

Leveraging Organizational IT Affordances for Dynamic Capabilities and Business Model
Innovation: Pathways to Organizational Resilience and Competitive Advantage

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Abstract

Leveraging Organizational IT Affordances for Dynamic Capabilities and Business Model Innovation: Pathways to Organizational Resilience and Competitive Advantage

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In an increasingly volatile, digitalized, and uncertain business environment, organizations face growing pressure to continuously review and improve how they create, deliver, and capture value. While information technologies (IT) are widely recognized as key enablers of organizational change, existing research offers limited explanation of how digital technologies translate into sustained adaptability and innovation at the organizational level.

Drawing on the affordance perspective and dynamic capabilities theory, this research advances a layered explanatory logic in which organizational IT affordances, specifically collaboration, memory, and process-management affordances, expand organizational action possibilities and, when routinized, enable sensing, seizing, and reconfiguring capabilities. These dynamic capabilities, in turn, shape firms' ability to innovate their business models across value offering, value creation, and value capture dimensions. The empirical context of Canadian small and medium-sized enterprises (SMEs) operating in supply chain and manufacturing-adjacent sectors provides a revealing setting due to its environmental turbulence and resource constraints.

The dissertation comprises three essays. The first synthesizes crisis-era research through a systematic literature review to identify IT-enabled actions underlying dynamic capabilities during prolonged disruptions. The second empirically models organizational IT affordances as antecedents of dynamic capabilities using variance-based analysis. The third adopts a configurational approach to identify multiple, equifinal combinations of dynamic capabilities sufficient for distinct forms of business model innovation.

Collectively, the findings advance theory by disentangling IT affordances from capabilities, integrating variance-based and configurational approaches, and offering actionable guidance for managers seeking to leverage digital technologies for organizational resilience and competitive advantage.

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Contribution of Authors

This dissertation is presented in a manuscript-based format and consists of three essays. The candidate, Amir Asadiara, was responsible for the conception of the research ideas, research design, data collection, data analysis, interpretation of the findings, and the writing of all chapters and essays included in this dissertation.

Dr. Suchit Ahuja, the candidate's supervisor, contributed to all three essays by providing academic supervision, mentorship, and regular feedback throughout the research process. He participated in periodic meetings during which he reviewed the development of the research design, methodology, analysis, and written drafts, and provided guidance and suggestions for revisions. In Essay 1, Dr. Ahuja also participated as one of the independent coders during the qualitative coding process conducted as part of the analysis.

Dr. Mohsen Farhadloo contributed to Essay 1 by participating as a member of the coding team during the independent coding stage of the systematic literature review and by providing mentorship and feedback related to the methodological approach of the study.

Dr. Anne Beaudry contributed to Essay 1 as a co-author of the journal manuscript derived from this study. Her contribution involved supervising and mentoring the development of the manuscript version of the paper and providing feedback on the writing and structure of the journal article.

The candidate conducted the primary research activities for all three essays, including the development of the research framework, execution of the analyses, and preparation of the written manuscripts.

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List of Abbreviation

Abbreviation	Description
AI	Artificial Intelligence
AIS	Association for Information Systems
AMC	Awareness–Motivation–Capability Framework
AVE	Average Variance Extracted
BMC	Business Model Canvas
BMI	Business Model Innovation
CDC	Centers for Disease Control and Prevention
CRM	Customer Relationship Management
CSR	Corporate Social Responsibility
COVID-19	Coronavirus Disease 2019
DC	Dynamic Capability
DDC	Digital Dynamic Capability
DOI	Digital Object Identifier
ERP	Enterprise Resource Planning
fsQCA	Fuzzy-set Qualitative Comparative Analysis
HRM	Human Resource Management
HTMT	Heterotrait–Monotrait Ratio
ICT	Information and Communication Technology
IS	Information Systems
IT	Information Technology
MES	Manufacturing Execution System
MIS	Management Information Systems
PLM	Product Lifecycle Management
PLS-SEM	Partial Least Squares Structural Equation Modeling
RBV	Resource-Based View
SLR	Systematic Literature Review
SME	Small and Medium-Sized Enterprise
SMEs	Small and Medium-Sized Enterprises
SITA	Social IT Alignment
SRMR	Standardized Root Mean Square Residual
VIF	Variance Inflation Factor
WHO	World Health Organization

Chapter 1. Thesis Introduction

In today's fast-paced, hyper-connected and volatile business environment, stability has become the exception rather than the rule. Firms are operating in a context marked by continuous technological disruption, geopolitical tension, shifting consumer expectations, and rapid diffusion of digital innovations. In such an environment, no strategy or business model remains static for long and what secures competitive advantage today may quickly become obsolete tomorrow. The global marketplace has evolved into a dynamic ecosystem where adaptation is not optional but vital for survival. Recent years have seen perfect examples of this constant evolution: traditional retailers such as Walmart and IKEA reinvented themselves through omnichannel models and digital logistics, entertainment giants like Netflix pivoted from content distribution to production; and automotive leaders such as Ford and Volkswagen redefined themselves as mobility and software companies. These cases exemplify a broader reality that organizations must continually monitor technological and market shifts, reconfigure their assets, and redefine their offerings to sustain relevance.

The need for such adaptability has highlighted the crucial role of information technology (IT) and information systems (IS) as enablers of dynamic change. Digital technologies have become the infrastructure through which firms sense market trends, coordinate internal processes, and experiment with new value propositions. Yet technology alone is insufficient. Firms must develop the organizational capabilities to continuously integrate new tools, repurpose existing ones, and leverage the resources embedded in their digital environments to respond effectively to uncertainty. This means rethinking how resources are mobilized, how knowledge is retained and reused across projects, and how workflows can flexibly adapt to emerging conditions. Practitioners increasingly seek actionable frameworks such as Osterwalder's Business Model Canvas (BMC) to translate strategic vision into flexible business architectures. However, to successfully guide transformation, such frameworks must be supported by a deeper understanding of how technologies enable firms to actualize new configurations of activities, relationships, and value mechanisms in practice.

The COVID-19 pandemic also offered an unprecedented reminder of this necessity. Virtually every organization, from global airlines to local restaurants, was forced to reconfigure its business model overnight shifting to digital channels, remote collaboration, and new modes of customer engagement. The crisis highlighted not only the importance of digital infrastructure but also of technologies that sustain collective coordination, preserve organizational know-how, and ensure process continuity amid disruption. The ability to connect multi-location teams, retrieve and reuse critical knowledge, and redesign workflows in real time determined whether firms could remain agile or fall behind. Those equipped with these capabilities (technological and organizational) were able to pivot swiftly, while others struggled to remain viable. The learned lesson was that in an era

defined by volatility, uncertainty, complexity, and ambiguity, leveraging IT for agility and transformation is no longer a strategic luxury but it is a matter of survival. Understanding how organizations can dynamically harness IT to continuously reshape their capabilities and innovate their business models thus represents a pressing challenge for both scholars and practitioners.

Building on this broader context, digital technologies continue to reshape industries not only by automating tasks or enhancing efficiency, but by expanding what organizations can do in terms of changing routines, relationships, and even the logic of value creation, delivery, and capture (Nambisan et al., 2017; Teece, 2010). These transformations highlight the need for theoretical perspectives that explain how technology enables such organizational change. While traditional IT research has often focused on resources and infrastructures, recent work emphasizes the action possibilities that technology affords to organizational actors. These affordances represent the bridge between technological potential and realized organizational change, capturing how digital tools become embedded in daily practices. In parallel, dynamic capability theory provides a complementary lens to understand how these enacted affordances accumulate into repeatable, organization-level capacities for sensing and responding to environmental shifts.

This dissertation studies how organizational IT affordances defined as the action possibilities enabled by digital systems become foundations for IT-enabled dynamic capabilities (DCs) and, in turn, how distinct configurations of DCs support business model innovation (BMI) (Leonardi, 2011; Strong et al., 2014; Volkoff & Strong, 2013).

Building on this theoretical foundation, the study situates these mechanisms within the context of Canadian small and medium-sized enterprises (SMEs) operating in supply chain and manufacturing-adjacent sectors. These firms provide an especially revealing setting for examining how IT affordances translate into dynamic capabilities and business model innovation, as they often face strong environmental pressures but operate with limited resources and less formal structures. Their survival and growth depend heavily on their ability to flexibly reconfigure routines and leverage digital tools to sense and respond to opportunities.

Firms, especially small and medium-sized enterprises operate under persistent turbulence. Shifting customer expectations, supply disruptions, data-rich competitors, and regulatory pressure on data and sustainability creates constant pressure. Many of these pressures are digital at their core: new data flows destabilize established routines; platform logics constantly change who captures value; and automation shifts different jobs' skill and knowledge requirements. In such environments, tactical adjustments to products or processes are rarely sufficient; the real challenge is to innovate in the business model itself. In other words, there is a need to revisit the fundamental questions of what is offered, how it is created and delivered, and how value is captured using the affordances of digital technology as leverage for change (Osterwalder & Pigneur, 2010; Teece, 2010). Two implications follow. First, the central question is not merely what IT a firm owns, but how IT changes what organizational actors can do together and how those actions cumulate into routinized capacities for adaptation. Second, because business model change is systemic, managers need to

understand not only average net effect relationships but also how different combinations of organizational capabilities can substitute for or complement each other to reach similar outcomes under different constraints.

1.1 Conceptual Underpinnings: IT Affordances, Dynamic Capabilities, and Business Model Innovation

In this sense, three concepts anchor this dissertation. First, *IT Affordances* are treated as organizational-level patterns of action possibility made available by digital systems and actualized in work practices, which mainly consist of collaboration, memory, and process-management affordances. They originate in user-technology interactions, but all together (either combined or compiled) they aggregate into collective, organization-level phenomena that shape what the firm can do (Leonardi, 2011; Volkoff & Strong, 2013; Strong et al., 2014). Second, *Dynamic Capabilities* are higher-order routines to sense changes, seize opportunities, and reconfigure assets and structures and work as capacities for renewing a firm's resource base (Pavlou & El Sawy, 2011; Teece, 2007; Teece et al., 1997). Recent research extends this argument to the ecosystem level, showing that sensing, seizing, and reconfiguring capabilities collectively enable firms to orchestrate digital innovation ecosystems through partnership configuration and value-proposition alignment (Linde et al., 2020). In uncertain and turbulent, digitally mediated markets, the dynamism of capabilities is not optional; it is the baseline. Because these capabilities affect performance mainly by reshaping how the firm creates, delivers, and captures value, their effects show up first in the business model. Third, *Business Model Innovation* is therefore conceptualized as a significant change in this value logic either in form of a completely new or significantly improved component of business model. To operationalize it in a way managers can recognize, the Business Model Canvas (BMC) provides a pragmatic, managerially legible scaffold (Osterwalder & Pigneur, 2010, 2013). Consistent with the thesis's aim to connect capabilities to outcomes while retaining analytic detail, this study adopts a two-level view: aggregated dimensions of value offering (e.g., proposition, customer segments, channels, CRM), value creation (partners, activities, resources), and value capture (costs, revenues); and the nine components of the BMC.

To provide some meaningful illustrations regarding the basis of these constructs from theoretical point of view, we can consider three practical examples: First regarding collaboration affordances: when cross-functional teams use a shared digital workspace (chat or co-authoring), it does more than hold messages. It helps people frame problems faster, surface side information, and work across unit boundaries. Doing this repeatedly widens sensing by seeing more and seeing it sooner. It also helps build support around good ideas, which speeds seizing when managers need to make decisions and commit resources (Leonardi, 2011; Pavlou & El Sawy, 2011). Second, memory affordances highlight the fact that searchable knowledge bases with decision logs and templates do more than just "document." They help teams spot patterns, compare options to past cases, and commit faster which is useful for seizing. But they can also lock people into old templates, raising

the risk of repeating yesterday's answers when conditions have changed (Svahn et al., 2017; Volkoff & Strong, 2013). Also, Process-management affordances which are reflected through instrumented workflows, clear handoffs, and visible dependencies let firms make modular changes in a safer and cheaper manner, enabling reconfiguring. Yet heavy formalization and rigid processes can cut slack and experimentation, making exploration harder (Markus & Rowe, 2021; Strong et al., 2014). These examples don't imply determinism. Affordances make certain outcomes possible, not guaranteed, but they show the basic intuition behind the models.

1.2 Filling Gaps in the Literature

Building on these definitions, three gaps frame the thesis agenda. First, studies often confuse the action possibilities embedded in IT (affordances) with the routinized capacities of the firm (capabilities). This dissertation disentangles them by treating organizational affordances as micro foundations and conditions that can enable the emergence of dynamic capabilities when enacted and routinized (Helfat & Raubitschek, 2018; Leonardi, 2011; Volkoff & Strong, 2013). Recent work on IT asset orchestration similarly emphasizes that digital transformation relies on social and relational mechanisms for mobilizing IT resources into dynamic capabilities (Ahuja & Chan, 2017; Pelletier et al., 2023). Second, net-effects thinking can mask double-edged IT dynamics. For example, process codification that streamlines execution may limit exploration; memory that accelerates reuse may reinforce old and rigid patterns; collaborative platforms that broaden search can also increase noise or create overload (Svahn, Mathiassen, & Lindgren, 2017; Markus & Rowe, 2021). Third, BMI is inherently systemic; different bundles of capabilities can yield similar outcomes (equifinality) and the absence of a condition is not simply the inverse of its presence (asymmetry). Explaining BMI therefore requires a configurational lens that can represent conjunctural causation and multiple, non-exclusive routes to similar endpoints (Fiss, 2011; Misangyi et al., 2017).

The thesis therefore aims to explain how organizational IT affordances enable the development of dynamic capabilities and how different configurations of those capabilities drive business model innovation, providing guidance for sequencing IT investments followed by the dynamics by which IT functions can be actualized after the perception and bundling capabilities under real-world constraints with the goal achieving innovation and performance excellence. Each research question follows directly from this aim. First, using the COVID-19 crisis as a gateway to observe dynamic capabilities end-to-end, how do firms enact sensing, seizing, and reconfiguring in turbulent, uncertain environments i.e., what IT-enabled actions and governance routines appear in practice. This calls for a conceptual synthesis anchored in crisis contexts and action-based responses. Second, generally, how do collaboration, memory, and process-management affordances differentially enable (or constrain) sensing, seizing, and reconfiguring? A variance-based model is necessary to estimate sign and magnitude and to test the validity of the underlying measurement model. Third, which bundles of sensing, seizing, and reconfiguring are sufficient for distinct BMI outcomes at both aggregated (offering/creation/capture) and component (BMC) levels? In this case

also, a configurational setting is required to reveal equifinal routes, to separate core from peripheral conditions, and to capture causal asymmetry.

In sum, these essays are unified by a central explanatory logic that underlies the dissertation: organizational IT affordances enable dynamic capabilities, which subsequently drive business model innovation (BMI). This causal chain anchors the theoretical model, clarifying how technological antecedents give rise to organizational mechanisms that ultimately shape innovation outcomes.

Taken together, as mentioned above, the dissertation advances a layered chain: affordances → dynamic capabilities → BMI. Affordances are expected to strengthen DCs by widening information flows, enabling reuse and informed commitment, and empowering reconfiguring by making resource recombination more streamlined and executable. Yet these links are neither universal nor uniform. The point is to replace “one best way” prescriptions with a bundle logic that acknowledges substitution and complementarity among capabilities which is also consistent with how managers actually deal with constraints (Teece, 2007; Pavlou & El Sawy, 2011; Fiss, 2011). Because BMI is the immediate pathway through which capabilities affect performance, the analysis keeps the outcome space close to managerial levers by organizing it with the BMC and by examining both aggregated dimensions and specific components (Osterwalder & Pigneur, 2010; 2013).

1.3 Organization of the Dissertation: Three Essays

The empirical and conceptual work proceeds in three mutually reinforcing essays. **Essay 1** conducts a systematic literature review of crisis-era research to map concrete, IT-enabled actions and governance routines to the DC triad, clarifying what sensing, seizing, and reconfiguring look like in practice and building a vocabulary the later essays operationalize. **Essay 2** models IT affordances as organizational-level microfoundations of DCs and estimates their net effects on sensing, seizing, and reconfiguring, documenting both enabling and constraining pathways (which is consistent with the double-edged nature of IT) and legitimizing the organizational level of analysis for affordances (Leonardi, 2011; Volkoff & Strong, 2013; Helfat & Raubitschek, 2018). **Essay 3** identifies capability bundles sufficient for BMI at multiple levels of granularity, showing that firms can reach similar innovation endpoints via different configurations (Fiss, 2011; Misangyi et al., 2017; Osterwalder & Pigneur, 2010, 2013; Ragin & Fiss, 2008). The dissertation concludes by integrating insights across essays to provide theoretical, methodological, and managerial guidance for IT-enabled capability building and business model change.

Figure 1 presents a straightforward graphical representation depicting the distinct perspectives utilized by the three essays included in this dissertation proposal.

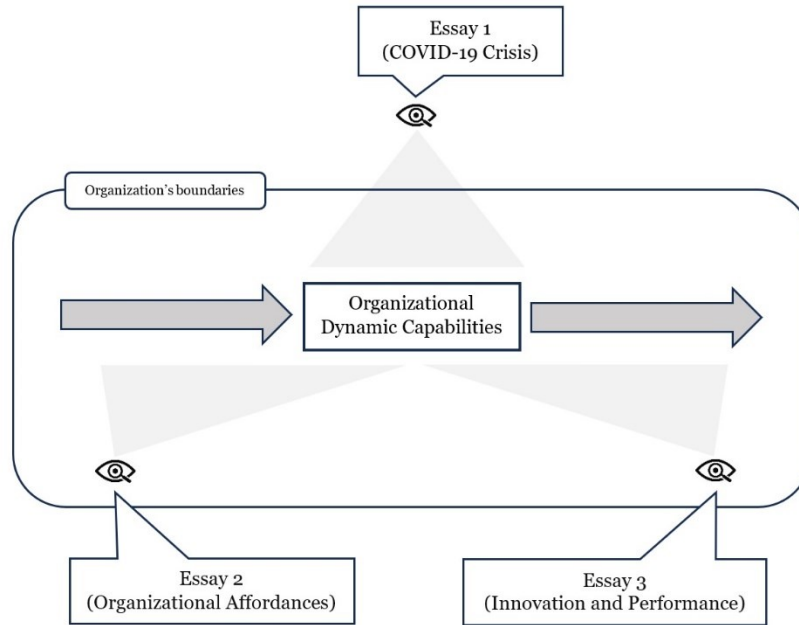


Figure 1: Overview of the Three Essays and Their Perspectives on Organizational Dynamic Capabilities

In terms of *methodological approach*, it needs to be taken into account that different questions demand different lenses. Essay 1 uses a **systematic literature review** to surface the IT-enabled, action-based microfoundations of the DC triad. Essay 2 employs **PLS-SEM** to estimate directional, net effects with reflective measurement and modest samples, yielding interpretable path coefficients, explained variance, and construct-validity evidence consistent with established psychometric criteria (Nunnally & Bernstein, 2007). Essay 3 applies a fuzzy-set Qualitative Comparison Analysis (**fsQCA**) method to identify capability combinations sufficient for BMI (conjunctural causation), accommodating equifinality and asymmetry, distinguishing core from peripheral conditions across parsimonious and intermediate solutions, and comparing coverage and consistency across routes (Fiss, 2011; Park et al., 2020; Ragin & Fiss, 2008; Schneider & Wagemann, 2012). Together, PLS-SEM answers how much and in which direction, while fsQCA answers which bundles and under what configurations.

Accordingly, Essay 1 asks: “How can firms’ actions and strategies during prolonged crises, such as the COVID-19 pandemic, be interpreted through the dynamic capabilities framework?” Essay 2 asks: “How do specific IT affordances contribute to the development of dynamic capabilities?” and Essay 3 asks: “Which configurations of dynamic capabilities lead to distinct forms of business model innovation?”

1.4 Contributions to the Theory and Practice

The cumulative contributions follow from this architecture. Conceptually, the dissertation separates affordances (action possibilities) from capabilities (routines) and positions the former as organizational-level antecedents clarifying microfoundations debates in IS and strategy (Leonardi, 2011; Volkoff & Strong, 2013; Helfat & Raubitschek, 2018). This moves discussions of “IT capability” away from undifferentiated inventories of assets toward a practice-based account of how digital systems change what actors can do, and how such changes translates into durable capacities for sensing, seizing, and reconfiguring. Methodologically, coupling variance-based and configurational lenses on the same phenomenon improves explanatory depth while staying faithful to distinct research questions: net-effects for direction and magnitude; configurational analysis for sufficiency, asymmetry, and equifinality (Ragin, 2008; Fiss, 2011; Schneider & Wagemann, 2012; Park, Fiss, & El Sawy, 2020). Practically, the results translate into playbooks for prioritizing IT investments (which affordances most strongly enable which capabilities) and for bundling capabilities tailored to specific BMI targets (i.e. offering, creation, capture) particularly under SME-style constraints where resources, time, and attention are scarce (Teece, 2018; Warner & Wäger, 2018). Rather than proposing an idealized capability portfolio, the dissertation shows how managers can realistically and practically move forward with their sequenced decisions: build or emphasize one capability given the available affordances, and then recombine.

To situate the contribution historically, the dissertation also builds on the maturation of dynamic capabilities theory from foundational statements about renewal under rapid change (Teece, Pisano, & Shuen, 1997) to the most recent clarifications of microfoundations and their governance under uncertainty (Teece, 2007), as well as more practitioner-oriented insights that tie capability orchestration to strategic choices and organizational design (Teece, 2018). This direction justifies the dissertation’s emphasis on routines and governance: Capabilities are not standalone traits but patterned actions that depend on how managers structure participation, incentives, and information flows. In that sense, organizational IT affordances constitute conditions for capability development. They shape the feasible action space, while governance mechanisms make some actions likely and others rare (Leonardi, 2011; Helfat & Raubitschek, 2018).

The argument also makes room for multilevel emergence and boundary conditions. Organizational-level affordances do not reduce the role of individuals but they assume that repeated, similar interactions with technology can form a stable pattern at the firm level. (Klein & Kozlowski, 2000). If practices are fragmented or inconsistent, affordances weaken and their effects become noisier. The results also depend on sector routines, regulations, and digital maturity. The generalizable claim is that capability bundles and their underlying affordances provide multiple viable routes to business model innovation; the specific bundles that dominate will depend on context.

These claims should be read under explicit boundary conditions. The unit of analysis is the organization; constructs are reflective and measured with multi-item Likert items validated through expert sorting and pilot testing. The empirical data also emphasize managers in Canadian firms in supply chain/manufacturing and closely related sectors. Environmental conditions such as turbulence, crisis, and regulatory shifts also need to be factored in for the entire chain from affordances to capabilities to innovation and shape how results might change in different settings. Additionally, the measurement follows established reliability and validity criteria (e.g., Cronbach’s alpha, composite reliability, AVE, Fornell–Larcker, HTMT) and reflects the choice to capture latent constructs that are not directly observable (Moore & Benbasat, 1991; Nunnally

& Bernstein, 2007; Venkatesh et al., 2003). At a theoretical level, multilevel emergence is acknowledged in treating organizational affordances as aggregations (in form of combination or compilation) from repeated micro-level practices. The firm-level pattern exists because similar action possibilities are enacted across roles and units with enough consistency to emerge as an organizational phenomenon (Klein & Kozlowski, 2000; Negoita et al., 2018). These boundaries do not weaken the argument but they clarify where and how the findings are intended to apply.

On measurement and validation, the reflective measurement follows established practice in IS and strategy for latent, perception-based constructs (which to a great extent is the case here). Items were adapted and refined through expert card sorting to align content with construct definitions and to reduce overlap which is particularly important where adjacent constructs (e.g., collaboration vs. process-management affordances) without careful wording could be confused (Moore & Benbasat, 1991). Psychometric evaluation (e.g., Cronbach's α , composite reliability, AVE, Fornell–Larcker, and HTMT) proceeds prior to hypothesis tests to help with interpretive errors being caused by weak measures (Nunnally & Bernstein, 1994; Venkatesh et al., 2003). This sequence is in line with the logic of variance-based modeling in Essay 2 and provides a defensible platform for subsequent configurational analysis in Essay 3.

