational, financial, sustainability and resilience outcomes	Firm size, flexibility, context and time horizon

Methodological and Measurement Patterns in the Reviewed Literature

Research design and causal interpretation

Survey-based quantitative research is common in this literature, but it is not the only approach. The evidence also includes panel studies, qualitative cases, configurational analysis, and meta-analytic work. Cross-sectional surveys are useful for showing associations, but they are less convincing when the argument depends on sequence or causality. Panel studies by Qin et al. (2024) and Zhao and Gao (2024), configurational work by Xia et al. (2024), and the qualitative study by Misbauddin et al. (2024) offer useful alternatives for questions that require change over time, combinations of conditions or process detail.

Measurement and level-of-analysis issues

Measurement varies almost as much as research design. Some studies keep exploration and exploitation separate, while others use balanced or combined indices, and still others focus on domain-specific forms such as green ambidextrous innovation. The capability side is also diverse: digital platform capability, AI capability, analytics, knowledge management and strategic learning are related, but they are not the same mechanism. Direct comparison therefore becomes difficult when the operationalization is ignored (Ahmad, 2025; Li et al., 2025; Nofiani et al., 2021).

Another issue is the level of analysis. Much of the literature reports firm-level outcomes even when the underlying mechanism involves employees, teams or managers. Individual entrepreneurial orientation, leadership and knowledge sharing may contribute to organizational ambidexterity, but that movement from individual behavior to firm-level capability should not be assumed. Multilevel designs could help make that link more explicit (Ritala et al., 2021; Saleh et al., 2023).

Contextual concentration and methodological opportunities

The geographical spread of the evidence is uneven, with many studies coming from Asian and emerging-market settings. Cross-country work already shows that similar capabilities can behave differently across national contexts, so institutional conditions should be examined explicitly rather than treated as background context (Gupta et al., 2023; Yoshikuni et al., 2025). Method should also follow the question: longitudinal designs are better for sequencing, configurational approaches for capability combinations, and qualitative or multilevel designs for process and cross-level explanation (Qin et al., 2024; Xia et al., 2024).

5. Research Gaps and Future Directions

Future research first needs greater conceptual clarity about where ambidexterity sits in the capability process. Empirical models should state whether they are explaining how ambidexterity develops, using it as a mechanism that connects capabilities with outcomes, or examining it as a condition that changes another relationship. Longitudinal designs would be especially useful because they can test feedback between capability development, ambidextrous innovation and organisational transformation rather than forcing these relationships into a one-way sequence (Ahmad, 2025; Li et al., 2025; O'Reilly & Tushman, 2008).

Researchers should also resist combining exploration and exploitation too quickly. The evidence shows asymmetric and nonlinear patterns associated with strategic learning, green intellectual capital and digitalisation. Composite measures can hide those differences, so polynomial, response-surface and configurational approaches may be useful where the research question concerns balance, imbalance or multiple pathways (Islam & Munir, 2023; Nguyen-Van et al., 2025; Qin et al., 2024; Xia et al., 2024).

The same should also be considered when it comes to capabilities. Digital, knowledge, leadership and relational capabilities often work in combination, and Xia et al. (2024) show that different configurations can lead to high ambidexterity. This makes configurational thinking particularly useful when comparing SMEs, family firms and larger organisations because their resource bases and governance arrangements are not the same (Gaffer et al., 2023; Ng & Ahmed, 2025; Xia et al., 2024).

Finally, digital and green transformation need to be examined together more directly. Digital infrastructure, while it competes for attention and precious limited organisational resources, can support green exploration, process optimisation and circular economy practices. Comparative and multilevel studies could help identify when digital and green capabilities reinforce one another and when trade-offs emerge, especially in resource-constrained SMEs and volatile emerging markets (Duong, 2026; Nguyen-Van et al., 2025; Yoshikuni et al., 2025).

Theoretical, Managerial and Policy Implications

Theoretical implications

From a theoretical standpoint, the main contribution is the way the review places ambidexterity inside a wider capability process rather than treating it as a stand-alone organizational attribute. The distinction between theoretical meaning and statistical position is important because exploration and exploitation may rely on different capability foundations. It also means that firm size, governance, strategic fit and turbulence are better treated as conditions attached to particular relationships than as general background variables (Islam & Munir, 2023; Li et al., 2025; O'Reilly & Tushman, 2008).

Managerial implications

For managers, the practical message is fairly straightforward: technology or knowledge investment on its own is unlikely to produce ambidextrous innovation. Firms still need strategic flexibility, learning, cross-functional integration and an organizational design that allows those resources to be used effectively. For SMEs, this may also mean sequencing exploration and exploitation or relying on external networks instead of trying to sustain high levels of both internally at the same time (Liao et al., 2023; Ng & Ahmed, 2025; Shafique et al., 2022).

Policy implications

For policymakers, the same argument suggests that support for digital and green transformation should not stop at technology adoption. SME programs may be more useful when finance or infrastructure is combined

with learning, knowledge management, coordination and network support. The design also needs to recognize that family firms, manufacturing SMEs and service firms do not face the same governance or resource constraints (Chakma et al., 2024; Guffler et al., 2023; Nguyen-Van et al., 2025).

Conclusion

This review sets out to understand how dynamic capabilities and related organizational capabilities support ambidexterity during digital and green transformation. Across the evidence, one point comes through quite clearly: ambidexterity is rarely the product of a single capability. Technology, knowledge, learning, leadership and organizational structure usually work together as firms try to turn resources into exploratory and exploitative innovation (Liao et al., 2023; Shafique et al., 2022; Teece, 2007).

The main contribution of this review is to clarify where ambidexterity fits within organisational capability processes. When researchers model ambidexterity as an outcome, mediator, moderator or predictor, they may be examining different stages of capability development and deployment rather than different constructs. Ambidexterity also does not produce identical outcomes in every setting: exploration and exploitation can respond differently to particular antecedents, while operational, financial and sustainability outcomes may diverge (Ahmad, 2025; Ceptureanu et al., 2026; Li et al., 2025).

The findings should also be read against the review's limitations, including reliance on Web of Science, uneven geographical coverage, and the continued use of cross-sectional designs and heterogeneous measures. These limitations strengthen the case for longitudinal, configurational, comparative and multilevel research. Within those boundaries, the review offers a capability-based explanation of how ambidexterity develops, where it operates within transformation processes and why its effects differ across organisational contexts (Saleh et al., 2023; Xia et al., 2024; Yoshikuni et al., 2025).

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