Regarding empirical context, focusing on Canadian SMEs in supply chain and manufacturing-adjacent sectors is theoretically and practically meaningful. These sectors offer a dynamic environment where firms must continuously adapt to fluctuations in demand, input availability, logistics constraints, and technological change, conditions that make the deployment of dynamic capabilities especially visible. At the same time, these SMEs face resource constraints in terms of capital, technical expertise, and managerial attention, which highlights the importance of understanding substitution and complementarity among capabilities. Moreover, digitization in such firms typically spans both enterprise systems (e.g., ERP, MES, PLM) and collaboration or knowledge-sharing tools, creating natural variation in collaboration, memory, and process-management affordances. This coexistence of operational and collaborative technologies provides an relevant context for examining how digital affordances are actualized and combined to enable adaptation and business model renewal. Finally, the centrality of supply-chain and manufacturing SMEs to Canada's innovation economy underscores the broader relevance of insights into how these firms can sequence IT investments determining what to emphasize first and what can be postponed without sacrificing innovation.

The configurational component (Essay 3) also requires a brief methodological note for managerial interpretation. Calibrating Likert scales into fuzzy sets using percentile anchors (for example, 10/50/90) maps survey variation onto set membership with transparent cutoffs, while consistency thresholds around 0.80 provide a conservative test of sufficiency (Ragin, 2008; Schneider & Wagemann, 2012). Coverage statistics translate the practical reach of each configuration (a manager-friendly indicator of how much of the outcome space any given route explains) while distinguishing unique from shared coverage clarifies whether a configuration offers distinctive guidance or largely overlaps with others (Fiss, 2011). This approach is helpful for decision makers choosing among multiple viable routes to offering, creation, or capture innovation.

In sum, with these pieces in place, the practical logic becomes concrete. For example a resource-constrained firm seeking to innovate its value offering without major structural changes, strengthening collaboration affordances to improve sensing and pairing them with disciplined seizing may suffice to reposition the value proposition and segments. A firm targeting value creation may focus on process-management

affordances to enhance reconfiguring, complemented by selective sensing to identify where modular changes can pay off. For value capture, stronger memory affordances can help firms innovate in pricing by using past decisions, while reconfiguring supports cost-structure redesign. These scenarios are consistent with the empirical expectations and keep the discussion close to managerial levers (Osterwalder & Pigneur, 2010, 2013; Teece, 2018; Warner & Wäger, 2019).

1.5 Theoretical Foundations

1.5.1 IT-enabled Dynamic capabilities of the firm

Dynamic capabilities (DCs) were introduced in the mid-1990s to address a core limitation of the resource-based view, the inability to explain how firms renew their competences when environments change. Early work by Teece and colleagues defined DCs as “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments”. Subsequent research refined this definition by specifying micro-foundational routines such as sensing opportunities and threats, seizing opportunities through committed action, and transforming or reconfiguring assets and structures that enable continuous renewal. In the information systems (IS) and management literatures, DCs have become a central construct for understanding how digital technologies, managerial actions and organizational learning processes interact to produce innovation and sustained performance. Recent case-based evidence further illustrates this interaction: firms reconfigure capabilities through iterative experimentation on digital platforms, turning affordance actualization into a continuous learning loop (Sjödin et al., 2020). However, there is an ambiguity and fuzziness around the conceptualisations and operationalization of the DC construct and its different categories namely sensing, seizing and reconfiguring capacities as well as the antecedents and outcomes of the construct that makes it extremely challenging to understand and study in more detail (Buzzao & Rizzi, 2021; Steininger et al., 2022).

This review synthesizes how DCs have been conceptualized and operationalized in IS and management, examines the antecedents that enable them, and traces the outcomes (such as innovation and firm performance that they mediate). The objective is to integrate findings across disciplines and highlight the chains linking digital and organizational factors to performance via dynamic capabilities.

Dynamic capabilities have been conceptualized in several, sometimes complementary, ways. One view treats them as higher-order organizational abilities. Teece et al. (1997) describe dynamic capabilities as an organization’s ability to purposefully integrate, build, and reconfigure competences to address change, thereby governing the evolution of ordinary capabilities. Another perspective defines them as learned and stable patterns of collective activity by which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness (Zollo & Winter, 2002), highlighting the routinized nature of DCs and the role of organizational learning in their development. A further approach frames DCs around three

interrelated routines of sensing, seizing, and reconfiguring, where sensing involves scanning and sensemaking to detect opportunities and threats; seizing mobilizes resources and commits to a course of action; and transforming (or reconfiguring) rearranges assets and structures to sustain new strategies (Barreto, 2010; Teece, 2007). Some research decomposes DCs into measurable clusters, such as learning, integrating, coordinating, and reconfiguring, arguing that these routines collectively implement sensing, seizing, and transforming and can be measured as reflective constructs at the organizational level. Finally, a synthesis view emphasizes that dynamic capabilities are best understood through their microfoundations such as the managerial processes, structures, and decision rules that underpin them (Foss, 2010) providing explanatory leverage and helping avoid confusing capabilities with resources or outcomes.

In this dissertation, dynamic capabilities are conceptualized following Teece (2007) and Pavlou & El Sawy (2011) as higher-order, routinized processes (specifically sensing, seizing, and reconfiguring) through which organizations purposefully adapt their resource base and business models. This perspective takes into account both the action-oriented view of microfoundations and the measurable, IT-enabled routines that operationalize these capabilities at the firm level. Despite differences across definitions, these perspectives share two common elements: dynamic capabilities focus on purposeful change rather than operational efficiency, and they are learned and repeatable, suggesting that organizations can build, transform, and improve them through practice and governance using their pool of tangible and intangible resources and technologies.

The literature proposes several frameworks to organise the content and operation of dynamic capabilities. As mentioned earlier, Teece's micro-foundational model groups capabilities into three classes including sensing, seizing and reconfiguring that must work together to generate innovation. This framework emphasises sequencing (sense → seize → transform) but allows overlap. Researchers often break dynamic capabilities into routines such as learning, integrating, coordinating and reconfiguring; these can be modelled as first-order factors loading on a higher-order dynamic capability construct. In terms of static or dynamic nature of the concept, Winter (2003) distinguishes zero-order capabilities (operational routines that allow the firm to “make a living”), first-order dynamic capabilities (e.g., product development routines) and second-order capabilities that modify lower-order capabilities (Winter, 2003), underscoring that dynamic capabilities operate on other capabilities. Process models of capability development offer further insights. Cyfert et al. (2021), for example, propose a five-stage model comprising generation, selection, integration, reconfiguration and impact assessment with 27 components, emphasising that dynamic capabilities emerge from intentional learning and reconfiguration processes (Cyfert et al., 2021). Additionally, several works draw from the knowledge evolution cycle (variation, selection, replication, retention) to explain how dynamic capabilities arise from learning and adaptation (Ambrosini & Bowman, 2009).

Despite these contributions, the dynamic capabilities literature shows ongoing conceptual ambiguity (Steininger et al. 2022). Scholars debate whether DCs should be defined as routines, processes, or resource configurations, and whether they are sequential or bundled. Eisenhardt and

Martin (2000) view dynamic capabilities as structured analytic processes, whereas Teece emphasises less formal routines. Some studies treat operational routines as dynamic capabilities, blurring distinctions (Eisenhardt & Martin, 2000; Peteraf et al., 2013). Many works rely on distant proxies or cross-sectional surveys, leading to calls for richer process data and longitudinal designs. A further critique is the absence of a standardized measurement scale as Kump et al. (2019) note that no universal scale exists, though they propose a 14-item instrument for sensing, seizing and transforming that predicts business and innovation performance. These ambiguities motivate the need for clear boundaries, careful operationalization and multi-method approaches (Kump et al., 2019).

Researchers have employed varied methods to measure dynamic capabilities. Reflective multi-item scales are common: many studies use survey instruments to capture perceptions of sensing, seizing and transforming, and Pavlou and El Sawy (2011) develop reflective scales for learning, integrating, coordinating and reconfiguring that together form a higher-order dynamic capability. Some studies treat dynamic capabilities as a second-order latent variable comprising first-order routines (Pundziene et al., 2022; Schilke, 2014), which accounts for their multidimensional nature while providing a parsimonious measure. Empirical work often relies on process indicators and proxies such as R&D intensity, number of new products or strategic alliances, although critics argue that such proxies may capture outcomes rather than capabilities. Scale-development efforts, including those by Kump et al. (2019) and Janssen et al. (2014), aim to provide more robust measures and propose measurement scales for complementary service innovation capabilities (Janssen et al., 2016). To capture non-linear interactions among capability dimensions, some researchers apply configurational approaches such as fuzzy-set qualitative comparative analysis (fsQCA), identifying sufficient configurations of sensing, seizing and transforming for desired outcomes. For instance, Raymond et al. (2020) employ fsQCA to uncover equifinal combinations of IT and strategic capabilities that enable explorative learning in Canadian industrial-service SMEs. Their study positions explorative learning as a dynamic capability emerging from the interplay of IT infrastructure and e-business capabilities with R&D, HRM and networking competencies, highlighting how distinct capability configurations produce high innovation and productivity outcomes. Taken together, operationalization remains an area of active development, with no universally accepted instrument (Raymond et al., 2020).

Building on this premise, the question becomes how organizations transform technological potential into lasting adaptability. While digital technologies provide the raw material for change, it is the firm's dynamic capabilities that determine whether transformation succeeds. These capabilities do not emerge in isolation; they are shaped by organizational, technological, and environmental conditions that either enable or constrain their development (Wilden et al., 2013). Understanding the antecedents that foster the emergence of dynamic capabilities, such as the presence of flexible digital infrastructures, knowledge-sharing routines, and supportive managerial cognition, is therefore essential. Equally important is examining their outcomes, including how these capabilities translate into innovation, strategic renewal, and sustainable competitive

advantage. This dual focus on what enables dynamic capabilities and what they enable in turn, provides the theoretical backbone of this thesis and guides the investigations presented in the subsequent essays.

1.5.2 IT Resources and Digital Assets as Antecedents of Dynamic Capabilities

Research identifies several categories of antecedents that enable or inhibit dynamic capabilities, with recent work in information systems and management placing increasing emphasis on digital antecedents (Linde et al., 2021; Pelletier, 2021; Raymond et al., 2020; Schilke; Barreto, 2010). While traditional antecedents such as leadership and governance, organizational learning processes, structural design, environmental dynamism, and human capital still remain relevant, but they increasingly interact with digital technologies to shape firms' adaptive capacities (Saeedikiya et al., 2024; Steininger et al., 2022).

In this regard, the asset orchestration perspective provides a complementary lens to understand how IT resources are mobilized into capabilities. This orchestration perspective echoes the resource-orchestration view, which details how firms structure, bundle, and leverage IT resources to develop IT and dynamic capabilities for innovation, even under environmental turbulence (Ahuja & Chan, 2017). Drawing from the social IT alignment (SITA) framework, Pelletier et al. (2021) demonstrate that IT-enabled transformation depends not only on the structural alignment of technologies but also on relational coordination, shared IT competencies, and the orchestration of IT assets through allocation, structuration, and coordination mechanisms. These processes collectively form the basis through which IT assets evolve into dynamic capabilities.

Building on this orchestration view, recent research has turned its attention to the specific digital capabilities that allow firms to enact such coordination and transformation through technology. Digital capability refers to an organization's proficiency in deploying digital technologies to support business activities and empower employees (Slavković et al., 2023). In a recent study of German SMEs, digital capability was conceptualized as a foundational enabler that provides firms with access to digital tools, platforms, and data essential for transformation. However, the study emphasized that digital capability alone is not sufficient to achieve superior outcomes. It must be complemented by dynamic capabilities to effectively convert digital resources into performance gains. Dynamic capabilities act as the driving force that enables firms to harness their digital infrastructure for strategic renewal, while organisational learning processes such as knowledge creation, integration, and reconfiguration facilitate the translation of digital capability into tangible business value (Held et al., 2025).

Complementary to digital capabilities is the role of IT flexibility which is the adaptability of IT infrastructure to changing needs. Mikalef et al. (2021) show that flexible IT infrastructure enables firms to reconfigure processes and align IT strategies with shifting conditions, thereby enhancing dynamic capabilities and competitive performance. They argue that IT capabilities are multidimensional constructs, and IT flexibility is a critical dimension enabling strategic

reconfiguration and differentiation (Mikalef et al., 2021). In turbulent and heterogeneous environments, flexible and decentralised IT governance schemes become even more important (Pavlou & El Sawy, 2010).

Digital assets such as data analytics platforms, cloud services, and digital platforms likewise provide resources that can be mobilized through dynamic capabilities (Saeedikiya et al., 2024). These specialized causal configurations highlight how evolving digital technologies expand the scope of automation and integration, aligning closely with the reconfiguring dimension of dynamic capabilities. Such affordances become microfoundational antecedents when organizations use them to experiment, iterate, and reconfigure digital services; however, barriers such as resistance to change or lack of skills can impede affordance actualization (Anderson & Robey, 2017; Bernhard et al., 2013; Volkoff & Strong, 2013).

A recurring theme in the RBV and dynamic capabilities literature is the need to separate IT resources from the affordances they provide (Volkoff & Strong, 2013). Steininger et al. (2022) caution against assuming that IT resources automatically yield positive outcomes and call for granular analysis of specific IT resources, their affordances, the actualization of those affordances and the resulting outcomes. They argue for a sociomaterial, resource-orchestration perspective, noting that simply deploying IT can constrain as much as enable; only when users recognise and enact an IT system's action possibilities (affordances) does it become an antecedent to dynamic capabilities (Steininger et al., 2022; Volkoff & Strong, 2013). As Volkoff and Strong note, affordances exist in the real domain as potentials for action that require user intentionality and temporal actualization. This perspective underscores that digital assets and platforms are latent resources, they become true antecedents of dynamic capabilities through the actions, learning processes and governance mechanisms that actualise them. Recent qualitative evidence deepens this connection by identifying specific routines through which dynamic capabilities emerge in digital transformation contexts (Ellström et al., 2022; Volkoff & Strong, 2013). Ellström et al. (2022) outline routines such as digital sensing, adaptive strategy development, and infrastructure unification that illustrate how firms enact sensing, seizing, and reconfiguring in practice. While this study does not examine these routines directly, they exemplify the kinds of organizational patterns that IT affordances can enable once actualized.

Recent configurational research further refines this distinction by examining how combinations of organizational and technological conditions drive strategic outcomes. For instance, Cui et al. (2017) demonstrate through a configurational analysis that awareness, motivation, and capability (AMC) factors interact in multiple ways to generate distinct patterns of competitive action (Cui et al., 2017). Complementarily, Mikalef et al. (2021) show that flexible IT infrastructures and architectures act as enabling assets that align with dynamic capabilities to support strategic renewal and competitive performance. Together, these studies highlight that neither organizational motivation and awareness nor technological resources alone suffice and competitive advantage arises from their synergistic orchestration within specific contextual configurations.

Digital antecedents also interplay with organisational learning. Chen & Zheng (2022) demonstrate that organisational learning significantly improves firms' resource integration and reconfiguration capabilities and that these capabilities mediate the relationship between learning and performance. Learning processes help firms transform digital data into actionable knowledge (Chen & Zheng, 2022; Pelletier et al., 2023; Raymond et al., 2020). This interplay between digital capability and learning fosters dynamic capability. The same study notes that dynamic capabilities are behaviour-oriented routines to improve and recreate resources and that learning is key to restructuring operational capabilities (Chen & Zheng, 2022). They argue that organisational learning converts digital capability into dynamic capability through knowledge generation, integration and reconfiguration.

Environmental factors also interact with digital antecedents. Steininger et al. (2022) observe that competitive pressure and environmental turbulence drive the development of dynamic capabilities and moderate their effects on performance. In dynamic and heterogeneous environments, flexible IT infrastructures and decentralised governance are particularly vital. The COVID-19 pandemic highlighted this point: crisis contexts provided a gateway to observe how digital tools, learning processes and governance routines jointly enable dynamic capabilities.

Although multiple antecedents can contribute to the emergence of dynamic capabilities, the present study focuses specifically on organizational IT affordances as the central antecedent. This choice reflects the need to move beyond static conceptualizations of IT resources and digital capabilities, toward understanding the action potentials embedded in technology and their enactment within organizational contexts. Following the critical realist and sociomaterial reasoning advanced by Volkoff and Strong (2013), affordances are treated not as properties of technology itself but as relational mechanisms arising from interactions between IT artifacts, users, and structures (e.g. organizational goals). By emphasizing affordances, this study captures the generative mechanisms through which digital resources become mobilized and transformed into dynamic routines such as sensing, seizing, and reconfiguring.

Focusing on affordances as antecedents also provides a stronger microfoundational explanation for how digital tools contribute to dynamic capabilities. Unlike broader constructs such as digital capability or IT flexibility, which describe organizational competencies or infrastructure properties, affordances are enacted phenomena that connect technology features to user actions and organizational outcomes (Leonardi, 2011; Volkoff & Strong, 2013). They offer an analytically precise bridge between technological potential and dynamic capability actualization, allowing the study to trace how organizations recognize and realize specific digital opportunities. In this sense, IT affordances represent the proximal enablers of dynamic capabilities, while other antecedents like leadership, learning, or environmental conditions function as contextual moderators influencing the realization of these affordances.

Accordingly, this study conceptualizes IT affordance actualization as the primary mechanism through which digital assets contribute to the development of dynamic capabilities. By identifying

and examining the configurations of affordances that enable sensing, seizing, and reconfiguring, the research extends dynamic capability theory into the digital transformation context. This perspective aligns with calls in recent IS research to examine the generative mechanisms that link digital resources to organizational adaptability (Volkoff & Strong, 2013; Steininger et al., 2021; Ellström et al., 2022) and positions affordance actualization as the foundational antecedent in this inquiry.

While prior research often treats affordance actualization as a distinct construct or outcome, this study takes a more integrative stance. It views affordance actualization not as a separate layer but as the process through which organizational IT affordances are translated into dynamic capabilities (Bygstad et al., 2016; Pozzi et al., 2014). In this framing, the success of affordance actualization is reflected in the organization's ability to transform digital possibilities into sensing, seizing, and reconfiguring capacities. Thus, rather than modeling it as an independent variable, this study embeds affordance actualization within the relationship between IT affordances and dynamic capabilities, treating it as the underlying generative mechanism that enables this translation. This interpretation maintains theoretical alignment with the affordance literature (Volkoff & Strong, 2013; Strong et al., 2014; Ellström et al., 2022) while ensuring coherence with the dynamic capabilities' framework central to this thesis.

1.5.3 Outcomes of Dynamic Capabilities: Innovation and performance

Dynamic capabilities are valuable insofar as they produce organizational outcomes. In the information systems and management literature, these outcomes typically unfold along two paths: innovation (product, process, marketing, business model) and performance (financial, operational, digital, sustainable). Although dynamic capabilities are often linked to improved organizational performance, the literature suggests that this relationship is usually indirect, operating through intermediate innovation or transformation outcomes (Eisenhardt & Martin, 2000; Teece, 2007; Wilden et al., 2016). In this view, financial and market performance are second-order outcomes that materialize once dynamic capabilities have enabled product, process, or business model innovations. These innovations, in turn, enhance competitiveness, efficiency, and adaptability, ultimately reflected in profitability, market share, and growth (Schilke, 2014; Peteraf et al., 2013).

Empirical research supports this multi-layered relationship. For instance, Wilden et al. (2013) and Barreto (2010) demonstrate that the impact of dynamic capabilities on firm performance is contingent on their effective deployment through operational capabilities and strategic initiatives. Similarly, in digital transformation contexts, strong sensing and reconfiguring capabilities allow firms to identify emerging opportunities, align digital strategies, and adapt resource structures, which subsequently lead to superior financial and market results (Karimi & Walter, 2021; Saeedikiya et al., 2024; Witschel et al., 2023).

Beyond their direct link to performance, these findings emphasize that dynamic capabilities act as the critical conversion mechanism through which digital assets yield value. Organizational IT

resources and digital infrastructures, by themselves, merely create the potential for change. Their strategic significance emerges only when firms can harness these digital resources to learn, collaborate, and reconfigure processes in ways that generate tangible outcomes. In other words, dynamic capabilities serve as the organizational pathways that transform technological potential into realized innovation and competitive advantage (Eisenhardt & Martin, 2000; Ferreira & Coelho, 2020; Li & Liu, 2014; Monteiro et al., 2019; Teece et al., 1997) .

Several studies show that dynamic capabilities are closely tied to digital innovation. For instance, conceptualising, coproducing/orchestrating and scaling dynamic capabilities identified in the SME context positively affect performance and innovation both in stable periods and during crises (Dejardin et al., 2023). Complementing these findings, Raymond et al. (2020) show that explorative-learning configurations combining IT and strategic capabilities yield either high innovation or high productivity, but rarely both, illustrating the trade-offs and equifinal paths through which dynamic capabilities produce digital innovation and performance in SMEs. Conceptualising new ideas leads to innovations that enhance performance (Frederiksen & Knudsen, 2017). These findings suggest that dynamic capabilities enable firms to generate and diffuse innovations that translate into improved outcomes, particularly when markets are volatile.

Dynamic capabilities also play a central role in digital transformation projects. Empirical research in telecommunications shows that firms with stronger dynamic capabilities achieve better implementation of digital transformation initiatives and that change management mediates this relationship (Ellström et al., 2022; Slavković et al., 2023). Another quantitative study of Chinese SMEs found that digital capability which is the proficiency in deploying digital tools and platforms provides foundational resources but must be complemented by dynamic capability to convert digital assets into performance improvements. In this study, employee dynamic capability served as the impetus that transformed digital capabilities into digital performance (Chen et al., 2014). These results emphasise that digital resources only yield value when firms can sense opportunities, seize them, and reconfigure assets accordingly.

Beyond technological innovations, dynamic capabilities also underpin marketing and customer-oriented innovations. Studies on dynamic marketing capabilities show that they strongly influence firm performance, particularly in crisis contexts. For example, dynamic marketing capabilities have the most pronounced direct effect on performance, while dynamic learning and innovation capabilities support marketing and contribute indirectly (Konwar et al., 2017). Such evidence suggests that dynamic capabilities broaden a firm's range of innovation activities, from product development to marketing and customer engagement.

Dynamic capabilities are also instrumental in sustainability performance. The digital dynamic capability framework illustrates how sensing digital trends and reconfiguring digital assets enable organizations to implement green knowledge management and green technology innovations, thereby improving sustainability outcomes (Bhadra et al., 2024; Rebs et al., 2019). Such findings

point to an emerging class of outcomes where dynamic capabilities help firms meet social and environmental objectives in addition to economic ones.

1.5.4 Business Model Innovation (BMI) as a Systemic Outcome

While dynamic capabilities influence multiple forms of innovation, business model innovation (BMI) has garnered particular attention as a systemic and often digital outcome (Wirtz et al., 2016). BMI involves reconfiguring how a firm creates, delivers, and captures value (Foss & Saebi, 2017; Sjödin et al., 2020). The dynamic capabilities literature suggests that sensing emerging digital opportunities, seizing them through commitment to digital strategies, and reconfiguring assets and organizational structures enable firms to innovate their business models (Clauss et al., 2019; Teece, 2007; Warner & Wäger, 2018). Although the detailed empirical evidence for BMI comes from many sectors, it is clear that IT affordances and its dimensions, which were discussed earlier, provide the microfoundational action possibilities that dynamic capabilities assemble into new value logics (Montasser et al., 2023). For example, collaboration affordances enable cross-unit digital coordination necessary for exploring new business models, memory affordances facilitate knowledge reuse in digital design, and process-management affordances support scalable digital reconfiguration. In this way, BMI becomes a natural endpoint of dynamic capability development: digital tools, flexible infrastructures and dynamic routines converge to produce new combinations of value offering, creation and capture (Dyduch et al., 2021; Rachinger et al., 2019; Teece, 2018). The literature therefore positions BMI (not just product or process innovation) as a crucial outcome through which dynamic capabilities, particularly in digital contexts, translate into sustained competitive advantage and performance.

Dynamic capabilities can generate a spectrum of outcomes ranging from product and process innovation to organizational resilience and digital performance. However, this study concentrates on Business Model Innovation (BMI) as the primary outcome. This focus reflects a growing consensus in information systems and management research that, in digital contexts, BMI represents a higher-order and systemic form of innovation (Clauss, 2017; Foss & Saebi, 2017; Teece, 2018; Witschel et al., 2023). Unlike incremental innovations in products or processes, BMI captures how organizations fundamentally reconfigure their logic of value creation, delivery, and capture in response to digital opportunities and disruptions (Bogers et al., 2019; Warner & Wäger, 2018). Dynamic capabilities, particularly sensing, seizing, and reconfiguring, provide the mechanisms through which such transformations occur by allowing firms to explore new markets, re-architect value networks, and redesign cost and revenue structures (Karimi & Walter, 2021; Sjödin et al., 2023).

Selecting BMI as the focal outcome also aligns conceptually with the affordance perspective underpinning this research. IT affordances constitute the microfoundations through which digital resources are enacted and combined into new business model configurations (Volkoff & Strong, 2013; Steininger et al., 2022). Collaboration, memory, and process-management affordances, for example, provide the specific action potentials that dynamic capabilities mobilize to redesign

organizational boundaries and value delivery mechanisms (Ellström et al., 2022). Thus, BMI serves as the most comprehensive manifestation of dynamic capability actualization, translating digital affordances and reconfiguration routines into sustainable competitive advantage. This view resonates with recent literature positioning BMI as the ultimate expression of dynamic capabilities in digitally transforming organizations (Karimi & Walter, 2021; Witschel et al., 2023).

Accordingly, this study adopts Business Model Innovation as the central outcome variable, emphasizing how combinations of dynamic capabilities enable firms to create, deliver, and capture value in novel ways. Other outcome categories such as performance, resilience, or sustainability are treated as consequences of successful BMI, rather than direct dependent variables. This conceptual boundary ensures a coherent analytical focus, tracing how dynamic capabilities, enabled by IT affordances, produce new business model configurations that underpin long-term adaptability and performance (Foss & Saebi, 2017; Teece, 2018; Sjödin et al., 2023).

1.5.5 Environmental context

A firm's ability to leverage dynamic capabilities is conditioned by its environmental context. Pavlou and El Sawy (2011) describe this interaction as the "black box" of dynamic capabilities, noting that environmental turbulence activates and shapes the routines through which firms sense, learn, integrate, and coordinate resources. Rather than serving as a passive backdrop, environmental dynamism functions as a contextual force that determines how these capabilities emerge and operate. In volatile markets, dynamic capabilities enable firms to sustain competitiveness and resilience by anticipating, absorbing, and adapting to shocks while maintaining core functions (Kurtz & Varvakis, 2016). Information systems and management research likewise highlights that turbulence and competitive intensity trigger firms to mobilize and reconfigure resources through sensing, seizing, and transforming routines (Breznik et al., 2019; Markovich et al., 2022; Steininger et al., 2022). Thus, environmental conditions both create the need for dynamic capabilities and shape their effective deployment.

Environmental dynamism refers to the pace of change in markets, technologies and customer preferences (Garg et al., 2003; Pavlou & El Sawy, 2010). Scholars argue that competitive pressures and turbulence drive the development of dynamic capabilities, while also moderating their effect on performance (Steininger et al., 2022). In such conditions, flexible IT infrastructures and decentralised governance structures become particularly important because they allow organisations to respond quickly to emerging opportunities and threats (Chen et al., 2014; Steininger et al., 2022; Wu et al., 2023). Similarly, recent work highlights that dynamic capabilities enable firms to reconfigure partnerships and govern ecosystem relationships under turbulent conditions (Linde et al., 2020). Empirical research shows that market turbulence and competitive intensity (two components of environmental turbulence) positively influence a firm's use of dynamic capabilities, thereby enhancing performance even during crises (Makkonen et al., 2014; Wilden et al., 2016). Recent empirical evidence confirms this relationship as environmental

turbulence directly enhances the sustainable innovation performance of SMEs, compelling them to reconfigure resources and adopt sustainability-oriented practices (Taghizadeh et al., 2024).

Environmental turbulence also stimulates innovation because firms must identify new ways to meet shifting customer demands. A study of SMEs during the COVID-19 crisis found that environmental turbulence prompted firms to innovate in their use of dynamic capabilities (Al Dhaheri et al., 2024; Dejardin et al., 2023). The results revealed a positive connection between turbulence, dynamic capability utilisation and innovation, suggesting that dynamic capabilities act as mediators between environmental conditions and firm outcomes. The implication is that environmental dynamism not only necessitates dynamic capabilities but also fosters complementary digital tools that increase the effectiveness of those capabilities.

The digital environment adds another layer of complexity though. Digital dynamic capability (DDC) which is the the ability to identify, seize and reconfigure digital resources enhances agility and risk management, allowing organisations to reconfigure operations and business models to meet changing market demands (van de Wetering & Versendaal, 2021). Research on DDC in tourism and hospitality industries shows that it leverages digital tools to improve knowledge management and green technology innovation, thereby enhancing sustainable performance. The synergy between environmental dynamism and digital dynamic capabilities suggests that firms operating in rapidly changing digital ecosystems must take advantage of these capabilities to remain competitive.

1.5.6 Crisis contexts and the COVID-19 pandemic

The COVID-19 crisis provides a vivid illustration of how environmental shocks can activate dynamic capabilities. During the pandemic, SMEs were forced to adapt rapidly to demand shocks, supply-chain disruptions, and regulatory changes. Pavlou and El Sawy (2011) describe dynamic capabilities as IT-enabled sensing, learning, integrating, and coordinating mechanisms that become particularly valuable under turbulent conditions, allowing firms to reconfigure resources swiftly in response to disruption. In the same spirit, Kurtz and Varvakis (2016) frame dynamic capabilities as the cornerstone of organisational resilience which is the capacity to anticipate, absorb, and adapt to shocks while preserving core functions.

Empirical research across multiple contexts confirms that crises trigger the activation and recombination of dynamic capabilities. Clampit et al. (2021) found that US SMEs with stronger sensing and reconfiguring routines were better able to maintain performance stability during the pandemic, evidencing agility as a key manifestation of dynamic capability deployment (Clampit et al., 2022). Dyduch et al. (2021) similarly show that Polish firms relied on sensing and seizing capabilities to sustain value creation and capture during lockdowns. Dejardin et al. (2023) report that dynamic capabilities enhanced performance both before and during COVID-19, although their emphasis shifted from opportunity exploration to market delivery once the crisis intensified. Collectively, these findings suggest that crises stimulate not the emergence of entirely new

capabilities but the intensified mobilisation of existing routines to sustain strategic coherence and performance.

Complementary evidence from logistics and supply-chain research reinforces this perspective. Dovbischuk (2022) demonstrates that innovation-oriented dynamic capabilities particularly inter-firm collaboration, cross-functional learning, and knowledge sharing were essential for building dynamic resilience and ensuring operational continuity during COVID-19 (Dovbischuk, 2022). Putritamara et al. (2023) likewise find that dynamic capabilities strengthened business resilience among Indonesian MSMEs through digital transformation, showing that the ability to sense, learn, integrate, and coordinate facilitated the reconfiguration of resources and adoption of digital tools to withstand the crisis. These insights are consistent with Kurtz and Varvakis (2016), who argue that resilience arises when organisations institutionalise adaptability through dynamic routines (Putritamara et al., 2023).

Similar dynamics are observed beyond the immediate crisis context. Taghizadeh et al. (2023) reveal that environmental turbulence directly enhances sustainable innovation performance by motivating firms to intensify learning, integration, and coordination activities. Together with Al Dhaheri et al. (2024), who find that market turbulence and competitive intensity positively influence the deployment of dynamic capabilities and AI applications, these studies highlight turbulence as a catalyst for the activation of dynamic capabilities rather than their origin. Dynamic capabilities thus represent continuously maintained organisational routines, ready to be mobilised when crises strike (Pavlou & El Sawy, 2011; Dyduch et al., 2021).

In sum, environmental factors, particularly turbulence, dynamism, and crises, act as catalysts that both demand and shape the deployment of dynamic capabilities. Flexible IT infrastructures, decentralised governance, digital resources, and learning processes enhance a firm's ability to sense, seize, and reconfigure in response to environmental change (Kurtz & Varvakis, 2016; Pavlou & El Sawy, 2011). As mentioned earlier, the COVID-19 pandemic demonstrates that firms with strong digital and dynamic capabilities were more resilient: they leveraged digital tools and AI, reallocated resources through dynamic routines, and ultimately innovated their business models to survive and thrive (Al Dhaheri et al., 2024; Putritamara et al., 2023). Thus, the dynamic nature of these capabilities becomes most apparent when environmental volatility forces firms to adapt or risk obsolescence.

1.5.7 Double-Edged Effects and Context Dependence

While dynamic capabilities are essential for navigating turbulence and sustaining innovation, their effects are not uniformly positive. Their influence depends on how they are enabled by IT affordances, enacted by organizational actors, and governed within specific contexts. The same affordances that enhance flexibility and responsiveness can also produce rigidity or path dependence if overformalized or misaligned with the firm's environment. This duality underscores

that affordances and capabilities are not inherently beneficial; their value emerges from the way they are orchestrated, combined, and adapted to the firm's strategic conditions.

From an affordance perspective, digital technologies provide action possibilities that can simultaneously enable and constrain. For example, memory affordances allow the storage and retrieval of knowledge that supports pattern recognition and faster decision-making, thereby accelerating sensing and seizing routines. However, they may also anchor judgment in established templates, inhibiting creativity or adaptation when prior knowledge becomes obsolete (Mikalef et al., 2021; Omidvar & Palazzo, 2023). Similarly, process management affordances can enhance coordination and scalability in reconfiguration activities but risk institutionalizing routines that discourage exploration and experimentation (Benner & Tushman, 2003). Hence, the relationship between affordances and dynamic capabilities is contingent on how technologies are actualized, interpreted, and integrated into daily work practices.

At the capability level, dynamic capabilities themselves exhibit context-dependent performance. When governance structures are overly centralized or rigid, sensing and reconfiguring routines may lose agility; when too decentralized, firms may experience fragmentation and inefficiency. The governance of dynamic capabilities (i.e. how authority, information, and decision rights are distributed) thus becomes critical to sustaining their adaptive potential (Heaton et al., 2023). This aligns with the broader argument of this dissertation: that IT affordances act as enablers of dynamic capabilities whose outcomes are conditioned by the interplay of technological, organizational, and environmental factors. Understanding these boundary conditions helps explain why some firms leverage IT-enabled capabilities to drive business model innovation, while others experience inertia, partial implementation, or failure to capture value from digital transformation.

1.5.8 Nomological Network of Constructs

Several empirical studies suggest causal chains linking antecedents, dynamic capabilities and outcomes (Dyduch et al., 2021; Pavlou & El Sawy, 2011; Mikalef et al., 2016; Wilden et al., 2016). One chain runs from leadership and learning to dynamic capabilities and on to innovation and performance: leadership and knowledge processes create conditions for sensing, seizing and reconfiguring; dynamic capabilities then enable innovation, which improves performance (Dyduch et al., 2021; Dejardin et al., 2023). A second chain links IT affordances to dynamic capabilities and subsequently to business model innovation: organizational IT affordances enlarge or constrain the action repertoire after which these routines drive BMI and subsequently performance (Volkoff & Strong, 2013; Mikalef et al., 2021). A third chain shows that environmental dynamism prompts firms to develop dynamic capabilities, which mediate the relationship between turbulence and performance (Wilden et al., 2013; Taghizadeh et al., 2023). Finally, in crisis contexts, dynamic learning, innovation and marketing capabilities combine to determine export performance, with dynamic marketing capabilities exerting the strongest direct effect and learning and innovation capabilities supporting marketing and contributing indirectly (Clampit et al., 2021; Kurtz & Varvakis, 2016).

Building on these alternative causal pathways, this thesis adopts the chain linking organizational IT affordances to dynamic capabilities and subsequently to business model innovation (BMI) as its central explanatory logic. This focus aligns with the thesis's overarching objective of uncovering how digital technologies enable organizational adaptability and innovation through the actualization of affordances. While leadership, learning, and environmental factors are acknowledged as relevant antecedents, the affordance-based chain provides a theoretically distinct and empirically grounded mechanism for explaining how technology-enabled action possibilities translate into organizational transformation. In this view, environmental crises and turbulence are not modeled as constant determinants but as situational triggers that can activate or intensify the deployment of dynamic capabilities, compelling firms to more effectively sense, seize, and reconfigure in response to external shocks.

In this framework, business model innovation represents the key outcome of dynamic capabilities which is the reconfiguration of how a firm creates, delivers, and captures value (Teece, 2010; Clauss, 2017). It is through BMI that the effects of IT-enabled sensing, seizing, and reconfiguring become observable, making it the practical expression of capability-driven renewal.

By viewing IT affordances as generative mechanisms that expand or constrain the organizational action repertoire, this thesis conceptualizes dynamic capabilities as the mediating routines through which these affordances are actualized into value-creating innovations. Business model innovation is then positioned as the systemic outcome, representing the reconfiguration of how the firm creates, delivers, and captures value. This pathway not only integrates sociomaterial and strategic management perspectives but also responds to recent calls in information systems research to open the "black box" between digital resources and business outcomes (Pavlou & El Sawy, 2011; Volkoff & Strong, 2013; Mikalef et al., 2021).

1.6 Synthesis and Research Agenda

This review consolidates research at the intersection of information systems and strategic management, emphasizing that digital transformation outcomes depend not only on technology adoption but on the organizational capabilities that translate digital potential into value. Despite substantial conceptual progress, the literature remains fragmented regarding how dynamic capabilities emerge from IT-enabled actions, how they can be reliably measured, and how they yield innovation outcomes across contexts.

Three implications follow. First, microfoundations matter. Examining how digital tools afford collaboration, memory, and process-management possibilities and how these affordances become routinized clarifies how dynamic capabilities develop and evolve. Second, methodological refinement is needed. More robust, validated measures and the use of longitudinal and configurational methods can better capture the multidimensional and processual nature of dynamic capabilities. Third, innovation is an outcome pipeline. Business model innovation provides the

most observable link between dynamic capabilities and performance, illustrating how IT-enabled sensing, seizing, and reconfiguring reshape how firms create, deliver, and capture value.

Context also shapes these relationships. Environmental turbulence, crises, and resource constraints influence which capability bundles are effective, reinforcing the need for contingency-sensitive and configurational approaches. Advancing this agenda requires integrating IS and management perspectives to examine how digital transformation, platform strategies, and emerging technologies such as artificial intelligence interact with dynamic capability development. This synthesis thus positions the dissertation's empirical focus on the affordance-capability-BMI chain as a response to these theoretical and methodological gaps.

Chapter 2.
**Essay 1: Discovering Dynamic Capabilities for Survival and Success During Prolonged
Massive Crises: Insights from a Systematic Literature Review**

Abstract

Dynamic capabilities (DCs) are pivotal to a firm's success especially in a business landscape that is volatile, uncertain, complex, and ambiguous. The COVID-19 pandemic has displayed unique characteristics and has affected almost every aspect of business and society, creating challenges for their survival. Although three types of dynamic capabilities (sensing, seizing, and reconfiguring) have been studied in the strategy literature, it is still not clear what types of actions and strategies constitute each of the three dynamic capabilities. In this study, we utilise a systematic literature review to: 1) identify strategies and actions employed by businesses in different sectors to survive and succeed in the changing competitive landscape during the COVID-19 outbreak; 2) discover specific actions and strategies that capture each of the sensing, seizing, and reconfiguring capabilities, and compare identified strategies and actions during COVID-19 with those that were suggested in the business strategy and competitive literature before COVID-19. Our findings identified ten strategies and actions and by mapping them onto DC framework we contributed to DC literature. Our analysis reveals various changes in the focus of strategies and actions compared to before COVID-19 with respect to internal capabilities, market power, or the type of industry.

Keywords: dynamic capabilities framework, competition strategies, covid-19 crisis, systematic literature review, firm performance

2.1 Introduction

Today, there is a broad consensus that the COVID-19 (coronavirus disease of 2019) outbreak is not only a contagious disease outbreak but also a big crisis that has affected every aspect of people's everyday life, businesses' performance, and economies (Sigala, 2020). According to many studies "The coronavirus disease 2019 (COVID-19) has changed our world forever" (Ågerfalk et al., 2020; He and Harris, 2020; Venkatesh, 2020). Even though scholars have studied many different types of crises such as the Global Financial Crisis of 2008 (Huhtala et al., 2014), environmental incidents like hurricanes and storms (Basker and Miranda, 2012), or epidemics like the 2002–2004 SARS outbreak (Tan and Enderwick, 2006) or 2016 Zika outbreak (Farhadloo et al., 2018; Chan et al., 2018a, 2018b), the COVID-19 pandemic has been different from previous crises in its scale, duration, and magnitude.

From people's everyday life routines to business operations, we can see the unprecedented changes triggered by COVID-19 in almost every sector and industry. Due to travel restrictions and lockdowns, airlines and airports suffer from a huge drop in demand and consequently passenger revenue (Albers and Rundshagen, 2020). More than 60% of the world's commercial aircraft were grounded and the estimated number of scheduled passengers boarded by the global airline industry amounted to just over 2.2 billion people (compared to 4.5 billion in 2019) (Statista, 2022). This represents a 50% loss in global air passenger traffic compared to 2019 (Albers and Rundshagen, 2020). Tourism is also negatively affected with the estimation that international tourist arrivals in 2020 have dropped by 78% compared to 2019 causing a loss of \$1.2 trillion in export revenues from tourism as well as many job cuts and unemployment (Sigala, 2020). The retail industry has experienced long queues to enter stores (especially at the beginning of the crisis), changes in consumer behaviour, the necessity of moving from offline ways of doing business to online shopping enforced by the new social distancing measures and challenges of supply chain management to facilitate the operations and relationship with partners. These negative effects can be found in the education, healthcare and retail industries (Civera et al., 2021; Jaiswal-Dale et al., 2022). Some sectors such as the technology industry (Amazon and Google to name a few) have experienced a significant increase in their revenue and profit since more firms are now engaged with the digital economy (Koeze, 2020). Many educational institutions and businesses in different sectors are now using remote working solutions and those who are providing such services have experienced positive effects since the beginning of this pandemic. Based on Globe Newswire's report in October (Meticulous_Market_Research, 2021), due to the extensive use of video conferencing services caused by COVID-19 lock-downs, the global video conferencing market is expected to grow from \$7.87 billion in 2020 to \$24.4 billion by 2028. A financial analysis of the Netflix platform during the pandemic shows that not only there has been no negative effect but also the financial position remained stable and the number of users has continued growth since 2020 (Lozic, 2021).

In times of crisis, due to the lack of resources and high demand, competition becomes even more severe and results in major shifts in the balance of power in the market (Forsyth et al., 2020). Firms, especially small and medium-sized ones that have less access to capital and liquidity will be more prone to closing and bankruptcy and some troubled large firms might be acquired or merged (Rose, 2020). For instance, in the tourism sector competition for luring tourists has increased since the equilibrium between supply and demand has been disrupted (Grech et al., 2020). However, drawing on the lessons from the 2008 Global Financial Crisis, studies (Klutse, 2020; Phan et al., 2019) have shown that in some sectors like banking, crises do not necessarily trigger and fuel competition. There are various arguments about the negative or positive effects of competition on the performance and stability of financial institutions in the literature. Dias and Rodrigues (2019) suggest that entrepreneurs in the agriculture sector were less willing to start a new or continue their business after the 2008 Global Financial Crisis due to many factors such as the high degree of competition which occurs after crises and the fear of failure (Dias and Rodrigues, 2019).

This study investigates the COVID-19 crisis as its case since it has unique characteristics. The COVID-19 outbreak is a much bigger crisis than its 21st century predecessors like Ebola, H1N1 Influenza, and SARS pandemics or even non-health crises like the 2008 global economic recession in terms of magnitude, span, duration, and also its universal impact on almost every aspect of life, business, and economy. According to the Centers for Disease Control and Prevention, from 2002 to 2003, 774 people (mostly from China) died from SARS and 151,700-575,400 people died worldwide from the 2009 H1N1 virus infection. Also, Ebola raged in West Africa between 2014 and 2016 with less than 12000 total deaths. However, COVID-19 has caused more than 5 million deaths worldwide so far and it does not seem to be over any time soon (CDC, 2021).

Apart from mortality numbers, COVID-19's effects on every aspect of individuals' life, business operations and the global economy bring unique challenges (Barnes, 2020). Due to measures for minimum social interactions, every part of the world experienced lockdowns and travel restrictions in addition to policies for wearing masks or practicing social distancing. These measures had variable success but invariably triggered profound socioeconomic collateral effects (Van Damme et al., 2020). Even in the most developed countries, the household net income has decreased because of job losses or lockdowns (especially for people living on hourly or daily wages) (Kansiime et al., 2021).

Another distinguishing feature of the COVID-19 pandemic is its duration. While previous epidemic shocks were short and sharp, COVID-19 is still an ongoing crisis (Baldwin and Di Mauro, 2020). In addition, due to the breadth and depth of the current crisis, some ripple effects might still be unknown (Buera et al., 2021). Moreover, responses to the crisis by different governments and countries are not similar and to the same extent. As a result of these imbalanced responses, it would be much more difficult to estimate the duration of the COVID-19 crisis and its collateral effects (Makin and Layton, 2021).

From the organisation and business point of view, while in prior health and financial crises, discussions were more centred on shortfalls in demand, the COVID-19 crisis manifests itself as a simultaneous shock to both demand and supply (Hassan et al., 2020). The shock to supply can mainly be explained by the shutdowns and the lack of technological infrastructures, human resource skills, and uncertainty management knowledge necessary for operating remotely (Alpers, 2019). Moreover, global disruptions in supply chain systems resulted in the shortage of resources and materials required for production because, in contrast to geographically centred natural/industrial disasters, pandemics are not limited to a particular region or time period (Jha et al., 2021). Therefore, different components of a supply chain like manufacturing, distribution centres, logistics, and markets are affected sequentially or concurrently and can become paralysed within overlapping time windows (Ivanov and Das, 2020). These supply chain disruptions also affect the marginal cost of products and services that would be reflected through increased prices which already can be seen in some sectors (Aday and Aday, 2020).

These unique characteristics of the COVID-19 crisis highlight the importance of acknowledging its different nature from previous ones in terms of magnitude, scale, duration, and impact. Therefore, the knowledge and learned lessons from the world's prior crises while being useful, would not be sufficient for studying the current one. This systematic review aims at treating COVID-19 like a unique crisis with peculiar characteristics and impacts. Adoption of new strategies and actions as well as changes in their focus highlighted new aspects for responding to the consequences of the current crisis demonstrating the importance of treating COVID-19 as a different crisis and not relying on previous experiences. Consequently, in this study, we aim to take into account the unique characteristics of the COVID-19 crisis and investigate the related literature to identify the proposed strategies and actions employed by various firms during the ongoing COVID-19 crisis, compare them with previous ones and hopefully provide insights for future research and practice. In doing so we address the following research question:

RQ1: What are the main strategies and actions that are utilised and implemented by businesses to address the crisis and eventually achieve survival/success during the COVID-19 crisis?

We also aim to investigate the possibility of fitting the identified strategies and actions within the dynamic capabilities (DC) framework. DC have been known to enable businesses to integrate, build, and reconfigure internal and external resources to gain competitive advantage and business value and maintain leadership in continually changing business environments (Fainshmidt et al., 2019; Teece, 2014). However, there is an ambiguity and fuzziness around the conceptualisations of the DC construct and its different categories namely sensing, seizing and reconfiguring capacities that makes it extremely challenging to understand and study in more detail (Buzzao and Rizzi, 2021; Steininger et al., 2022). It is still not clear what strategies or actions form different types of DCs such as sensing, seizing and reconfiguring capabilities. Since the COVID-19 crisis became a source of great uncertainty for businesses in almost every industry, this framework is relevant and useful for studying and integrating all the identified strategies and actions in one single framework and will contribute to both research and practice. Therefore, we also aim at answering the following question:

RQ2: How do the identified strategies and actions fit the DC framework and what insights can be developed for the post-COVID-19 era for both research and practice?

In addition to the identification of strategies and actions that are employed by businesses during the COVID-19 crisis, the intrinsic uniqueness of this crisis compared to previous ones suggests that these strategies might be different from those of the pre-COVID-19 era. Looking at firms' responses to the current crisis shows that different aspects of previously known business strategies have been highlighted during the COVID-19 crisis. A different crisis requires attention to different capabilities or different ways of leveraging them. Therefore, in addition to this study's two research questions, we were also interested to investigate how strategies that are utilised during the COVID-19 crisis are different from the pre-COVID-19 era in terms of specific actions, new aspects of existing strategies or leveraging new capabilities.

Taking RBV and DC framework as the main theoretical lenses, this study attempts to elaborate and provide more instances and details regarding three distinct dimensions of the DC framework (sensing, seizing, and reconfiguring) and find theoretically generalisable relationships among these constructs and the actual firm initiatives that they comprise.

The insights from this study can be useful in responding to future crises and generally in helping firms to build upon their existing resources and adopt different strategies and actions in time of uncertainty. Mapping these strategies and actions in the DC framework also contributes to both research and practice by enriching the DC framework itself and providing businesses and managers with a classification of various actionable options for survival and even gaining competitive advantage.

The rest of this paper is organised as follows: The next section presents DC as the theoretical grounding for this study. Section 3 explains the process of the systematic search and data extraction as well as the different phases and factors considered for each phase. Section 4 presents our results and provides a big-picture classification of all the strategies and actions. In Section 5, we discuss the findings and highlight the factors that need to be considered in addressing the competition during crisis and Section 6 presents the conclusions and suggest some directions for future research.

2.2 DCs as the theoretical perspective

DCs are rooted in the resource-based view (RBV) of the firm (Barney, 1991). According to Teece (2014), one of the most important and influential sources of firm performance is the bundle of DC. Unlike ordinary capabilities that are generally associated with operational, administration and governance capabilities, the DC framework involves higher-level actions that can enable an enterprise to direct its activities toward high-payoff endeavours (Teece, 2014).

DC enable the firm to integrate, build, and reconfigure internal and external resources to gain a competitive advantage and maintain leadership in continually changing business environments (Fainshmidt et al., 2019; Teece, 2014). This framework can be broken down into three primary categories:

- 1- sensing is the identification, development and assessment of opportunities in relation to customer needs, technology change and competition
- 2- seizing refers to the mobilization of resources to address needs and opportunities and to capture value from doing so
- 3- reconfiguring that is construed as continued renewal transformation.

To ensure sustainability, engagement in the continuous process of sensing, seizing, and reconfiguring is essential (Teece, 2007, 2014). The most prominent feature of a firm's DC is its manager and top management team's ability to identify an opportunity or threat and create a proper

response at certain critical junctures (Steininger et al., 2022; Teece, 2014). Strong DC can be manifested in proper alignment between dynamism in markets, technologies, and the business environment and strategies employed by the firm (Teece, 2014). Employed strategies and actions at the time of crisis influence the performance of the firm. This is in line with the outcomes that are expected from DCs which can be disaggregated into two types. First-order outcomes are related to the observed organisational change in terms of new resources, processes, or ways of doing business and second-order outcomes concern organisational performance effects of DCs or impacts that result from the organisational change induced by DCs (Steininger et al., 2022).

Although various studies have investigated the role of the DC framework in gaining competitive advantage and business value (Fainshmidt et al., 2019; Steininger et al., 2022; Teece, 2014), it is still not clear how a firm's strategies and actions in a dynamic environment can be mapped onto a the DC framework and its different categories (Fainshmidt et al., 2019). Linking these strategies and actions to DC framework contributes to the DC literature by addressing the fuzziness and ambiguity in the conceptualisation of this framework. It also provides managers and firms with a framework that includes a list of possible actions based on their needs and the type of capabilities that each category (sensing, seizing or reconfiguring) offers. Moreover, the fact that these strategies and actions have been designed and utilised by firms to respond to environmental uncertainties and dynamism as one of its dimensions like the change in customers' demand or competition landscape makes them a possible fit for the DC framework and its different categories.

2.3 Method

A systematic literature review (SLR) was adopted aiming to provide a complete summary and synthesis of the recent literature on businesses' responses to the COVID-19 crisis. To do so we followed insights and suggestions made by Okoli 2015 as well as Wee and Banister about the overall structure of a literature review paper. The process of selection was based on three phases: 1- the identification phase in which papers were obtained from scientific databases. 2- the screening and filtering phase where records were removed or included based on pre-selected criteria 3- the analysis phase where relevant and eligible papers were read and analyzed and useful information was extracted (Okoli 2015; Wee and Banister 2016). The search strategy used in this review is depicted in Figure 2.

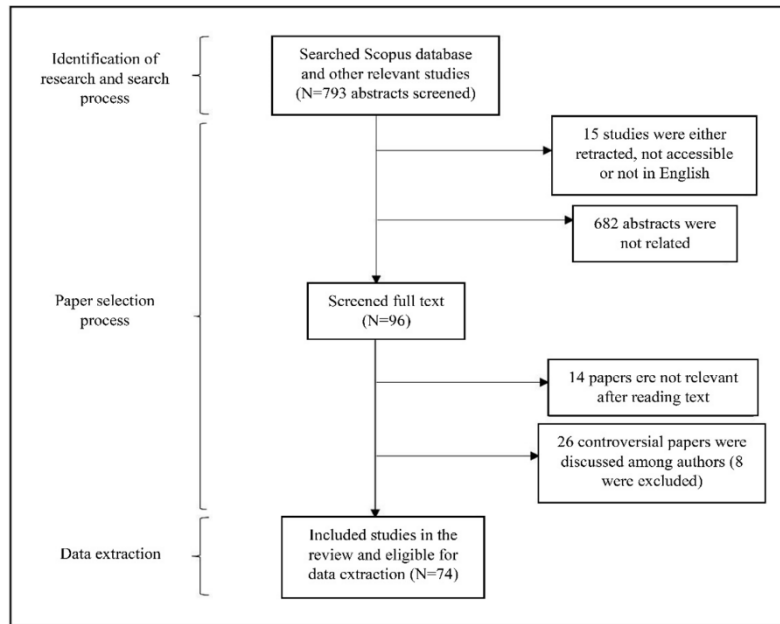


Figure 2: Flowchart of the Literature Search, Screening, and Selection Process

2.3.1 Identification of research and search process

At the first stage, we searched through the Scopus database with (COVID- 19 and Competition) and (Crisis and Competition) combinations in titles, abstracts or keywords for papers that were published from October 2019 to August 2021. In addition, related issues and some papers obtained from forward/backward searches were also included as well as papers that were published in the basket of eight (European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems, MIS Quarterly) in case they were not included in the search results from the Scopus database. October 2019 was chosen because it was the starting point for the first wave of outbreak and crisis caused by the COVID-19 in China (the first country to report cases). However, the backward searches helped to gain an understanding of different industries' before-COVID overall situation and competition. In our opinion, knowing about the businesses' situation before the pandemic and comparing it to their status during the crisis, would help to gain a better perspective about the situation.

2.3.2 Paper selection process

As a result of searching keyword terms in titles, abstracts and keywords, we ended up with 793 papers, 24 of that were conference papers. Considering the fact that it has not been long since the appearance of the COVID-19 crisis, there are relatively fewer relevant papers published on this phenomenon. Consequently, studies that became available in the identification phase were included as much as possible. Fifteen papers which were not available in English were excluded

from our review. Next, papers were evaluated and screened based on the possibility of extracting useful and relevant data and information first by reading abstracts and then by reading the full text. At this stage, researchers independently decided about inclusion or exclusion and discussed their results in meetings to obtain consensus.

The main criterion for inclusion decision was if the study suggested any form of business strategy or action during any type of crisis, or provided any type of theoretical lens for studying a firm's survival and success during a crisis. At this stage, 682 papers were found to be unrelated after reading the abstracts which left us with 96 papers for full-text screening. The papers included were from varied countries, contexts, and industries. Additionally, empirical and conceptual papers both were included in this review. During this second phase, authors agreed that 14 papers should not be included since they do not provide any relevant insight. After examining the full text if there was disagreement about inclusion, authors discussed it until the agreement was reached. At this stage, 26 papers were discussed and the authors agreed that except for eight papers, all of them had to be included since each could provide helpful insights and answers for the research questions either in the form of their suggested lens toward the problem or implicit mention of some strategies and actions. As a result, studies that met the following criteria are included: studies that: 1- investigate the relationship between competition and crisis especially (but not necessarily) the COVID-19 pandemic. 2- explicitly or implicitly suggested strategies and actions by which businesses are able to face the problematic circumstances caused by crisis especially (but not necessarily) COVID-19 pandemic. 3- covered a specific case in an organisation or business about their response to a crisis such as COVID-19 pandemic or any given crisis even without explicitly mentioning the strategy or actions which are employed. 4- provided any insight about the theoretical lens or perspective about organisation's actions and decisions during a crisis.

After having read all the abstracts and the full text, 74 papers were identified as being eligible for data extraction. In order to compare actions and strategies before and during the COVID-19 crisis, we did a backward reference search using our pool of papers to find studies that propose strategies and actions adopted by businesses at the time of crisis and we found 20 papers that investigate strategies and actions that were utilised by businesses before COVID-19.

2.3.3 Data extraction

At this stage, the 74 included studies were carefully read and coded independently by three authors. The inter-coder agreement between authors was 85% (based on Cohen's kappa). In case of disagreement, studies were discussed by all members in meetings. At this point, all information pertaining to study characteristics in terms of year of publication, location of the study, the sector and industry in which the study was conducted, type of study (being qualitative or quantitative), methodology, main variables, findings and results were extracted. During the coding process, some new codes emerged. For instance, it appeared relevant to code the articles' theoretical lenses as well as external strategies and actions such as government measures and interventions during the crisis. Eventually, for the purpose of this review, all the strategies and actions explicitly or

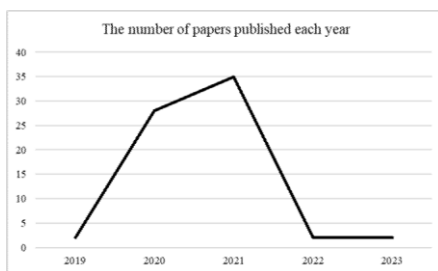
implicitly proposed by each study and also their general approach and lens toward the problem were extracted. Also, similarities between studies were highlighted to be able to integrate and accumulate all the ideas and findings in what will be proposed as the categorisation of strategies and actions in this review. Additionally, we compared the findings from included studies in our review with those that were found relevant and useful in before-COVID-19 literature in terms of suggesting competitive business strategies and actions. This comparison was done to find the main differences between before-COVID-19 literature and those that are published during the pandemic.

2.4 Results

2.4.1 Descriptive analyses of reviewed papers

As part of our search for relevant articles, we could not find any review paper that particularly focuses on competition strategies during a crisis. However, Naradda Gamage et al. (2020) and Sharma et al. (2020) have conducted reviews on global challenges for SMEs and uncertainties during a crisis such as the current one which offers useful insight but do not provide specific answers to our research questions. Consequently, to the best of our knowledge, this study is the first to investigate business strategies during the COVID-19 crisis.

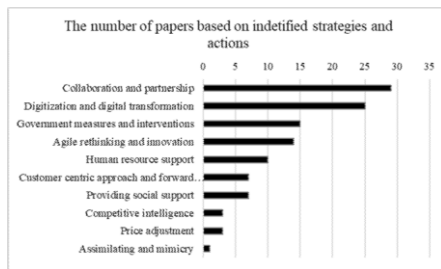
Figure 3 shows some descriptive visualisation of the reviewed papers based on the year of publishing and the number of papers per industry. As is depicted in Figure 2(a), there is an emerging upward trend in the number of papers in the past few years. This trend seems to be more significant in the months after the COVID-19 situation was declared a pandemic by World Health Organization (WHO).



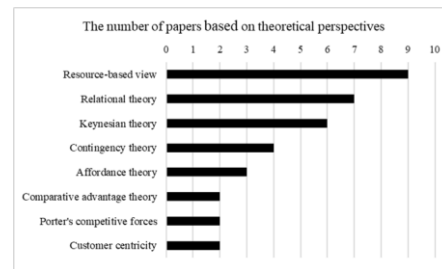
(a)



(b)



(c)



(d)

Figure 3: Descriptive Summary of the Reviewed Studies - (a) Distribution of published papers by year; (b) distribution by industry; (c) identified strategies and actions; and (d) underlying theoretical perspectives used in the reviewed studies.

As can be seen in Figure 2(b), this review includes studies from different industries such as retail, tourism, aviation, finance, manufacturing and different contexts like marketing, supply chain and employee treatment that investigate the effect of the crisis on businesses from countries all around the world. Banking and Finance and Healthcare are the industries with the highest number of papers. Given that this is a health crisis, we anticipated that we would find a high number of papers in the healthcare context. However, the complex and global nature of the pandemic coupled with lockdown measures forced governments and corporations to take a number of supportive financial measures and therefore we see a high number of papers in the banking and finance context.

2.4.2 *Discovering strategies and actions of DC*

In line with Teece's DC (sensing-seizing-reconfiguring) framework, we have identified strategies and actions to face the crisis and uncertainty for each of the sensing, seizing and reconfiguring categories. DC are the firm's ability to integrate, build, and reconfigure internal competencies to address or bring about, changes in the business environment (Teece, 2007). Responding to the changes and consequently uncertain situations, highlights the importance of managerial attention to the perception, recognition and proper reaction toward opportunities and threats in the environment. Proposed strategies and actions that are extracted by this review somehow follow this perspective.

The identification of crisis-response strategies followed an inductive qualitative coding process consistent with systematic literature review practices. First, all selected articles were examined to extract specific actions, managerial practices, and strategic responses reported in the literature during crisis situations, particularly those associated with the COVID-19 pandemic. These extracted actions were initially coded using an open coding approach in order to capture recurring patterns without imposing predefined categories. In the second stage, similar actions were grouped through axial coding, allowing conceptually related practices to be clustered into broader strategic categories. Through this iterative comparison process, ten distinct strategy/action categories emerged from the literature.

To ensure conceptual consistency with the dynamic capabilities framework, these strategies were subsequently mapped onto the three dynamic capability dimensions of sensing, seizing, and reconfiguring (Teece, 2007). The coding process involved independent coding and cross-validation among the researchers to enhance reliability and reduce subjective bias. Discrepancies in coding were discussed and resolved through consensus, resulting in the final classification of strategies used in the analysis.

Table 1. Crisis-response strategies identified through the systematic literature review and mapped to dynamic capability dimensions.

Strategy Category	Dynamic Capability Dimension	Description	Examples from Literature
Customer Centricity	Sensing	Continuous monitoring of customer needs and behavioral changes during crisis situations to adjust offerings and service channels.	Firms analyzed changing consumer behavior and adjusted product offerings or service models during COVID-19 disruptions.
Competitive Intelligence	Sensing	Systematic scanning of competitors, markets, and industry developments to anticipate threats and opportunities during crises.	Firms monitored competitors' pricing, digital initiatives, and strategic responses to adapt quickly.
Digitization and Digital Transformation	Seizing	Adoption or acceleration of digital technologies to maintain operations and enable new ways of delivering value.	Adoption of e-commerce platforms, digital communication tools, and remote work systems.
Human Resource Support	Seizing	Organizational efforts to support employees, reorganize work structures, and maintain productivity during crisis disruptions.	Flexible work arrangements, employee well-being initiatives, and remote work implementation.
Corporate Social Responsibility (CSR)	Seizing	Engagement in socially responsible initiatives that strengthen relationships with stakeholders and communities during crises.	Firms supporting local communities, donating supplies, or engaging in socially responsible practices during COVID-19.
Innovation and Agile Rethinking	Reconfiguring	Development of new products, services, or business practices in response to crisis-induced changes in demand and supply conditions.	Firms launching new digital services or adapting existing products to emerging needs.
Collaboration and Partnerships	Reconfiguring	Formation of alliances and partnerships to access resources, knowledge, and capabilities needed to navigate crisis conditions.	Firms collaborating with suppliers, partners, or even competitors to maintain operations.
Price Adjustment	Reconfiguring	Adjusting pricing structures or cost models to respond to economic uncertainty and changes in market demand.	Temporary price reductions, subscription models, or flexible pricing strategies.
Mimicry and Imitation	Reconfiguring	Adopting successful strategies implemented by other firms or industries to quickly adapt to crisis conditions.	Firms replicating digital business models or operational practices used by leading companies.
Government Intervention and Support	External Institutional Support	Leveraging government programs, financial assistance, and policy support to sustain operations and adapt to crisis conditions.	Firms benefiting from government subsidies, relief funds, regulatory flexibility, or economic stimulus programs.

Figure 3(c) shows the number of identified strategies and actions in the reviewed papers. The proposed strategies and actions are presented in Table 1. These strategies and actions can be categorized into ten groups.

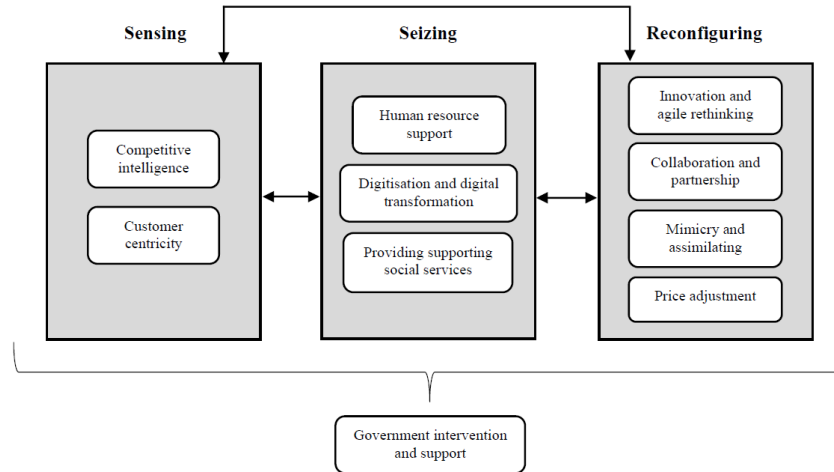


Figure 4: A DC framework for competition strategies and actions

As shown in Figure 3, some strategies and actions are more prevalent than others in the reviewed papers. Indeed, collaboration and forming relationships with partners and suppliers, digitisation and digital transformation, and agile rethinking and innovation appear to be the most widely used strategies by organisations in the 66 studies in our database as their reaction to the COVID-19 crisis. Findings show that while information technology (IT) is the core of digitisation and digital transformation strategy, most of the other responses and reactions such as innovation, human resource support, or forming collaborations also are driven or supported by IT.

As mentioned earlier, we can find the roots of these strategies and actions in the concept of DC, which are underpinned by organisation routines and managerial skills. DC has also been highlighted to be a great source of competitive advantage (Fainshmidt et al., 2019; Teece, 2014). Figure 4 maps all identified strategies and actions found in the reviewed studies. They will be introduced in more detail in the following sections. The strategies and actions have been mapped to different types of DC by the first three authors. They each mapped the identified strategies and actions to sensing, seizing and reconfiguring categories. Very few cases of disagreement were discussed to reach an agreement.

The titles for the proposed strategies and actions extracted by this review have been chosen by the authors based on the frequency of their usage in the reviewed studies and in order to encompass and represent the idea and true meaning behind them in the best possible way. Table 2 presents our literature review findings and the following sections provide a detailed account of strategies and actions under each of the DC framework dimensions.

Table 2. Identified Strategies and Actions in Reviewed Studies

<i>Strategies and actions</i>	<i>Paper</i>	<i>Industry/sector/context</i>	<i>Country</i>	<i>Impact on performance</i>	<i>Theory</i>
<i>Strategies and actions for sensing</i>					
Competitive intelligence	Elgazzar (2021)	Pharmaceutical	India	Negative	Contingency theory, relational view
	Venkatesh et al. (2021)	SMEs	Russia	Negative	Resource based view, (DC)
	Tatarovsky (2021)	Retail		Negative	
	Elmahla and Neilson (2021)	Retail	South Africa	Negative	
	Grobbehaar and Visser (2021)	Forestry		Neutral	Resource-based view
	Ilinova et al. (2021)	Agriculture		Negative	
	Lin and Zhang (2021)	Air industry	Taiwan	Negative	
	Pantano et al. (2020)	Retail		Negative	Customer centricity, relational view
	Pavlova et al. (2021)	E-commerce and retail	Ukraine	Negative	
	Raj et al. (2022)	Supply chain	India	Negative	Resource-based view, (DC)
<i>Strategies and actions for seizing</i>					
Human resource support	Aleem et al. (2022)	HR management		Negative	
	Botnaryuk and Kalimina (2021)	Transport		Negative	
	Cao and Rees (2020)	HR management	USA	Neutral	Affordance theory
	Heningsson et al. (2021)	Finance	Ukraine	Negative	
	Kniazieva et al. (2021)	Insurance	India	Negative	
	Kumar et al. (2021)	SMEs		Negative	
	Pantano et al. (2020)	Retail	India	Negative	Customer centricity, relational view
	Pereira et al. (2021)	Information technology-business	India	Negative	
	Raj et al. (2022)	Supply chain	India	Negative	Resource-based view, (DC)
	Sheldon (2022)	Tourism		Negative	

<i>Strategies and actions</i>	<i>Paper</i>	<i>Industry/sector/context</i>	<i>Country</i>	<i>Impact on performance</i>	<i>Theory</i>
<i>Strategies and actions for seizing</i>					
Digitisation and digital transformation	Akpan et al. (2022)	Developing economies		Negative	
	Amankwah-Amoah et al. (2021)			Negative	
	Bilbao-Ubillos and Camino-Beldarrain (2021)	Brexit			
	Botnaryuk and Kalinina (2021)	Transport			
	Bucea-Manea-Toniş et al. (2021)		28 countries		
	Carillo et al. (2021)	Remote working	France	Negative	
	Canugati et al. (2020)	Higher education	Italy, France, Denmark	Negative	
	Chanana and Sangeeta (2021)	Employee engagement		Negative	
	EdeImann et al. (2021)	Public sector	Austria	Negative	
	Elhahla and Neilson (2021)	Retail		Negative	Affordance theory
	Hacker et al. (2020)	Social technology		Neutral	
	He and Harris (2020)	Marketing		Neutral	
	He et al. (2021)	Brick-and-mortar retail			
	Henningsson et al. (2021)	Finance	USA	Neutral	Affordance theory
	Ilinova et al. (2021)	Agriculture		Neutral	Resource-based view
	Klöckner et al. (2023)	Various sectors	USA	Negative	Resource-dependence theory
	Kniazieva et al. (2021)	Insurance	Ukraine	Negative	
	Kumar et al. (2021)	SMEs	India		
	Pantano et al. (2020)	Retail			Customer centricity, relational view
	Pavlova et al. (2021)	E-commerce and retail	Ukraine	Negative	
Raj et al. (2022)	Supply chain	India	Negative	Resource-based view, (DC)	
Sigala (2020)	Tourism	Global	Negative		
Tatarovsky (2021)	Retail	Russia			
Waizenegger et al. (2020)	Remote working		Negative	Affordance theory	
Bressan et al. (2023)	SMEs	Italy			
Boubaker et al. (2020)		USA firms	Negative		
Chen (2021)	CSR	China	Neutral		
He and Harris (2020)	Marketing				
Lawton et al. (2020)	Corporate political activities (CPA)				
Pantano et al. (2020)	Retail		Negative	Customer centricity, relational view	
Smith and Casper (2020)	Research institutions		Negative	Relational view	

<i>Strategies and actions</i>	<i>Paper</i>	<i>Industry/sector/context</i>	<i>Country</i>	<i>Impact on performance</i>	<i>Theory</i>
Agile rethinking and innovations	Albers and Rundshagen (2020)	<i>Strategies and actions for reconfiguring</i> Aviation (airlines) Higher education Sport Banking and finance Various sectors SMEs Marketing Insurance Economic globalisation Retail Tourism Tourism Manufacturing	European countries	Negative	Keynesian theory, contingency theory
	Bucea-Manea-Tomiş et al. (2021)		28 countries	Negative	
	Carugati et al. (2020)		Italy, France, Denmark	Negative	Contingency theory
	Cho et al. (2021)		USA and Korea	Negative	
	Del Prete et al. (2021)		Italy	Negative	
	Durmaz et al. (2021)		Turkey	Negative	Comparative advantage theory
	Grondys et al. (2021)		Poland	Neutral	
	He and Harris (2020)		Ukraine	Negative	
	Kniazieva et al. (2021)		Global	Negative	Porter's five forces of competitive position
	Naradda Gamage et al. (2020)		Global	Negative	Customer centricity, relational view
	Pantano et al. (2020)		Global	Negative	
	Sheldon (2022)		USA	Negative	
	Sigala (2020)				
	Dias et al. (2020)				

<i>Strategies and actions</i>	<i>Paper</i>	<i>Industry/sector/context</i>	<i>Country</i>	<i>Impact on performance</i>	<i>Theory</i>	
Collaboration and partnership	Albers and Rundshagen (2020)	Aviation (airlines)	European countries	Negative	Keynesian theory, contingency theory	
	Bressan et al. (2023)	SMEs	Italy		Social capital and stakeholder theory	
	Bucea-Manea-Toniş et al. (2021)		28 countries			
	Chen et al. (2021)	Supply chain	USA			
	Chhimwal et al. (2021)	Supply chain		Negative	Relational view, resource-based view	
	Crick and Crick (2020)	Cooperation		Negative	Relational view	
	Cutcher-Gershenfeld et al. (2020)	Research institutions				
	Durmaz et al. (2021)	Various sectors	Turkey			
	Elgazzar (2021)	Pharmaceutical				
	Grondys et al. (2021)	SMEs	Poland			
	Jaiswal-Dale et al. (2022)	Healthcare	USA			
	Javed and Chhattu (2020)	Health diplomacy	Global		Negative	Contingency theory, relational view
	Kerehen and Craighead (2020)	Supply chain			Negative	Comparative advantage theory
	Klöckner et al. (2023)	Various sectors	USA		Negative	
	Kniazieva et al. (2021)	Insurance	Ukraine		Negative	Relational view
	Lawton et al. (2020)	Corporate political activities (CPA)				
	Makin and Layton (2021)	Marketing			Negative	Relational view
	Li et al. (2021)	International trade	China			
	Lin and Zhang (2021)	Air industry	Taiwan		Negative	
	Nagoev et al. (2020)	Catering and restaurant	Russia		Mixed impacts	
	Naradda Gamage et al. (2020)	Economic globalisation	Global		Negative	Porter's five forces of competitive position
	Pitas et al. (2021)	Local park and recreation	Services		Negative	Negative
	Raj et al. (2022)	Supply chain	India		Negative	Resource-based view, (DC)
Remick et al. (2021)	Healthcare	USA		Negative		
Sheldon (2022)	Tourism			Negative		
Simha and Grover (2021)	Banking	India		Mixed impacts		
Venkatesh et al. (2021)	SMEs	India			Resource-based view, (DC)	
Wang et al. (2020)	China			Negative	Relational view, resource-based view	

<i>Strategies and actions</i>	<i>Paper</i>	<i>Industry/sector/context</i>	<i>Country</i>	<i>Impact on performance</i>	<i>Theory</i>	
<i>Strategies and actions for reconfiguring</i>						
Assimilating and mimicking	Ketchen Craighead (2021)	Supply chain		Negative	Relational view	
	Civera et al. (2021)	Academia	Italy	Negative	Porter's five forces of competitive position	
	Forsyth et al. (2020)	Aviation (airports)	European countries	Mixed impacts	Keynesian theory	
Price adjustment	Raj et al. (2022)	Supply chain	India	Negative	Resource-based view, (DC)	
<i>External strategies and actions</i>						
Government measures and interventions	Alkpan et al. (2022)	Developing economies		Negative		
	Albers and Rundshagen (2020)	Aviation (airlines)	European countries	Negative	Keynesian theory, contingency theory	
	Baramova and Borisova (2021)	SMEs	Russia	Negative	Keynesian theory	
	Bressan et al. (2023)	SMEs	Italy		Social capital and stakeholder theory	
	Chen et al. (2021)	Supply chain	USA			
	Forsyth et al. (2020)	Aviation (airports)	European countries	Mixed impacts	Keynesian theory	
	He et al. (2021)	Brick-and-mortar retail				
	Heo et al. (2021)	Healthcare	South Korea, UK	Positive in UK		
	Marinescu et al. (2021)	Labor market	USA			
	Naradda Gamage et al. (2020)	Economic globalisation	Global	Negative	Porter's forces of competitive position	
	Seliverstov et al. (2021)	Government	Russia			
	Sigala (2020)	Tourism	Global	Negative		
	Yan et al. (2021)	European countries		Negative	Keynesian theory	
	Zhang and Zhang (2021)	Air industry	Australia	Negative		
	Papers with no specific strategy or action being suggested	Phan et al. (2019)	Banking 23 countries, negative	23 countries	Negative	
		Klutse (2020)	Banking	Middle East, North Africa	Positive	
		Mateev et al. (2021)	Coopetition		Negative	Relational view, resource-based view
Sharma et al. (2020)				Negative		
Seliverstov et al. (2021)		Government	Russia			

2.4.3 Strategies and actions for sensing

According to Helfat and Peteraf (2015), the sensing process implies recognizing emerging patterns in the environment and interpreting them which are essential for accurate threat and opportunity recognition and creation (Helfat and Peteraf, 2015). Identification, development and assessment of opportunities in relation to customer needs, technology change and competition which is the core idea of sensing capabilities can be ascertained through strategies that aim at collecting information about customers' preferences and competitors' actions.

Customer centric approach and forward integration

In 1954, Drucker, in his landmark book proposed that it is the customer who determines what a business is, what it produces, and whether it will prosper (Drucker, 2012). As resources become scarcer and working conditions get harder during a crisis, businesses realise the fact that they have to be more accurate in meeting their customers' needs, and ensuring their well-being (Pantano et al., 2020). In the retail sector, for example, retailers are expected to be aware of consumers' vulnerability and special needs and consider addressing the possible health hazards during (offline) shopping (Pantano et al., 2020). Also, they had to provide the products and services that their customers needed in a reasonable amount of time. Consequently, it became more important that they gather information about customers to be able to provide them with a better shopping experience (Elnahla and Neilson, 2021). According to Raj et al. (2022), developing products and services in close coordination with customers and promoting brand loyalty through schemes and campaigns as well as providing timely response and satisfactory resolution to customer queries would lead to greater customer satisfaction and consequently better performance, especially during crises. Several studies in our review propose that the traditional backward integration approach (reducing costs as much as possible) has to be replaced with forward integration (integration with end-user) (Grobbelaar and Visser, 2021; Ilinova et al., 2021; Lin and Zhang, 2021; Pavlova et al., 2021)

Competitive intelligence

In addition to collecting information about customers, information about competitors in the market is also of great importance during a crisis (Elgazzar, 2021; Tatarovsky, 2021). Venkatesh et al. (2021) define competitive intelligence as collecting necessary information and data about competitors. Drawing on Porter's five forces theory (Naradda Gamage et al., 2020), some studies demonstrate that SMEs can ensure their survival by implementing competitive intelligence to detect competitive surprises in their industry (Venkatesh et al., 2021). Highlighting the importance of cooperation (cooperation and competition at the same time) for COVID-19 management, businesses need to have enough information about their rivals as well as deep research of competitors' activities to gain complete and detailed information (high quality information) (Elgazzar, 2021; Tatarovsky, 2021).

2.4.4 Strategies and actions for seizing

Seizing opportunities and responding to emerging threats are essential parts of the DC perspective that entails making large and sometimes irreversible investments in tangible and intangible assets (Helfat and Peteraf, 2015). We find strategies and actions related to digitisation and digital transformation, human resource support and investments in knowledge management within the organisation as well as providing social support to be examples of seizing.

Human resource support

As firms decided to do some or all parts of their operations remotely due to COVID-19 conditions there was an urgent need for training employees who were accustomed to the traditional face-to-face in-office interactions (Henningsson et al., 2021). Preparing employees for changes in the business processes which in some cases seemed inevitable (even in offline businesses like retailers who have to practice new measures of social distancing and sanitising), exemplifies the importance of providing employees with new skill sets and knowledge (Henningsson et al., 2021; Kniazieva et al., 2021; Pantano et al., 2020; Raj et al., 2022). In other words, in many cases, human resource support in the form of training and improving skills has been considered a complementarity to the digitisation and digital transformation strategy (Botnaryuk and Kalinina, 2021; Kumar et al., 2021). In addition to training and improving skills, employee treatment has a positive effect on labor investment efficiency during and after a crisis (Cao and Rees, 2020). According to Aleem et al. (2022), during the COVID-19 pandemic, human resource professionals have tried to create opportunities for remote workers to develop some critical characteristics and competencies by enabling them to be open to new experiences, show resilience, and consequently have a greater sense of psychological well-being. Developing and implementing interventions that enable employees to. In the manufacturing context, Al-Ali and Abu-Rumman (2019) propose the idea that total quality management measures such as senior management support have positive impacts on addressing the competition during a crisis (Al-Ali and Abu-Rumman, 2019). In times of uncertainty, Pereira et al. (2021) highlighted the centrality of Human Resource Management (HRM) in enhancing strategic agility in organisations. In this regard, they suggest that organisational development interventions/initiatives such as encouraging knowledge sharing, experimentation, and improvisation or innovation had been instrumental in enhancing strategic agility and performance.

Digitisation and digital transformation

According to some studies, state-of-art technologies such as the internet of things (IoT), cloud computing, or big data analytics can help businesses enhance the digitisation of their internal operations and processes, improve effectiveness and efficiencies and re-design their business models in order to survive crises and improve corporate performance in terms of new business opportunities, productivity, and income (Akpan et al., 2022; Barba-Sanchez et al., 2018; Bilbao-Ubillos and Camino-Beldarrain, 2021; Botnaryuk and Kalinina, 2021; Doyle and Conboy, 2020;

He et al., 2021; Klöckner et al., 2023; Pavlova et al., 2021; Raj et al., 2022). Arvanitis and Loukis (2020) suggested that even though the investment in ICT reduces during an economic crisis, manufacturing companies' performance will not be impacted since they tend to leverage their existing ICT resources in more innovative ways.

A key aspect of the COVID-19 crisis is the exponential increase and reliance on digital communication to conduct business both within the firm and with their external stakeholders (He and Harris, 2020; Pantano et al., 2020). Chanana (2021) also suggests that organisations must implement online practices to remain competitive during this difficult time.

Remote working has also received significantly more attention since the beginning of the pandemic and digitisation has been proposed as a vital requirement for implementing the shift to remote working and remote operations (Amankwah-Amoah et al., 2021; Waizenegger et al., 2020). Bucea-Manea-Țoniș et al. (2021) for instance, investigate the concept of smart working, which implies distance working reliance on new smart technologies such as cloud technologies, big data, and blockchain and frontier communication technologies. Web conferencing systems are suggested as one of the technologies used during the pandemic to bring value and provide different affordances such as communicating with different groups or attending events (Hacker et al., 2020). In this sense, by looking at teaching-related practices of university lecturers in response to the COVID-19 crisis, Carugati et al. (2020) suggested that managers speed up a digital transformation that will be followed by IT-based crisis-born innovations. Some studies have taken even further steps to investigate concepts such as epidemic-induced remote work adjustment at the individual and organisational levels and found the significant role of digitalisation in addressing the communication barriers caused by the crisis (Carillo et al., 2021; Edelmann et al., 2021). Henningson et al. (2021) who investigate a financial company's response to the shutdown of back-offices and customer-facing branches, also highlight the use of cloud-based hybrid infrastructure, telecommuting equipment, and improving internet connection as well as providing employees with necessary technologies as actions aimed at developing digital affordances to face the remote working challenges. Even in the tourism industry technologies like mobility tracing apps, robotised AI touchless service delivery, digital health passports and identity controls, and social distancing and crowding control technologies have been identified to be at the core of solutions for fighting against COVID-19 and its effects (Sigala, 2020).

Providing social supports

Some studies published during the COVID-19 outbreak show that businesses tend to enhance their engagement with society and community during the crisis (Boubaker et al., 2020; Bressan et al., 2023; Chen, 2021; Naradda Gamage et al., 2020; Pantano et al., 2020). Some businesses in the retail sector have used their production line to produce health-related equipment (e.g., ventilators or masks) or "made donations to hospitals, national health systems, charities, etc." (Pantano et al., 2020). When there was a shutdown of almost all professional sports activities and leagues, many sport-related associations and organisations addressed their fans' disappointment and frustration

with corporate social responsibility (CSR) programs trying to inspire, assist, and educate the followers (Smith and Casper, 2020). With their influence on their fan-bases through mass and social media, they participated in programs with social purposes like those that were designed to educate people and encourage social distancing measures (Smith and Casper, 2020). The adoption of these CSR practices is believed to lead to a more attractive corporate environment, better financial stability and more crisis-resilient economies (Boubaker et al., 2020). The impact of providing society (and not necessarily only customers) with these services is beyond the crisis and will improve the image of the business in the long term leading to a better status in the competition. Additionally, evidence suggests that a positive and proactive relationship with nonmarket stakeholders like the local community can give firms an advantage in their interactions with governments during and post-pandemic (Lawton et al., 2020). As a result, an optimistic view is that the COVID-19 pandemic will accelerate post-pandemic CSR development in the long run (He and Harris, 2020).

2.4.5 Strategies and actions for reconfiguring

Reconfiguring implies “sustaining growth and profitability, by enhancing, combining, and reconfiguring the firm’s organizational assets (its resources and capabilities)” (Helfat and Peteraf, 2015; Teece, 2007). According to Helfat and Peteraf (2015), reconfiguring tangible and intangible assets and responding to uncertainties and changes in the external environment requires “the enhancement or alteration of strategic assets through innovation and organizational learning, as well as acquisition of new assets” which are completely in line with Agile Rethinking and Innovation, Price adjustment, and Collaboration/Partnership strategies identified in this review (Capron and Mitchell, 2009; Helfat and Peteraf, 2015; Sniazhko, 2019; Teece, 2007).

Agile rethinking and innovations

According to Tushman and Nadler (1986), organisations can gain a competitive advantage only by managing effectively for today while simultaneously creating innovation for tomorrow. Naradda Gamage et al. (2020) proposed that “economic competition influences businesses to be vigilant to their business strategies, particularly on innovations”. The term ‘innovation’ is broadly recognised as a new or significantly improved product or service; however, it is a complex process that assembles different innovation types, including product, process, and business model innovation (BMI) (Bucherer et al., 2012; Liu and Stephens, 2019; Snihur and Wiklund, 2019). Innovation is closely associated with agile thinking especially when it comes to unplanned changes and crises (Pantano et al., 2020). Every crisis or sudden change creates new norms; thus, businesses will be faced with unpredicted situations like new demand, operation constraints or different forms of collaboration with stakeholders. In the time of crisis, firms tend to invest more in innovation and R&D (Dias et al., 2020). However, Disoska et al. (2020) mentioned decreased public funding on R&D budgets and unavailability of human resources as some barriers caused by the crisis which have significantly decreased the innovation activities of the firms (Disoska et al., 2020).

Additionally, Innovation can be considered as a by-product of digital transformation strategy since it provides individuals and organisations with more affordances (Carugati et al., 2020).

By using an agile approach new DC have to be developed in response to consumers' new demands and governments' pressures and interventions (Pantano et al., 2020). Also in the marketing context, based on He and Harris (2020) "changes to the marketing environment and the marketing landscape forced organizations to develop a strategic agility pre, during, and post-pandemic" which helps them to reach customers and meet their demands. This might be the reason why some believe that small businesses are more likely to survive crises due to their agility (Sniazhko, 2019). Also, Albers and Rundshagen (2020) introduced innovating as a response category to the COVID-19 outbreak that refers to the strategic renewal of the organisation during the crisis. For instance, after the outbreak and the drop in travels, some airlines have engaged in tactical moves with immediate effect such as converting passenger aircraft into cargo transporters. In the tourism industry, Sigala (2020) suggested innovations in the business model like virtualisation of experiences as a response to the pandemic. To address challenges in the sports industry such as uncertainty in the context of facility and league operations, Cho et al. (2021) suggested flexible facility/venue management, customised services as well as new and innovative ways to rebuild the fan experience. In the banking and finance sector, Del Prete et al. (2021) introduced different types of mortgage contracts with differentiated terms and conditions as a form of product innovation. A similar strategy has been used in other sectors such as insurance (Kniazieva et al., 2021). In addition to the innovation in product, service, or business model, there are suggestions for diversification toward other sectors and multimarket strategies as another form of innovation (Cabanelas et al., 2020).

In his categorisation of strategic crisis responses, Wenzel et al. (2020) posed the idea that innovations and agile rethinking responses may turn out to be an important moves in long-lasting crises that tend to provoke irrevocable traces in the business landscape that render a return to the previous order impossible.

Collaboration and partnership

One of the early consequences of crises is when business resources are endangered and a part of the system becomes the bottleneck for the whole process. In some other cases, resources like required skills are not the problem and firms have to deal with other issues like the lack of innovation. One of the main streams that are identified in this review is the collaboration and partnership strategies and establishing relations with other firms (Bressan et al., 2023; Chhimwal et al., 2021; Durmaz et al., 2021; Jaiswal-Dale et al., 2022; Kniazieva et al., 2021; Lawton et al., 2020; Lin and Zhang, 2021; Naradda Gamage et al., 2020; Pitas et al., 2021).

According to Ketchen and Craighead (2021), since large firms become less flexible and innovative after a while, they have to approach other firms (mostly SMEs which are believed to be better innovators) to find the lost element of innovativeness especially when facing crises. Wang et al. (2020), in their proposed typology of marketing innovation strategies in the COVID-19 crisis, also

suggest that when the level of collaborative innovation and resource dependency is high, firms have to consider partnership strategies. In the banking sector, Sinha and Grover (2021) proposed consolidation as one of the main strategies during the COVID-19 crisis to enhance liquidity creation. The airline industry has also witnessed the use of collaboration and partnership strategies through actions like setting up joint ventures (Albers and Rundshagen, 2020). In the tourism literature, Sheldon (2022) proposed that collaboration with sharing economy mindset has to replace the previous underlying assumption of many economic models that competition leads to better performance in the tourism industry. In the healthcare sector, Remick et al. (2021) suggested collaboration between public and private sectors in the healthcare system to alleviate the effects of the COVID-19 crisis. Crick and Crick (2020) proposed cooperation between competing organisations also known as co-opetition during the COVID-19 crisis. The concept of collaboration and partnership is not limited to the practice and collaboration between scientists and researchers in terms of sharing pandemic data, information and knowledge is also important (Cutcher-Gershenfeld et al., 2020). Javed and Chattu (2020) introduced the concept of Global Health Diplomacy as a way of collaboration between countries and nations that connects the disciplines of public health, law, international relations, management, and economics, focusing on negotiations and influencing the global policy environment for health (Javed and Chattu, 2020).

Nagoev et al. (2020) and Shchepakina et al. (2018) introduced sanctions as another sort of restriction and challenge that might lead to situations like a crisis. In Nagoev et al. (2020) which studies the challenges of the Russian catering and restaurant industry during crisis, researchers suggest forming long-term relationships with suppliers as a strategy to mitigate the negative impacts of the crisis. Grondys et al. (2021) also pinpoint the poor relationship between SMEs and suppliers as a source of potential risk. In this sense, especially in the supply chain context, collaboration with the vendor, sub-contractor and customer to source critical components and raw materials, is critical to ensure seamless supply during emergencies (Raj et al., 2022). Furthermore, alternate vendors should be explored to ramp up. Consequently, during severe global crises like the COVID-19 pandemic collaboration with partners and even other firms opens possibilities for more flexible production scaling, joint research or product development, risk-sharing, and asset-sharing and thus fruitful to pursue (Klößner et al., 2023).

Assimilating and mimicry

In some cases, the idea for change and innovation does not come from inside the business and it has to be found somewhere else. Hence, some businesses that lack agility and internal resources for research and development employ assimilating and mimicry strategies. In the supply chain context, Ketchen and Craighead (2021) suggest ‘assimilating’ as one of the mechanisms of supply chain entrepreneurial embeddedness, which is defined as “the degree to which a large firm integrates small entrepreneurial business capabilities within its supply chain”. Assimilating, in their view, refers to the cases in which, firms mimic small entrepreneurial firms rather than acquiring or allying with them (Ketchen and Craighead, 2021). Also, in the marketing context Shchepakina et al. (2018) suggests mimicry as a form of marketing behaviour that can be done

during a crisis and is understood as “imitating the best experience of any market agents in the various components of their activities (tactical, strategic, innovative, organizational, functional, product, sales, communication, technical and technological)” (Shchepakina et al., 2018).

Price adjustment

The situation caused by crises provides monopoly businesses with higher market power and stronger liquidity with an opportunity to fight against their competitors by manipulating the prices in their own favour. In a highly competitive market, lowering the price would make the brand and product more appealing to the customers, and in a situation where they have the upper hand in market share increasing the price would be the strategy to survive the crisis (Forsyth et al., 2020).

Forsyth et al. (2020), in their study which revolves around the airport and airline industry, suggest that increasing or lowering the price based on the market power and internal capabilities in the time of crisis might be a strategy used by some businesses. They assert that airports which are in competition would not be able to raise charges and in order to stay in competition maybe even have to drop their prices dealing with more serious challenges in the long term. In contrast, monopoly airports and those subject to different kinds of regulation could increase their prices. Also, in the supply chain context, Raj et al. (2022) introduced differential pricing to customers as one of the short-term strategies during crises like the COVID-19 pandemic. Lowering prices and fees can be seen in other industries and sectors as well. Civera et al. (2021) explored the role of competition and reputation in affecting universities’ decisions on tuition fees when facing a crisis and showed that universities could lower prices to attract more students or to fend off the effects of their competitors’ lower prices, which threaten their existing student body.

2.4.6 Identified theoretical lenses and approaches

The reviewed studies have employed various theoretical backgrounds and lenses to investigate the relationship between challenges, strategies, and their possible impacts. As depicted in Figure 2(d), among these theories, the RBV, contingency theory, and relational view are the most dominant theoretical lenses used in the studies that are analysed. The main theories that are identified in this review as well as their definitions have been depicted in Table 3.

The RBV suggests that firms can employ their strategic resources to achieve competitive advantage and superior long-term performance. In order to embrace external opportunities, businesses select the strategy or competitive position that best takes advantage of internal resources and capabilities (Barney, 1991; Crick and Crick, 2020; Ilinova et al., 2021; Mateev et al., 2021; Naradda Gamage et al., 2020; Venkatesh, 2020; Wang et al., 2020). In this regard, Shchepakina et al. (2018) proposed a model of choosing rational marketing behaviour of a manufacturing enterprise by the use of all available and attracted resources to increase competitiveness.

Crick and Crick (2020) also proposed the infusion of the RBV and relational view to study the implementation of co-opetition strategies in response to the COVID-19 crisis. The relational view

by Dyer and Singh (1998) is a theory for considering networks of firms and how high-quality inter-organisational relationships can positively affect firm performance. This view has also been implicitly considered in some studies in which forming partnership relations with other firms is proposed as a strategy for firms during a crisis (Ketchen and Craighead, 2021; Wang et al., 2020).

Another important theory that is implicitly mentioned in several articles is Keynesian economics which is a macroeconomic theory advocating for increased government interventions in the form of lowering taxes or providing businesses with aid packages to help the economy stay out of the depression (Albers and Rundshagen, 2020; Baranova and Borisova, 2021; Forsyth et al., 2020; Naradda Gamage et al., 2020; Yan et al., 2021). In the airline industry, due to the unprecedented magnitude of the COVID-19 crisis, in many countries like the US, Korea and European countries (Italy, Germany, etc.), governments have provided national airlines with significant bailout packages (Albers and Rundshagen, 2020). Considering the highlighted effect of COVID-19 on firm performance, contingency management theory is an approach that has been implicitly mentioned by some studies (Cho et al., 2021; Elgazzar, 2021). Contingency theory suggests that there is no best way for making decisions in organisations and the optimal course of action is contingent upon the internal and external situation (Luthans and Stewart, 1977). For example, drawing on the concept of prisoner’s dilemma, Elgazzar (2021) suggested that during a crisis, in addition to capabilities and goals, a firm’s response also depends on the environmental factors and competitors’ strategy, thus while having their own game plan, firms have to constantly watch for their rivals’ next move.

Table 3. Theoretical Lenses Identified in the Reviewed Studies

<i>Theory</i>	<i>Definition</i>
Contingency theory of management	Drawing on the notion of situational perspective, the contingency approach is defined as identifying and developing functional relationships between environmental, management and performance variables (Luthans and Stewart, 1977).
Dynamic capabilities (DC)	A DC is the firm’s potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions and to change its resource base (Barreto, 2010).
Resource-based view (RBV)	The RBV argues that firms possess resources, a subset of which enables them to achieve competitive advantage, and a further subset which leads to superior long-term performance (Barney, 1991; Grant, 1991).
Keynesian economic theory	Keynesian Economics is a macroeconomic theory which is developed in response to Great Depression crisis and focuses on using active government policy to manage aggregate demand in order to address or prevent economic recessions (Naradda Gamage et al., 2020).
Affordance theory	Affordances are possibilities for goal-oriented action, emerging from the relation between IT artefact, considered in terms of IT features, and organisational systems, and afforded to specified groups of actors by technical objects (Markus and Silver, 2008; Zammuto et al., 2007).
Relational view	Relational view complements the RBV by arguing that critical resources may span firm boundaries and that firms can earn relational rents, which are jointly generated with alliance partners (Dyer and Singh, 1998).
Porter’s five forces framework	Porter’s Five Forces is a model that identifies and analyses five competitive forces that shape every industry and helps to measure competition intensity, attractiveness, and profitability of an industry or market. These forces are: <ol style="list-style-type: none"> 1. competition in the industry 2. potential of new entrants into the industry 3. power of suppliers

	4. power of customers
	5. threat of substitute products (Porter, 1980).
Comparative advantage theory	Comparative advantage theory explains a firm's ability to sell goods and services at a lower price than its competitors and realise stronger sales margins (Hunt and Morgan, 1995).
Customer centricity	Customer centric approach suggests a culture of doing a business that focuses on creating the best experience for the customers and putting them the core of business's philosophy, operations, or ideas (Shah et al., 2006).

Affordance is defined as the possibilities for goal-oriented action afforded to specified user groups by technical objects (Markus and Silver, 2008). According to Henningsson et al. (2021), this potential and possibility exist independent of the user's awareness about it. As Henningsson et al. (2021) and Hacker et al. (2020) suggested, crises like COVID-19, provide users with the opportunity to perceive and actualise previously non-recognised affordances in digital technology. Also, Waizenegger et al. (2020) proposed that the affordance perspective can enable us to examine the performance of digitisation projects implemented during the lockdown to improve internal collaboration and remote working conditions.

According to Porter's competitive framework, based on the market being broad or narrow and also the source of competitive advantage (cost or differentiation) Porter suggests four strategies namely, cost leadership, differentiation, cost focus, and differentiation focus. Considering the nature of SMEs, Mutisya (2013) suggested cost leadership and differentiation as the best strategies for SMEs (Mutisya, 2013). However, since SMEs are constantly looking for increasing their profit while keeping the costs at the lowest, cost leadership probably is the best option for them (Julita Julita, 2019; Naradda Gamage et al., 2020).

Being able to produce goods and services at a lower cost compared to other players in the market and realising stronger sales margins is the core of the theory of comparative advantage (Naradda Gamage et al., 2020). Grondys et al. (2021) investigated the most important risks facing small and medium-sized enterprises in Poland and in line with this theory, they suggest that during the pandemic, both micro-, small and medium-sized enterprises ought to primarily concentrate their efforts on increasing revenue and reducing operating costs (Grondys et al., 2021).

Also considering the importance of focusing on the end user, customer centric approach helps businesses to put customers at the core of their philosophy, strategies and activities and focus on creating the best experience for them to build brand loyalty in addition to making profit. Pantano et al. (2020) suggested that in the retail industry, retailers' main priority must be ensuring consumers' safety and health while providing the products they need in a reasonable amount of time.

2.4.7 Comparing before and after COVID-19

In this study, we are interested in examining if new strategies or new aspects of existing ones have been developed, as well as in studying the main differences between these strategies and actions

before and during the COVID-19 crisis. Our findings show that many of these strategies are not radically new and have their roots in research studies and practices before the current pandemic. In addition, there are some aspects that are relatively new or exclusively highlighted during the COVID-19 crisis. In order to find these differences, we first traced the roots of these strategies through backward reference searching and discussing papers that were referenced in studies included in this review as previous examples of suggested strategies and actions. We identified and examined the 20 most cited studies that were referenced in the pool of reviewed papers to find the roots of these strategies and actions as well as their definitions for different strategies and different aspects. Next, we coded these studies based on the different strategies that have been identified and categorised in our review. Then we compared COVID-19-related studies that are included in our review with them to identify the main changes in firms' views toward their strategies since the occurrence of the current crisis.

Even though we could not find any novel theory, strategy or framework in the analysed papers developed to address challenges due to a prolonged major crisis such as the COVID-19 pandemic, some specific aspects of existing strategies have been highlighted by the recent studies and in some cases, actions have been suggested that are directly associated with the consequences of the current crisis (Albers and Rundshagen, 2020; He and Harris, 2020; Pantano et al., 2020). Findings from this comparison for each strategy and action are presented and discussed in Table 4.

In terms of digitisation and digital transformation strategy, developing technological infrastructures necessary for remote working is inevitable (Liu and Stephens, 2019). Also in many industries, business models had to be modified digitally to be able to shift offline operations and communications to an alternative online form (Sigala, 2020). As a result of this change, businesses have to support their human resource by training and equipping them with the required skills, knowledge and devices required for the new digitally enhanced way of doing tasks (Chanana, 2021; Henningsson et al., 2021). In terms of customer centricity and forward integration, while collecting data and information is not a new idea, during the pandemic it became of even greater importance to collect necessary information about customers to be able to appropriately respond to demands and ensure customers' safety and wellbeing at the same time (Elnahla and Neilson, 2021; Pantano et al., 2020). In highly competitive sectors, because of the shortage of resources, firms had to monitor their rivals closely to be able to respond to their actions properly (Ilinova et al., 2021; Pantano et al., 2020).

Moreover, before COVID-19 the decision to collaborate and partner was mainly based on potential opportunities that could have been realised through alliances (Barney, 1991; Dyer and Singh, 1998). However, due to the constraints on resources or innovative capabilities, during the COVID-19 many firms had to form relationships (even with their competitors) to compensate for the negative effects of the crisis as much as possible (Albers and Rundshagen, 2020; Crick and Crick, 2020; Ketchen and Craighead, 2021). In terms of providing social support which is similar to the notion of corporate social responsibilities, social media helped businesses to run educational campaigns, advertisements and programs to inspire and educate people and at the same time

provide a socially responsible image of the corporate because people become even more sensitive to these kinds of messages during crises and unfortunate incidents. While before COVID-19 firms used to leverage different pricing strategies to sell their products and services, during COVID-19 crisis dynamic pricing based on constantly changing and uncertain situations became their priority in price adjustment (Forsyth et al., 2020). During the COVID-19 crisis, business model innovation became a more feasible and fruitful form of innovation for businesses compared to product or service innovation (Sigala, 2020). Agility became important to the extent that forced some firms to acquire other smaller more innovative firms during the pandemic (Ketchen and Craighead, 2021). Governments' interventions are also in some cases unprecedented during the COVID-19 crisis. Mandatory shutdown of offices, schools and public places to ensure people's safety during the pandemic as well as financially supporting vulnerable businesses in some countries are among the measures taken by governments to mitigate the spread of the virus and support businesses (Forsyth et al., 2020; He and Harris, 2020; Naradda Gamage et al., 2020).

Table 4. Comparison between competition strategies and their different aspects before and During COVID-19 crisis

<i>Strategies and actions</i>	<i>Before COVID-19</i>	<i>During COVID-19</i>	<i>Main differences (new aspects or highlighted existing aspects)</i>
Customer centric approach and forward integration	In customer-centric approach all decisions start with the customer and opportunities for advantage. Products and services have to be tailored to customer's need and preferences with affordable price and high value with the goal of maximising share of wallet of customers, customer satisfaction and wellbeing customer lifetime value, customer equity (Shah et al., 2006; Sheth et al., 2000).	Collecting data about the customers' needs and behaviours during crisis which helps firms to establish customer centric activities and increasing concerns about privacy issues (Elmahla and Neilson, 2021; Pantano et al., 2020). Being aware of consumers' vulnerability, special needs, acceptable times for responses, ensuring availability of product and service at any time and location and considering possible health hazards during (offline) shopping expeditions (Pantano et al., 2020). Integration with end users to increase consumer value instead of costly push approach during crisis (Ilmova et al., 2021).	Highlighted existing aspect: <ul style="list-style-type: none"> Collecting information to provide a better service (In terms of availability of products and services, new needs and behaviours and safety issues) during pandemic and consequently increased concerns about customers and users' privacy. New aspect: <ul style="list-style-type: none"> Necessity of ensuring customers' health and safety during offline shopping and services.
Competitive intelligence	Competitors' intelligence is a form of competitive intelligence that is needed to evaluate the evolution of competitive strategy over time through changes in competitors' structure, new product substitutes and new industry entrants (Rouach and Santi, 2001).	In the time of crisis competition becomes so fierce that in addition to customers data, businesses have to collect information and data about their competitors in the market and their next move (Venkatesh et al., 2021).	Highlighted existing aspect: <ul style="list-style-type: none"> Since the situation was almost new and unknown, in some cases, businesses' response to the crisis depended on their rivals' response.
Digitisation and digital transformation	The adoption of new technologies alongside with strong leadership can help to digitally transform the organisation and its value proposition. As a result, three forms of transformation are expected each of which have three aspects: <ol style="list-style-type: none"> transforming customer experience that includes customer understanding, top-line growth and customer touch points transforming operational processes through process digitisation, worker enablement and performance management transforming business models by digital modifications to the business, the creation of new digital businesses, and digital globalisation (Westerman et al., 2014). 	Device readiness and developing technological infrastructures necessary for distance working (Bucea-Manea-Toniş et al., 2021; Henningsson et al., 2021). Developing technological requirements for digital communication with customers instead of face-to-face interactions, to ensure their safety, overall contribution to public health, and the use of surveillance measures to limit the spread of the virus (Pantano et al., 2020). Employing low costs technologies by small businesses to undertake virtual operations in situations of community lockdown (Akpan et al., 2022).	Highlighted existing aspect: <p>Among nine aspects of digital transformation introduced by Westerman et al. (2014) findings show that considering all the constraints caused by pandemic situation, businesses have focused more on:</p> <ul style="list-style-type: none"> Developing more efficient customer touch points to enhance online communications with users and customers. By digitally modifying the business model firms (especially SMEs) would be able to reduce their costs. New aspect: <ul style="list-style-type: none"> In terms of transforming operational processes developing remote working technological infrastructure highlights the importance of process digitisation during pandemic.

<i>Strategies and actions</i>	<i>Before COVID-19</i>	<i>During COVID-19</i>	<i>Main differences (new aspects or highlighted existing aspects)</i>
Human resource support	HRM introduced as a key source of sustainable competitive advantage and growth with practices such as attracting talented employees and developing their skills, performance related pay aimed at eliciting high levels of effort (motivation), or the use of empowerment programs to enable employee voice and influence (Becker and Gerhart, 1996; Snape and Redman, 2010).	Exercising remote working to ensure employees' health and safety (Henningsson et al., 2021; Chanana and Sangeeta, 2021). Providing employees, who were accustomed to in-office face-to-face interactions, with education, training and improving remote working skills and culture (Chanana, 2021; Gignauri, 2020; Henningsson et al., 2021; Pereira et al., 2021; Sheldon, 2022).	Highlighted existing aspect: <ul style="list-style-type: none"> • Employees' safety and wellbeing became of even greater importance both for firms and governments. New aspect: <ul style="list-style-type: none"> • Businesses had to train and equip their employees (both in terms of skills and also necessary technological infrastructures) to be able to do their jobs remotely from home.
Providing social support	The adoption of CSR practices has been mentioned to provide firms with better image, more attractive corporate environment, better financial stability and more crisis-resilient economies (Boubaker et al., 2020). Environmental protection practices, transparency, community satisfaction, Participation in public activities of social interest, Support for training and educational activities and activities linked to health and wellbeing have all been mentioned as different practices for being socially responsible (Valiente et al., 2012).	During COVID-19 pandemic, some businesses have moved their own brand production to medical support equipment and necessities such as masks or hand sanitisers, or made donations to hospitals, national health systems, charities, etc. Such practices enhance consumers' attachments to the retail brand and improve their image (Pantano et al., 2020). Three main themes were found in some firms' CSR programs and efforts during Covid-19 pandemic: Educating, assisting and inspiring the society and community (Smith and Casper, 2020).	Highlighted existing aspect: <ul style="list-style-type: none"> • Educational campaigns, advertisements and programs to increase the awareness about COVID-19 disease and safety instructions. New aspect: <ul style="list-style-type: none"> • Some manufacturers stopped their normal productions to produce medical equipment and health related products such as masks and sanitisers.
Agile rethinking and innovations	Organisations can gain competitive advantage only by managing effectively for today while simultaneously creating innovation for tomorrow (Tushman and Nadler, 1986). While being one of the necessary tools to fight against backdrops of crisis, firms' investment in innovation decreases in the time of crisis (Paunov, 2012). There is a consensus that in the time of crisis business model innovation can be more effective than process and product/service innovation (Bekmezci, 2013; Chesbrough, 2007).	Based on agile approaches, new DC need to be developed to shorten the time between changes and responses and deal with consumers' new demands and governments' pressures on how businesses are to be run during pandemic (Pantano et al., 2020). During pandemic, some new forms of innovation especially in business models have emerged such as different types of mortgage contracts with probably differentiated terms and conditions in banking sector or airlines changing their business model by converting passenger to cargo flights (Del Prete et al., 2021; Albers and Rundshagen, 2020).	Highlighted existing aspect: <ul style="list-style-type: none"> • Like collaboration strategy, innovation becomes less of an option and more a necessity during crises. <ul style="list-style-type: none"> • Some new forms of innovations in different industries that mostly is focused on innovation in business model. Reaching for new customer segments, new value propositions (adding online shopping and delivery option), finding new streams of revenue and finding ways to reduce costs.

<i>Strategies and actions</i>	<i>Before COVID-19</i>	<i>During COVID-19</i>	<i>Main differences (new aspects or highlighted existing aspects)</i>
Collaboration and partnership	<p>Firms usually form partnerships and alliance relationships to leverage complementary resources and capabilities and also exploit knowledge sharing potentials. Alliances can be formed around tangible assets to benefit initially from investments in relation specific assets (RSA) or around intangible assets for subsequent investments in knowledge sharing routines (KSR) (Dyer et al., 2018).</p> <p>The goal of collaboration and partnership is exploration, value creation and discovering additional opportunities (Dyer et al., 2018).</p>	<p>Unlike collaboration before COVID, the goal mainly would be avoiding threats and finding solutions for mutual problems. In some industries that were hit hard by pandemic, collaboration for responding to the decreased demand was necessary for example due to the unprecedented drop in passengers, some airlines decided to set up joint ventures (Albers and Rundshagen, 2020). Due to the shortage of resources mainly caused by pandemic, alliances and collaborations (even with competitors which is called cooperation) became necessary for many businesses to leverage each other's resources (Crick and Crick, 2020; Ketchen and Craighead, 2021; Naradda Gamage et al., 2020; Wang et al., 2020).</p>	<p>Highlighted existing aspect:</p> <ul style="list-style-type: none"> • While before COVID-19 crisis, forming collaborations and partnership relationships were considered as an option and mainly based on exploration of opportunities, during COVID-19 outbreak this strategy was employed to avoid threats caused by consequences like unprecedented drop in customers and demand, shortage of resources and lack of necessary capabilities required for operating during pandemic situation.
Assimilation and mimicry	<p>Environmental turbulence fosters the emergence of uncertainty and mimicry among organisations, because of incomplete information about further market developments. In order to mitigate such uncertainty, organisations tend to imitate the behaviour of successful competitors in terms of their strategies even if the consequences and benefits of the imitated strategies are poorly understood (Fiol and O'Connor, 2003; Wolf et al., 2012).</p>	<p>The advantage of assimilating and mimicry is that it allows the firm to pick and choose exactly which aspects of entrepreneurial firms to mimic – and which ones to forego – whereas when acquiring and allying the large firm gets the total package (Ketchen and Craighead, 2021). One way for large firms to assimilate small firms' capabilities without acquiring or allying with them is to hire key people away from small firms (Ketchen and Craighead, 2021).</p>	<p>Highlighted existing aspect:</p> <ul style="list-style-type: none"> • Large firms are interested in mimicking small firms' successful actions during crisis situation because of their potential for innovativeness and flexibility.
Price adjustment	<p>There are a lot of circumstances that make managers reconsider their price decisions. Price adjustment can be based on different factors: different consumer perceptions of product value, different geographical consumer distribution and taking into consideration the situation on international markets. There are different price adjustment strategies based on the objectives and situations like dynamic pricing, discount and allowance pricing, psychological pricing, etc. (Nateva-Porcheva and Bozev, 2019)</p>	<p>Many airports have tried to keep their prices low or provide discounts. This will be helpful to increase the viability of airlines and tourism, and it will enable the wider economic benefits of the air transport like connectivity (Forsyth et al., 2020).</p> <p>In education sector reputation affects universities' behaviour in setting tuition fees in contexts of high competition; in response to a crisis, some universities tend to lower their fees to be able to compete whereas highly reputed universities charge even higher prices. In some cases, higher prices even during crisis can be interpreted as a signal of quality (Civera et al., 2021)</p>	<p>Highlighted existing aspect:</p> <ul style="list-style-type: none"> • Unlike before-COVID era, during COVID crisis, dynamic pricing was the most prevalent case of price adjustment due to the severe competition and also huge demand drop in some industries like airports, education institutions. • Also increasing prices in some other sectors was mostly inevitable and due to the increase in variable costs.

<i>Strategies and actions</i>	<i>Before COVID-19</i>	<i>During COVID-19</i>	<i>Main differences (new aspects or highlighted existing aspects)</i>
Government measures and interventions	<p>New firms are an important source of economic and social benefits, such as job creation, innovation and economic dynamism. Thus in many cases, governments are keen to help firms (especially new ones) by providing subsidies and financial helps to correct the perceived market failures that new firms face in their quest to establish themselves as viable entities (Auto and Rannikko, 2016; Söderblom et al., 2015). Exposing local SMEs for global competition by decreasing trade tariffs gives the international experience for competing in the global market (Jeppesen, 2005).</p>	<p>Internal competition is essential to delivering a better response to a pandemic as long as it is kept under control by reliable authorities (Heo et al., 2021). Many restrictions such as encouraging and, in some cases, forcing firms to shut down their in-office activities, were imposed by governments to ensure public's safety during COVID-19 pandemic (Carillo et al., 2021). By offering aid packages and subsidies, governments provide businesses (especially vulnerable ones) with the opportunity to survive temporary difficulties, but at the same time maintains market competition (Forsyth et al., 2020; He and Harris, 2020; Kiseleva and Sangmova, 2021; Naradda Gamage et al., 2020).</p>	<p>Highlighted existing aspect:</p> <ul style="list-style-type: none"> • Providing businesses with aid packages and subsidies to make sure that they can face the impacts of crisis and stay in the competition. Unlike normal situations, during crisis, government's aids were not limited mainly to new firms but almost all the businesses. <p>New aspect:</p> <ul style="list-style-type: none"> • Mandatory shut down of offices and in-person workplace interactions to ensure employees and customers' safety and health.

An important observation from the review is that the COVID-19 crisis did not introduce entirely new categories of strategic responses. Rather, it intensified and accelerated strategies already

discussed in the dynamic capabilities and crisis management literature. Firms relied on familiar mechanisms such as digital transformation, collaboration, innovation, and resource reconfiguration, but these actions were implemented more rapidly and at a larger scale due to the unprecedented level of environmental turbulence created by the pandemic. This suggests that crises such as COVID-19 do not necessarily generate new strategic logics but instead activate and amplify existing dynamic capability processes.

2.5 Discussion

Our study shows that firms in almost every industry have suffered from the negative effects of the COVID-19 outbreak and its consequences. The magnitude of its impacts and businesses' responses depends on many factors; namely type of industry, size of the firm, market power, and internal capabilities. Also, while in some cases the crisis has led to more severe competition, in our review we found cases in which the competition has decreased since the challenges caused by the pandemic have led to a gap between larger and smaller players as well as government and society's expectations for more collaboration instead of competition between firms in the time of crisis.

In line with our first research question, we were able to identify various strategies and actions that were adopted by businesses during a prolonged, large-impact crisis (RQ1). The crisis can be looked at as an opportunity for transformation and studies from different sectors show that businesses have adopted various strategies namely digitisation, agile rethinking and innovation, human resource support, forming relationships with partners and suppliers, mimicry, price adjustment, and customer-centricity to combat the negative consequences of the outbreak. While in some cases researchers focused on only one type of strategy and tried to conceptualise it in more detail (Akpan et al., 2022; Crick and Crick, 2020; Forsyth et al., 2020; Sigala, 2020; Smith and Casper, 2020; Wang et al., 2020), in some other studies, a group of strategies are observed and reported (Albers and Rundshagen, 2020; He and Harris, 2020; Henningsson et al., 2021; Naradda Gamage et al., 2020). While some of these strategies are more effective for the short-term survival of the organisation such as cost or asset reduction and tend to preserve the status quo of the business and its activities, another group of measures focus on innovation and are designed with a more long-term perspective toward competition (Albers and Rundshagen, 2020; Wenzel et al., 2020). For example, due to the lack of resources, different forms of partnership are considered by many firms (Albers and Rundshagen, 2020; Crick and Crick, 2020; Ketchen and Craighead, 2021; Wang et al., 2020). Some invested in CSR related activities to improve their image during the crisis and gain a competitive advantage in the post-crisis (Boubaker et al., 2020; He and Harris, 2020). Innovation and technology have been frequently mentioned as the main sources of competitive advantage that ensure the survival of businesses (Anning-Dorson, 2018; Ireland and Webb, 2007). Digital transformation and deployment of new technologies are not only important but also necessary as one of the first and simplest requirements for remote working. We also observed the presence of IT infrastructures, device readiness, and employees' skills in many cases but deployment and management of technology turned into a huge challenge for many businesses

(Chanana, 2021; Henningsson et al., 2021; Sigala, 2020). Businesses must align their response strategies with the resources and capabilities at their disposal. Further research in this area will prove to be valuable for research and practice.

In addition to all strategies and actions that can be employed by businesses, many papers also stress the importance of government interventions in the form of monitoring markets, incentives, subsidising, and basically every measure that can help firms and especially SMEs to survive the intense competition caused by the crisis (Baranova and Borisova, 2021; Chen et al., 2021; Marinescu et al., 2021; Seliverstov et al., 2021; Yan et al., 2021; Zhang and Zhang, 2021). He et al. (2021) suggested that providing subsidies to brick-and-mortar retailers during the pandemic will improve their profitability. Heo et al. (2021) in their study argue that competition is essential to delivering a better response to a pandemic. However, it has to be kept under control by reliable authorities to make sure that every party is being treated fairly.

Concerning our second research question, given the fact that DC are great sources of competitive advantage, especially during uncertain situations, we were able to map identified strategies and actions identified in this review in the DC framework based on the nature and conceptualisation of sensing, seizing, and reconfiguring capabilities (Fainshmidt et al., 2019; Teece, 2014) and fill the gap in DC literature regarding the ambiguity and fuzziness around the conceptualisations of the DC construct and its different categories. In addition to the contribution toward DC and crisis-related literature, we believe this framework provides managers and firms with different options and opportunities for decision making at the time of crisis. It is essential for businesses to continue their engagement with the sensing, seizing, and reconfiguring process. The findings also highlight that sensing, seizing, and reconfiguring capabilities should not be interpreted as strictly sequential stages. Rather, they represent interrelated organizational processes that may occur simultaneously as firms respond to crisis conditions. As we move on from the COVID-19 crisis, changes in competition such as competitors' new moves or new entrances as well as changes in customers' preferences and needs along with the development of new technologies and ways of doing business and changes in government policies necessitate reviewing every step of the capability building process and appropriate response and reaction.

Additionally, we investigated the main differences between strategies and actions utilised before and during the COVID-19 crisis. Our findings show that even though many of these strategies are not radically new, there are still some fresh aspects that have been exclusively highlighted during the COVID-19 crisis such as the intensified development of remote working (Akpan et al., 2022; Henningsson et al., 2021), the importance of training employees in this new setting (Chanana, 2021; Henningsson et al., 2021; Sheldon, 2022), and the transforming role of business model innovation compared to other forms of innovation (Albers and Rundshagen, 2020; Del Prete et al., 2021). Our study finds a research opportunity to develop theories and frameworks designed for addressing the challenges of a prolonged major crisis as there is a gap in the literature in this regard.

We acknowledge some limitations of our study. First, most of the reviewed studies so far, have focused on providing suggestions regarding useful strategies and actions during crisis considering the current situation, rather than analysing the actual impact of these strategies on firm performance after implementation. As a result, this review provides preliminary findings with regard to the impacts of strategies and actions as some of these strategies still need to be implemented and impacts may take more time to realise. Second, in this review, we did not include articles that were written in another language than English, so this study is based on a subset of what has been published. Despite these limitations, our study makes important contributions to research and practice.

2.6 Conclusions

In an attempt to find what real-world business initiatives truly reflect sensing, seizing, and reconfiguring as three aspects of the DC framework, we reviewed the recent literature to identify strategies and actions implemented by businesses to survive a changing competitive landscape during a times of crisis. Our findings indicate that specific strategies and actions were used by organisations for each of the sensing, seizing, and reconfiguring capacities of the DC framework ranging from sensing transformative opportunities in the firm's environment to seizing them and reconfiguring strategic assets.

Even though digitisation and digital transformation strategy has been identified as one of the more prevalent reactions among firms, findings show that most of the other strategies and actions such as innovation, human resource support, or forming collaborations also support or are supported by IT. The literature indicates that strategies and actions employed by firms can be great sources of competitive advantage and business value in time of crisis. Our findings also suggest that, although DC are partly path-dependent in their process of emergence, they share a significant degree of similarity across firms and different industries.

In our review, we did not find any comprehensive theory or framework that can encompass all the strategies and actions that are employed by different businesses in different industries during crises such as COVID-19. Therefore, we call for more studies to develop new theories considering what we have learned from prolonged massive crises like COVID-19. Such theories can serve as a foundation for future research on strategy during a crisis. Second, even though many studies have proposed modifications and customised versions of previously known strategies, we found most of them incremental solutions highlighting specific aspects of existing strategies which are tailored to the current situation.

In this review, we contributed to DC literature by filling the gaps in the conceptualisation of the DC framework and identifying business strategies and actions that capture the essence of the DC construct and its different categories namely sensing, seizing, and reconfiguring.

We believe that by filling the gap in the DC literature and providing clear instances for sensing, seizing, and reconfiguring capabilities that help to reach a better conceptualisation of the DC

framework, and also by studying the relationship between crisis (particularly COVID-19) and competition as well as identifying different responses to the challenges caused by it, our findings will contribute to both research and practice. Strategies that are highlighted in this review are not restricted necessarily to COVID-19 response plans but will provide business managers with a set of options and scenarios that can enhance decisions in the face of challenges resulting from many types of crises or generally any sort of environmental uncertainty that requires a firm's attention to internal capabilities while considering external opportunities for growth. We call for renewed future research in this domain that will be potentially valuable for theoretical development, practitioner insights, and policymaking.

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Transition to Chapter 3

The first essay in this dissertation synthesized the literature on dynamic capabilities in order to clarify how firms adapt and survive in contexts of disruption. By focusing on organizational responses to prolonged crises, the review highlighted that dynamic capabilities are critical for resilience and long-term success (Teece, 2007; Eisenhardt & Martin, 2000). A key insight from this review was that IT plays an increasingly central role in enabling these capabilities. Studies in both strategic management and IS point to the importance of digital technologies for strengthening sensing through analytics and environmental scanning, seizing through data-driven decision-making, and reconfiguring through coordination and automation (Pavlou & El Sawy, 2011; Warner & Wäger, 2019; Helfat & Raubitschek, 2018).

At the same time, Essay 1 revealed that while IT is consistently recognized as a driver of dynamic capabilities, the underlying mechanisms remain underdeveloped in the literature. Much of the strategy research has focused on high-level constructs such as IT resources or IT capabilities, often leaving unspecified how technology translates into action. Likewise, many studies highlighted the potential of IT to support adaptability but stopped short of detailing how specific IT functionalities become embedded in organizational routines. As a result, although IT is acknowledged as vital, it is not yet clear how it contributes to the micro-foundations of dynamic capabilities.

This gap provides the motivation for Essay 2. To move beyond broad claims about IT and capabilities, a more precise conceptual lens is needed. The affordance perspective offers such a lens by conceptualizing IT not merely as a resource but as a set of action potentials that organizations can actualize to transform routines, processes, and relationships (Volkoff & Strong, 2013). Where Essay 1 showed that IT matters for dynamic capabilities, Essay 2 asks how IT matters by examining the actualization of distinct affordances and their contribution to sensing, seizing, and reconfiguring.

The rationale for hypothesizing a relationship between IT affordances and dynamic capabilities rests on both theory and prior research. Dynamic capabilities are enacted through organizational routines and processes (Zollo & Winter, 2002), and IT affordances directly shape and enable these routines. For example, collaborative affordances create new possibilities for cross-functional knowledge sharing that supports sensing; memory affordances allow firms to codify and retrieve knowledge, enhancing seizing; and process management affordances provide the infrastructure for reallocating resources, thereby facilitating reconfiguring. Without the actualization of such affordances, the abstract processes of dynamic capability development would lack the technological infrastructure required for enactment in digital contexts.

Prior work supports this reasoning. Warner and Wäger (2019) demonstrated how digital transformation initiatives strengthen sensing and seizing capabilities. Pavlou and El Sawy (2011) argued that IT capabilities underpin firms' abilities to identify and act upon market changes. Helfat and Raubitschek (2018) stressed the role of digital platforms and ecosystems in enabling dynamic capabilities, while Strong, Volkoff, and Johnson (2014) showed how affordance actualization

offers a useful mechanism for explaining organizational change outcomes. Taken together, these studies suggest that IT affordances provide an empirically and theoretically valid antecedent to dynamic capabilities.

To investigate these relationships systematically, Essay 2 employs partial least squares structural equation modeling (PLS-SEM). This approach allows for simultaneous assessment of the reliability and validity of the constructs and the estimation of the hypothesized relationships between IT affordances and dynamic capabilities. The choice of this method reflects the progression of the thesis: moving from integrative theory building in Essay 1 to empirical testing in Essay 2. Where the first essay clarified what is known about IT's role in DCs, the second essay tests how IT affordances contribute in practice by using organizational data to estimate the pathways of influence.

From the perspective of the overall dissertation, Essay 2 plays a critical bridging role. Essay 1 highlighted IT as an important enabler of dynamic capabilities but also exposed conceptual and empirical gaps in understanding the mechanisms at work. Essay 2 fills this gap by applying the affordance lens and providing quantitative evidence of how affordances are actualized to build sensing, seizing, and reconfiguring capabilities. It delivers three main contributions. First, it moves beyond perceptions of technology to focus on affordance actualization, clarifying how IT concretely enables organizational adaptability. Second, it extends the micro-foundations literature on dynamic capabilities by demonstrating how IT-enabled action potentials become embedded in routines and processes. Third, it strengthens the empirical foundation of the dissertation by providing statistical evidence of IT's contribution to capability development.

Taken together, these contributions advance the thesis from conceptual review to empirical analysis and prepare the ground for Essay 3, which examines how dynamic capabilities, once established, translate into business model innovation. The progression underscores IT as the anchor construct of the dissertation: it is not only a contextual factor but the material basis through which firms enact dynamic capabilities and ultimately reconfigure their business models.

Chapter 3.

Essay 2: Bridging IT Affordances and Dynamic Capabilities at the Organizational Level

Abstract

Digital transformation success depends less on what technologies firms own than on how they use them to build the capacity for continuous renewal. This study investigates how organizational IT affordances defined as the action possibilities enabled by digital systems shape the development of dynamic capabilities. Drawing on multilevel emergence theory, three types of affordances are theorized at the organizational level: collaborative, memory, and process-management. Each is proposed to influence one or more of the core dynamic capabilities of sensing, seizing, and reconfiguring. Survey data from 90 Canadian firms in manufacturing and supply-chain sectors were analyzed using partial least squares structural equation modeling (PLS-SEM), complemented by fuzzy-set qualitative comparative analysis (fsQCA). The results show that collaborative affordances strongly enhance sensing and seizing, process-management affordances drive reconfiguring, and memory affordances support seizing but can constrain reconfiguring, revealing the double-edged nature of IT use. Overall, IT affordances explain more than half of the variance in each dynamic-capability dimension, confirming their role as organizational-level enablers rather than capabilities themselves. The findings clarify how distinct technological affordances contribute unevenly to capability development and provide managers with guidance on prioritizing digital investments that best support strategic agility and renewal.

3.1 Introduction

The rapid advancement of digital technologies has fundamentally transformed the foundations of competition, innovation, and organizational adaptation across industries. Firms today are not only challenged to adopt new technologies but also to integrate them strategically into their structures and processes to sustain agility and long-term competitiveness. In this constantly evolving digital environment, where technological change is both pervasive and accelerating, the key question is no longer whether organizations use technology, but how they do so in ways that enable them to sense, seize, and reconfigure in response to emerging opportunities and threats (Teece, 2018; Warner & Wäger, 2018). To thrive in such turbulent and data-intensive contexts, organizations must establish an effective alignment between their strategic goals, business processes, and the digital infrastructures that support them (Aral & Weill, 2007; Asadiara et al., 2023). This alignment, however, requires moving beyond a focus on technological implementation to

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understanding the underlying mechanisms through which technology becomes a source of strategic renewal and capability development (Mikalef & Pateli, 2017; Steininger et al., 2022).

Within the information systems (IS) and management literature, researchers have increasingly emphasized that the value of digital technologies arises not from the possession of IT resources alone, but from the ways in which these resources are used, interpreted, and integrated into organizational routines (Bharadwaj, 2000; Helfat & Peteraf, 2015; Pavlou & El Sawy, 2011). This view echoes the resource-based perspective but extends it by stressing the interaction between technological features and human or organizational agency. Consequently, scholars have shifted attention from outcome-oriented studies of IT performance to examining how digital tools shape the processes of adaptation, learning, and strategic change (Park et al., 2017). As firms strive to remain competitive in increasingly dynamic markets, they must continually leverage these interactions to transform technological possibilities into actionable outcomes that enhance both efficiency and innovation (Sadreddin & Chan, 2023; Teece, 2018). In this context, the concepts of **affordances** and **dynamic capabilities** have emerged as two integral theoretical building blocks that explain how organizations convert digital potential into tangible performance advantages.

As organizations increasingly depend on digital infrastructures and analytics, understanding how technology translates into strategic agility requires attention to the affordances that technologies offer rather than to their features alone (Leonardi, 2013; Volkoff & Strong, 2013). This perspective shifts the analytical focus from technology adoption to the interaction between IT and its users which would be the process by which actors perceive and actualize action possibilities to achieve organizational goals. Such an approach not only complements resource-based and capability-oriented views but also explains why similar technologies can yield divergent outcomes across firms (Park et al., 2017).

In recent years the concept of affordances has gained considerable momentum among IS researchers in terms of exploring not only the usage but even the action possibilities that raise from the interaction between users and technology (Dremel et al., 2020; Robey et al., 2013; Strong et al., 2014). Psychologist James Gibson is widely recognized for introducing the term "affordance" to the field of ecological psychology for the first time in 1979. Based on Gibson's definition, an affordance is what is offered or furnished to someone or something by the environment and objects in it (Gibson, 2014). In recent years numerous IS scholars have adopted the affordance concept to explain and analyze the interaction between IT artifacts and their users as well as the outcomes of this relationship (Anderson & Robey, 2017; Sadreddin & Chan, 2023; Strong et al., 2014). Generally, IT affordances encompass four main aspects: existence, perception, actualization, and effect (Pozzi et al., 2014). This study adopts a process-oriented mindset and the value chain of affordances to clarify the conceptualization and operationalization of the concept. While the existence aspect is manifested as the features embedded in IT resources by designers, the organization's perception of these possibilities can differ from the designers' intentions. Moreover, perceived affordances can only yield concrete effects and outcomes if actualized within the organization. This study focuses on IT affordances arising from IT resources and perceived at the

organizational level. To comprehend the actual impact and outcome of affordances, it is crucial to understand the process by which affordances are perceived and subsequently actualized. On another note, regarding affordance theory, there have been various attempts by IS and management researchers in recent years to generalize and extend affordance concept from individual to organizational level (Rehm & Goel, 2017; Vyas et al., 2017; Zammuto et al., 2007). This proposition argues that since in almost every definition of affordance construct, there is no limitation for the level of theorization for the “goal-oriented user” of IT object (i.e. individual, unit or organization), it is acceptable to assume that organizations can also perceive action possibilities from their IT resources.

Although early studies conceptualized affordances at the individual level, recent research extends them to collective and organizational contexts (Bernhard et al., 2013; Chan et al., 2019; Rehm & Goel, 2017). From this viewpoint, affordances emerge from distributed interactions among individuals, groups, and technologies and can be actualized through shared routines and knowledge structures. Understanding affordances at this level is crucial because the organizational outcomes of technology use depend not on isolated user actions but on how collective patterns of use evolve into stable organizational practices.

To ensure that perceived and actualized action possibilities lead to meaningful outcomes for organizations, they must be integrated into the firm’s fabric through dynamic capabilities (Helfat et al., 2009). Helfat et al. (2009) define a dynamic capability as “the capacity of an organization to purposefully create, extend, or modify its resource base.” According to this definition, not only can the perception and actualization of different possibilities from a technological artifact be viewed as capabilities in their own right, but these affordances can also contribute to creating, extending, or transforming the firm’s dynamic capabilities (Chatterjee et al., 2021; Steininger et al., 2022; Strong et al., 2014). Dynamic capabilities reflect how organizations purposefully adapt and renew their resource base in changing environments (Eisenhardt & Martin, 2000; Helfat & Peteraf, 2015; Teece, 2018). Recent research emphasizes that digital technologies are central to this adaptive process, yet their impact depends on how organizations perceive and actualize technological affordances (Mikalef et al., 2021; Steininger et al., 2022). Thus, while affordances describe what actions are possible, dynamic capabilities determine how these possibilities are mobilized for strategic change.

Notwithstanding the significant role of organizational affordances in characterizing the process through which organization’s information technological resources can be leveraged to build and improve dynamic capabilities and eventually financial and non-financial outcomes, there is still gaps in the literature in terms of construct’s (organizational affordances) conceptualization, operationalization, and its relationship with other organizational concepts (Bernhard et al., 2013; Steininger et al., 2022; Strong et al., 2014). In addition, despite some attempts in literature for generalizing affordance concept from an originally individual-level notion to organizational form, IS literature lacks sufficient arguments that evidently define affordances as a multilevel construct (Chan et al., 2019).

Building on this conceptual integration, this essay examines three core organizational IT affordances i.e., collaborative, memory, and process management, and their influence on the development of dynamic capabilities: sensing, seizing, and reconfiguring. By distinguishing among these affordance types, the study explores how different technological action possibilities contribute to capability building in distinct yet interdependent ways.

RQ. “How do organizational IT affordances enable dynamic capabilities in the firm?”

Drawing first on the multilevel theory of emergence, an organizational level conceptualization for affordance construct is proposed in this paper. This study’s aim is to address the confusion around the generalization of affordances from individual level to organizational form. Next, the relationship between organizational affordances and firm’s IT-enabled dynamic capabilities in the context of manufacturing industry and supply chain sector is explored. The specific argument is that the way user and organization interact with IT resources can shape the action possibilities that are perceived and actualized in relation to firm’s goal. These affordances and different configurations of them later on can affect dynamic capabilities of a firm. The manufacturing and supply chain sectors are ideal for studying the relationship between organizational IT affordances and dynamic capabilities due to their complexity and heavy reliance on IT for efficiency (Fawcett & Waller, 2014). These industries face rapid technological changes and market demands, necessitating robust dynamic capabilities for competitiveness (Teece, 2007). Additionally, prior research shows significant IT impacts on innovation and performance in these sectors and the availability of extensive data facilitates comprehensive analysis (Mikalef et al., 2016).

This essay contributes to theory and practice in several ways. First, it advances the conceptual understanding of organizational IT affordances by grounding them in multilevel emergence theory and demonstrating their role as enablers of higher-order capabilities. Second, it empirically disentangles affordances from dynamic capabilities, showing that they are not equivalent but complementary constructs: affordances define technological action potentials, whereas dynamic capabilities represent the organizational abilities that actualize them. Third, by differentiating between affordance types and testing their effects on sensing, seizing, and reconfiguring, the study provides a nuanced account of how technologies can simultaneously enable and constrain strategic change. Finally, by adopting a variance-based methodological design and complementing it with a configurational analysis, this essay contributes to a broader understanding of how IT shapes organizational adaptability and innovation.

Although this essay primarily adopts a variance-based approach using PLS-SEM, it also recognizes the growing methodological movement toward combining symmetric and asymmetric techniques to enhance analytical robustness. Recent studies in information systems and management research (Hossain et al., 2024; Pappas & Woodside, 2021; Rasoolimanesh et al., 2021; Richter et al., 2022) demonstrate that fuzzy-set Qualitative Comparative Analysis (fsQCA) can complement SEM by uncovering equifinal and asymmetric configurations that lead to similar outcomes. Following this trend, fsQCA is employed in this research program as a complementary

robustness check to validate and extend the linear relationships estimated by PLS-SEM. This multimethod strategy ensures that the findings are not only statistically robust but also sensitive to causal complexity, heterogeneity, and multiple pathways toward capability development.

3.2 Literature Review and Model

3.2.1 Organizational Affordances

The notion of affordances stems from Gibson's work in the field of perceptual psychology who defined the affordance concept very simply as "what the environment offers the individual" back in 1979 (Gibson, 2014). While early IS work theorized affordances primarily at the individual level, recent research demonstrates that affordances can emerge as collective, organizational phenomena when repeated interactions become shared routines and structures (Bernhard et al., 2013; Chan et al., 2019; Rehm & Goel, 2017). Drawing on multilevel emergence (Klein & Kozlowski, 2000; Kozlowski et al., 2013), organizational affordances are understood here as functional properties arising from distributed actor–technology interactions that, through coordination and institutionalization, manifest as stable patterns of action possibilities at the firm level (Leonardi, 2013; Volkoff & Strong, 2013).

Following Strong et al. (2014), an IT affordance is the potential for goal-oriented action arising from a relation between a technological artifact and actor(s). We adopt a process view, from existence and perception to actualization and effects (Pozzi et al., 2014), and focus analytically on organizational-level actualization, because that is the stage at which dispersed uses coalesce into routines with firm-level consequences (Volkoff & Strong, 2013; Leonardi, 2011, 2013). Therefore, drawing on Strong et al. (2014) we define affordance as "the potential for behaviors associated with achieving an immediate concrete outcome and arising from the relation between an artifact and a goal-oriented actor or actors". Affordance can be viewed as a shared relationship between environmental artifact and human. According to this notion, affordances are neither objective nor subjective. Although what has been offered by the environment or an artifact is real and objective. Perception and realization of that affordance by the human (or whatever that interacts with the environment) is a matter of subjectivity (Vyas et al. 2017). While any given digital artifact consists of a certain set of features, the perception of specific affordances happens only if the goals and strategic approaches of the user collide with a subset of one or more that one of those offered features. At this point, perceived affordances by user enables them to harness certain capabilities or pursue specific actions. In another word, a specific technology offers almost the same characteristics to every user or organization that uses it. However, not every user perceives the same set of affordances that raise from a digital artifact.

However, as we move beyond the individual affordance level, we are faced with a more collective concept which aims to investigate the interrelationship between technology and organizational features (Chan et al. 2019). While originally being theorized as an individual level concept, there has been some attempts by IS researchers to generalize affordance construct to higher levels of

examination (e.g. units or organization) and study its effect on the performance (Anderson and Robey 2017; Strong et al. 2014; Vyas et al. 2017).

This organizational-level stance explains why similar technologies yield divergent outcomes across firms. It is the configuration and enactment of affordances (not necessarily features) that conditions capability formation and performance (Park, El Sawy, & Fiss, 2017; Mikalef & Pateli, 2021). This study argues that by drawing on multilevel theory we will be able to explain why organizational affordances emerge as a compilation from affordances perceived and actualized by different individuals (Klein and Kozlowski 2000).

The main premise of multilevel theory is the idea that higher-level phenomena emerge from lower-level components (Negoita et al., 2018). According to Kozlowski and Klein (2000) “A phenomenon is emergent when it originates in the cognition, affect, behaviors, or other characteristics of individuals, is amplified by their interactions, and manifests as a higher level, collective phenomenon”. On the other hand, as previously mentioned, there is consensus among IS researchers on defining affordance as action possibility arising from the interaction between an artifact and a goal-oriented actor or actors (Strong et al. 2014; Volkoff and Strong 2013). This definition of affordance does not limit actor to a single user or a larger group (i.e., unit or organization). Also, it does not emphasize any specific psychological origin of the theory (e.g., the individual’s perception or cognitive abilities) (Chan et al. 2019). In the case of affordances, the process starts with user’s perception of the technology and affordances that it offers and then goes through user cognitive processes and finally organization’s process management and knowledge management structure to be actualized in a way that corresponds to the goals of the organization (Anderson and Robey 2017; Strong et al. 2014).

In their study of multilevel theory and the concept of emergent phenomenon, Kozlowski et al. introduce four core conceptual foci based on their definition for multilevel emergence in organizational behaviour (Kozlowski et al. 2013). This study draws on these criteria to conceptualize affordance as a multilevel emergent phenomenon.

First, emergent phenomena are multilevel, originating at a lower level and emerging as a collective construct at a higher level (Crutchfield, 2012; Kozlowski et al., 2013). In this sense, although the perception of affordance can start from the interaction of a single user and technology, the compilation of the affordances perceived and actualized by different users can be seen at higher organizational level (Chan et al. 2019; Volkoff and Strong 2013; Vyas et al. 2017). Also, in terms of “goal-oriented user or users” which is an integral part of affordance definition, it is assumed that individuals’ goals echo those of the organization or group to which they belong as a result the possibilities that are perceived at lower-level must align and collectively contribute to the higher-level (Nevo et al., 2021; Volkoff & Strong, 2013).

Second, emergent phenomena are process-oriented and the dynamic interactions between lower-level entities results in the emerged property (Kozlowski & Chao, 2012). According to Vyas et al. (2017) individuals’ interaction with an object influences others as they directly or indirectly learn

about possibilities for action. According to Leonardi (2011) “all interactions between human and material agencies produce an organizational residue”. Routines and processes are one of the outputs of this imbrication between user and material (i.e. technology) which will remain and be shared withing organization (Leonardi, 2011).

Consistent with the empirical model, we organize organizational IT affordances into three analytically distinct types: collaborative (enabling cross-boundary interaction and shared sensemaking), memory (supporting storage/retrieval of knowledge for decision-making and learning), and process-management (structuring workflows, coordination, and control). This typology synthesizes prior accounts of communication/sensing infrastructures, codified knowledge bases, and workflow integration platforms (Leonardi, 2013; Volkoff & Strong, 2013; Park et al., 2017).

Third, emergence of the high-level collective property requires time and has to go through developmental and episodic changes (Bedwell et al., 2012; Kozlowski et al., 2016). As affordances are possibilities and not actions especially at the perception stage, they need to be actualized in the proper way. It is only after the actualization process that affordances in their individual form can emerge as a higher-level construct and have sensible effects (Bernhard et al. 2013). In other word, when individual-level affordances become actualized in terms of actions and immediate concrete outcomes first there is need for horizontal aggregation across individual actions or outcomes. Then, the aggregation of these actualized affordances in short time can lead to organizational outcomes. Finally, in long term proper alignment can help to achieve organizational goals (Croteau & Bergeron, 2001). In this process, alignment takes a vertical view by linking the immediate individual and organizational level outcomes to longer term organizational goals (Strong et al. 2014).

Consequently, this study argues that affordances are inherently multilevel, especially when shifting beyond the perception stage to focus on affordance actualization. In other words, when an affordance initially perceived by an individual user is recognized by the organization as a viable action possibility and is subsequently taken up and enacted across the organization actualization occurs. Through this process, a construct that originates at the individual level emerges as an organizational-level phenomenon grounded in repeated enactments across users.

Burton-Jones suggests that when trying to conceptualize a multilevel construct, it is fruitful to consider the function and structure dichotomy. The function of a multilevel construct refers to the effects or outputs of the phenomenon that the construct reflects at different levels. On the other hand, structure refers to the interactions between individual entities (i.e. single user) that forms the collective higher-level construct (Burton-Jones & Gallivan, 2007). One of the steps when using a multilevel construct is to consider whether the function of the construct could be the same at multiple levels even if the structure is different. In this sense, we can argue that as in an organization, individuals’ goals tend to echo and eventually contribute to higher-level goals of organization, expected outcomes of affordance actualization would be the same across different

levels. However, since the main focus of this model is on role of organizational affordances in the process of turning organizational IT resources into useful capabilities for the organization, this study tends to focus on the function aspect of emergent organizational affordances and not the structure of it. In other word, this study argues why affordance should be considered as a multilevel construct and not the mechanism by which organizational affordances emerge from its individual level.

Organizational IT affordances are believed to encompass the notion of sociotechnical structures (Chatterjee et al. 2021). Organizational IT affordances highlight the ways by which organizations and their social elements can be arranged in accordance with firm's IT resources to provide organizations with new possibilities for action (Leonardi 2011).

Although the perception of affordances that arise from IT resources used by an organization is a vital starting point in the process of change and improvement, these affordances need to be "actualized" in a proper way. In this vein, Strong et al. (2014) define actualization as "the actions taken by actors as they take advantage of one or more affordances through their use of the technology to achieve immediate concrete outcomes in support of organizational goals" (Strong et al. 2014). According to this definition, affordances need to be translated from "perceptions" to "actions" to be able to bring about "concrete outcomes". Following the same idea, this study argues that affordance actualization in an organization happens through building IT-enabled organizational dynamic capabilities.

Importantly, organizational affordances can be double-edged. The same structures that enhance coordination and efficiency may also constrain exploration and flexibility (March, 1991; Markus & Rowe, 2021). This implies heterogeneous, even asymmetric, links from specific affordances to different capability dimensions.

3.2.2 IT-enabled Organizational Dynamic Capabilities

Over the past decades many studies in IS and Strategic Management realm have relied on Bharadwaj's RBV theory to explain the role of different organizational resources and capabilities on the firm's ability to gain competitive advantage and superior firm performance (Bharadwaj, 2000; Pavlou & El Sawy, 2006; Peteraf et al., 2013; Steininger et al., 2022). Originating from and extending RBV, dynamic capabilities perspective tends to take the relationship between organizational resources and firm performance to a higher level and explain how these resources can be leveraged to result in different forms of innovation and excellence in firm's performance.

The DC literature oscillates between viewing DCs as repeatable processes (Eisenhardt & Martin, 2000) and as abilities that enable purposeful change under uncertainty (Helfat & Peteraf, 2015; Teece, 2018). Given our focus on directional effects from technological conditions to capability development in dynamic, digitally intensive contexts, we adopt the ability view, which aligns with variance-based estimation of relative influences among antecedents.

In the DC literature many studies have provided various definitions encompassing fruitful details regarding specific aspects of this construct. However, the literature still lacks a unified and comprehensive conceptualization for DCs (Steininger et al. 2022). For example, some of the definitions refer to DCs as “processes” which implies stability and repetitiveness (Eisenhardt & Martin, 2000; Li & Chan, 2019), whereas other conceptualizations define DCs in terms of “abilities” which more highlight the dynamic nature of the construct (Chen et al., 2014; Helfat & Peteraf, 2009; Sadreddin & Chan, 2023).

In this study, IT-enabled organizational dynamic capabilities (ITODC) are defined as "the organization's ability to sense, integrate, and reconfigure internal and external resources and competencies, facilitated by information technology, to adapt to rapidly changing environments" (Bharadwaj, 2000; Pavlou & El Sawy, 2006; Teece et al., 1997). These capabilities allow firms to respond effectively to new opportunities and threats by leveraging IT to enhance agility, innovation, and overall performance. The logic behind choosing this definition is threefold. First, this definition is in line with the choice of organizational resources and affordances as antecedents of ITODC since neither features of technology nor user's characteristics remain stable and static over time. Second, in addition to the constant technological advancements and user's continuing learning process, uncertainties and dynamism in the environment keep us from conceptualizing ITODC as routine and stable processes. Additionally, IS research also appears to favor the “ability” over the “process” as the underlying nature of DC (Steininger et al. 2022).

Prior work implies distinct pathways from specific affordances to particular dynamic capabilities. Collaborative affordances foster sensing by enabling boundary-spanning search, real-time information flows, and collective interpretation (Park et al., 2017; Pavlou & El Sawy, 2011). Memory affordances bolster seizing by providing accessible knowledge bases, analogical reasoning, and evidence-informed decision-making (Argote & Miron-Spektor, 2011; Walsh & Ungson, 1991). Process-management affordances underpin reconfiguring by coordinating interdependent tasks, standardizing handoffs, and supporting resource redeployment at scale (Eisenhardt & Martin, 2000; Pentland & Feldman, 2008). Yet routinization can dampen exploratory sensing (March, 1991), and entrenched memory can anchor firms to legacy logics, complicating reconfiguring (Sydow et al., 2009).

In the context of this study, differentiating between affordances and capabilities is of immense importance as these two concepts have some theoretical similarities which might result in occasions when capabilities and affordances overlap (Hatakka et al., 2016; Thapa & Zheng, 2019). To establish a clear distinction between affordances and capabilities, it is essential to recognize the fact that while organizational affordances concept explains action possibilities that come from the interaction between features offered by IT resources and user's (or organization's) characteristics, organizational dynamic capabilities refer to a set of actual organizational abilities that utilize these resources and turn them into tangible tools that enable organizations to pursue innovation and performance outcomes. In another word, “Affordances allow us to examine how individuals (as

well as groups or organizations) explore material properties in IS with the objective of enhancing their capabilities” (Hatakka et al. 2016; Steininger et al. 2022).

Conceptually, organizational IT affordances operate as microfoundations of DCs: they shape information exposure, coordination patterns, and recombination options through which sensing, seizing, and reconfiguring are enacted (Helfat & Raubitschek, 2018; Peteraf et al., 2013). Thus, affordances define the technological action space, whereas DCs reflect the organizational abilities that actualize that space under managerial discretion (Teece, 2018).

Because these mechanisms imply directional, heterogeneous influences (some enabling, some constraining), a variance-based approach is appropriate to estimate net effects and their relative magnitudes across the three capability dimensions (Hair et al., 2019; Rigdon, 2012).

While this study aims to unravel the relationship between organizational IT affordances and organizational dynamic capabilities, assuming a linear causal relationship between the two constructs would not be straightforward. This is particularly true given that the affordance concept aligns more closely with the notion of perception. Correlation makes more sense than causation, especially since perception is necessary but not sufficient until actualization occurs. According to this logic, the actualization of affordances can be directly equated to building ITODCs within a firm. This is why it is crucial to study the actualization process and how it leads to the development of ITODCs. The IS literature has extensively investigated the perception aspect of affordances, but minimal work has been done to address the actualization stage (Pozzi et al., 2014; Zammuto et al., 2007). According to observations in the IS and management literature, the role of affordances, especially at the organizational level, on firm capabilities and outcomes remains abstract. As a result, this study aims to investigate the relationship between organizational affordances and ITODC to understand how the perception and actualization of affordances by an organization can contribute to different ITODCs that eventually results in firm’s performance excellence. By utilizing fsQCA as one of very recent qualitative approaches in IS and management literature, this study will attempt to link different possible configuration of organizational affordances that affect dynamic capabilities built within a firm.

3.3 Research model

Synthesizing the literature, we posit that (a) collaborative affordances primarily enable sensing, (b) memory affordances primarily enable seizing, and (c) process-management affordances primarily enable reconfiguring, with secondary and potentially negative cross-links consistent with double-edged effects. These propositions reflect theoretically grounded, non-uniform influences rather than a one-size-fits-all role of IT. The empirical model therefore specifies three affordances as predictors of the three DCs, estimated simultaneously to assess relative contributions and asymmetries.

Figure X illustrates the conceptual model developed to operationalize the study’s framework and address the research question.

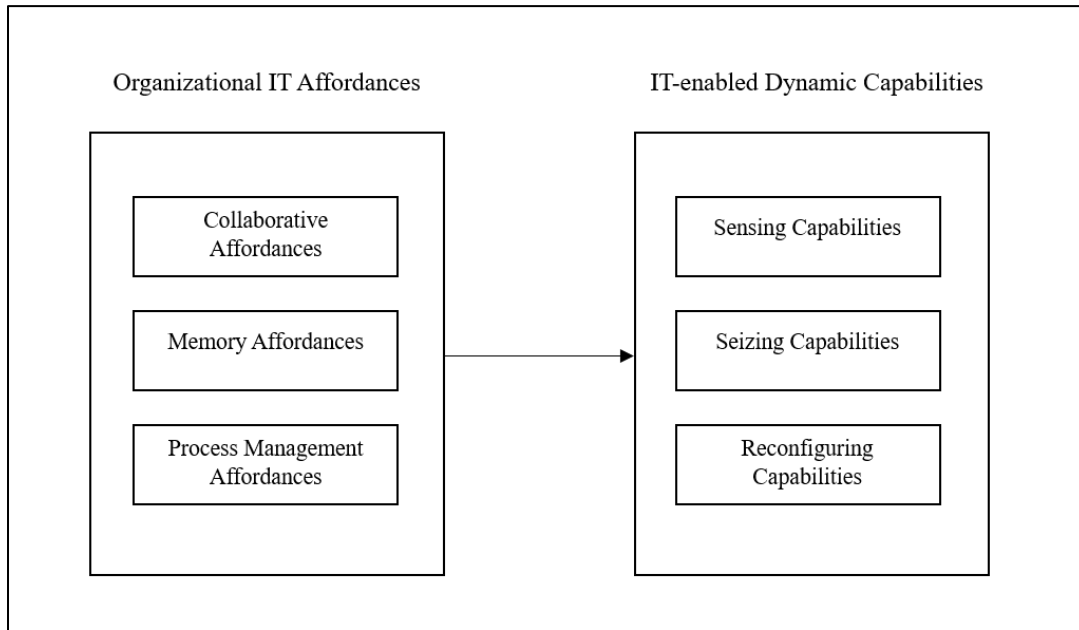


Figure 5: Conceptual Framework Linking Organizational IT Affordances and IT-Enabled Dynamic Capabilities

Drawing from the theoretical arguments presented earlier, this study argues that distinct organizational IT affordances differentially enable specific dynamic capabilities. Collaborative affordances are expected to enhance environmental scanning and knowledge sharing processes that underlie sensing capabilities. Memory affordances should facilitate informed decision-making and opportunity exploitation that strengthen seizing capabilities. Process management affordances are anticipated to support workflow integration and structural adjustments that improve reconfiguring capabilities. Considering the possibility of cross-effects and double-edged influences, several secondary linkages are also proposed. Accordingly, the hypotheses are formulated as follows:

Digital collaboration technologies facilitate information sharing and cross-functional communication within organizations. Prior research suggests that such collaboration mechanisms enhance environmental scanning and collective awareness, enabling firms to better identify emerging opportunities and threats (Leonardi, 2011; Pavlou & El Sawy, 2011).

H1a: Collaborative affordances positively influence sensing capabilities.

Organizational memory systems allow firms to store, retrieve, and reuse knowledge accumulated from prior experiences. These knowledge repositories support pattern recognition and help organizations interpret environmental signals more effectively (Volkoff & Strong, 2013).

H1b: Memory affordances positively influence sensing capabilities.

Process-management technologies increase visibility and coordination across organizational workflows. Such transparency can improve monitoring of operational and market conditions, supporting the organization's ability to detect emerging changes (Strong et al., 2014).

H1c: Process management affordances positively influence sensing capabilities.

Collaboration technologies support joint decision-making and coordination among organizational actors. These mechanisms facilitate the mobilization of resources and collective commitment necessary to act upon identified opportunities (Pavlou & El Sawy, 2011; Leonardi, 2011).

H2a: Collaborative affordances positively influence seizing capabilities.

Organizational memory allows firms to leverage past experiences and stored knowledge when evaluating strategic alternatives. This capability enables managers to commit resources more effectively and respond to opportunities with greater confidence (Volkoff & Strong, 2013).

H2b: Memory affordances positively influence seizing capabilities.

Process management systems provide structured workflows and coordination mechanisms that facilitate the implementation of strategic decisions. Such structures help organizations translate identified opportunities into concrete organizational actions (Strong et al., 2014).

H2c: Process management affordances positively influence seizing capabilities.

Organizational transformation often requires collaboration across units and stakeholders. Digital collaboration platforms enable knowledge integration and coordination, which support the recombination of resources during organizational change (Leonardi, 2011; Pavlou & El Sawy, 2011).

H3a: Collaborative affordances positively influence reconfiguring capabilities.

Organizational memory systems provide historical knowledge that helps firms redesign routines and adapt existing processes. Access to accumulated knowledge enables organizations to restructure resources and adjust their operations during periods of change (Volkoff & Strong, 2013).

H3b: Memory affordances positively influence reconfiguring capabilities.

Process-management technologies increase the visibility and modularity of organizational workflows. This structural transparency allows firms to modify, recombine, and redesign processes more efficiently during strategic transformation (Strong et al., 2014).

H3c: Process management affordances positively influence reconfiguring capabilities.

Table 5. Summary of research hypotheses.

IT affordances effect on sensing capabilities:	<p>H1a: Collaborative affordances positively influence sensing capabilities.</p> <p>H1b: Memory affordances positively influence sensing capabilities.</p> <p>H1c: Process management affordances positively influence sensing capabilities.</p>
IT affordances effect on seizing capabilities:	<p>H2a: Collaborative affordances positively influence seizing capabilities.</p> <p>H2b: Memory affordances positively influence seizing capabilities.</p> <p>H2c: Process management affordances positively influence seizing capabilities.</p>
IT affordances effect on reconfiguring capabilities:	<p>H3a: Collaborative affordances positively influence reconfiguring capabilities.</p> <p>H3b: Memory affordances positively influence reconfiguring capabilities.</p> <p>H3c: Process management affordances positively influence reconfiguring capabilities.</p>

These hypotheses reflect the proposed model illustrated in Figure 5 and guide the subsequent empirical analysis.

3.4 Method

3.4.1 Research Design and Analytical Approach

This essay investigates how distinct IT affordances collaborative, memory, and process management enable the development of dynamic capabilities, namely sensing, seizing, and reconfiguring. To empirically test these relationships, a variance-based approach was adopted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The choice of PLS-SEM is driven both by the theoretical focus of this study and by the characteristics of the dataset.

In addition to PLS-SEM, this study adopts fsQCA as a complementary analytical tool to enhance robustness and capture configurational nuances. While PLS-SEM estimates the average, net effects of IT affordances on dynamic capabilities, fsQCA identifies combinations of conditions sufficient for achieving high outcomes. This integration reflects an emerging consensus in methodological literature that combining symmetric (SEM) and asymmetric (fsQCA) approaches provides a better understanding of complex organizational phenomena (Rasoolimanesh et al., 2021; Hossain et al., 2024; Pappas, 2021). In information systems and strategic management research, such dual-method designs are increasingly used to verify whether linear effects remain valid across heterogeneous configurations and to ensure the generalizability of results beyond mean-based patterns (Richter et al., 2022).

The rationale for this complementary use is threefold. First, as emphasized by Rasoolimanesh et al. (2021) and Pappas (2021), fsQCA provides a case-oriented perspective that uncovers multiple equifinal paths to an outcome, addressing causal asymmetry often hidden in regression or SEM models. Second, Hossain et al. (2024) and Vaithilingam et al. (2024) highlight that combining SEM and fsQCA strengthens methodological rigor by serving as a form of robustness check confirming whether significant SEM paths are consistently reflected in configurational results (Vaithilingam et al., 2024). Finally, Richter et al. (2022) argue that PLS-SEM studies benefit from integrating complementary techniques, such as fsQCA, to address heterogeneity and complexity inherent in international management and innovation contexts. Following these methodological best practices, fsQCA is applied here as a robustness verification technique rather than a substitute for SEM, ensuring that the observed relationships between IT affordances and dynamic capabilities are still reliable under both symmetric and asymmetric logics.

PLS-SEM is particularly well suited for models involving multiple latent constructs measured with several indicators, as is the case in this study. By estimating both the measurement model and the structural paths simultaneously, PLS-SEM enables the assessment of construct reliability and validity together with the explanatory power of the hypothesized relationships (Hair et al., 2017). This dual capacity offers a methodological advantage over simple regression, which cannot account for measurement error or latent variable structures. Moreover, the constructs in this study are reflective and measured with multi-item Likert scales, and PLS-SEM has become widely established in information systems research for validating and estimating such models (Benitez et al., 2018; Pavlou & El Sawy, 2011).

The size and nature of the sample further support the choice of PLS-SEM. With 90 organizational responses, the sample is adequate for PLS estimation but would be considered relatively small for covariance-based SEM (CB-SEM), which generally requires larger samples and distributional assumptions to produce stable estimates (Gefen, Rigdon, & Straub, 2011). PLS-SEM, in contrast, is distribution-free and has been consistently recommended for smaller to moderate samples, especially in exploratory contexts where prediction and variance explanation are the primary objectives (Hair et al., 2017; Rigdon, 2012). This aligns closely with the aims of this essay, which seeks to quantify the extent to which each IT affordance contributes to the development of dynamic capabilities.

An important consideration is the distinction between PLS-SEM and configurational approaches such as fuzzy-set Qualitative Comparative Analysis (fsQCA). FsQCA, as applied in Essay 3, is designed to identify equifinal configurations of conditions sufficient for an outcome, emphasizing causal asymmetry and conjunctural causation (Fiss, 2011; Ragin & Fiss, 2008; Schneider & Wagemann, 2012). This is highly appropriate when the research question concerns how bundles of dynamic capabilities combine to generate business model innovation, where multiple different pathways may be effective. By contrast, the research question in this essay is directional and variance-based: how strongly, and in which direction, do specific IT affordances shape the development of dynamic capabilities? PLS-SEM is designed to answer precisely this type of

question, by estimating net effects, relative contributions, and explained variance (R^2). FsQCA does not provide comparable estimates of effect size or magnitude, and it requires the calibration of data into fuzzy sets, which compresses continuous variation into membership scores and introduces additional researcher judgment at threshold selection (Misangyi et al., 2017). While calibration is well suited to configurational questions of sufficiency and necessity, it is less effective for testing hypotheses about relative strength and direction of relationships across constructs.

The distinction between affordances and dynamic capabilities also provides a theoretical rationale for this methodological choice. Dynamic capabilities are higher-order routines that organizations deliberately shape, combine, and redeploy in pursuit of innovation (Helfat & Peteraf, 2015; Teece, 2007). This managerial discretion makes them particularly open to configurational analysis, as firms can achieve similar innovation outcomes through different bundles of sensing, seizing, and reconfiguring. IT affordances, by contrast, are action potentials embedded in technologies (Leonardi, 2011; Volkoff & Strong, 2013). Although managers can decide how to actualize them, the range of affordances available to the firm is constrained by its IT resources. Unlike dynamic capabilities, which can be purposefully designed and recombined, affordances reflect the technological conditions under which capabilities develop. This asymmetry suggests that examining affordances through a variance-based lens such as PLS-SEM is more appropriate. It allows us to quantify the relative influence of each affordance dimension on dynamic capabilities, while recognizing that firms cannot freely “bundle” affordances in the same flexible way they bundle capabilities.

This methodological distinction is also evident in the findings. Several paths in this model are positive and significant, while others are weak, non-significant, or even negative. PLS-SEM captures these directional nuances directly through path coefficients and effect sizes. Modeling the same relationships through fsQCA would require constructing sets of “high” or “low” affordances and capabilities, thereby losing granularity in favor of dichotomized or fuzzy membership logic. In a context where theoretical development depends on detecting both enabling and constraining effects of specific affordances preserving the full metric information of the constructs is essential.

In sum, PLS-SEM provides the appropriate balance between methodological rigor and practical feasibility for this study. It allows the simultaneous validation of reflective measurement models and the estimation of structural relationships, while accommodating a modest sample size and non-normal survey data. The use of fsQCA in Essay 3 complements this approach by addressing a different type of research question one focused on configurational sufficiency and equifinality rather than variance and relative effect size. Together, the two essays provide a richer methodological perspective: Essay 2 establishes the microfoundational pathways from IT affordances to dynamic capabilities using a variance-based method, while Essay 3 demonstrates how bundles of these capabilities combine to enable business model innovation through a configurational lens. This methodological complementarity not only ensures that each essay is

aligned with its specific research question but also enhances the coherence of the dissertation as a whole.

3.4.2 Measurement and Instrument Development

The constructs for this study were operationalized using multi-item scales adapted from prior information systems and strategy research. IT affordances were modeled as three distinct dimensions, collaborative, memory, and process management drawing on established conceptualizations of how technology enables action possibilities in organizations (Chatterjee et al., 2021; Leonardi, 2011; Volkoff & Strong, 2013). Collaborative affordances capture the extent to which IT systems enable interaction, communication, and knowledge sharing across organizational boundaries. Memory affordances reflect the capacity of IT to store, retrieve, and make use of organizational knowledge and historical information. Process management affordances refer to the ability of IT to structure, coordinate, and automate workflows, routines, and decision processes. Dynamic capabilities were operationalized as sensing, seizing, and reconfiguring, following established definitions in the management literature (Kump et al., 2019; Mikalef & Pateli, 2017; Pavlou & El Sawy, 2011).

All constructs were measured with multiple items on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Items were adopted from validated instruments in IS and strategy research to ensure conceptual consistency while tailoring wording to the context of IT-enabled processes in manufacturing and supply chain organizations.

The instrument underwent a multi-stage pretesting process to enhance content validity and reduce the risk of common biases. First, card sorting was conducted in iterative rounds with six experts (two academic researchers and four industry practitioners familiar with the concepts). In the first round, an open sorting procedure allowed participants to classify items into categories they found appropriate. Disagreements were discussed and resolved through refinement of item wording and, in a few cases, combination, reallocation or removal of items. In subsequent rounds, a closed sorting procedure was used, with some filtered or reworded items mapped to predefined constructs. This procedure is consistent with recommended practices for scale development and adaptation (Venkatesh et al., 2003). Results from the card sorting practice are depicted in table 9 in the appendix.

Second, following the card-sorting stage, a small-scale pilot test was conducted with the same expert sample to assess internal consistency. Preliminary Cronbach's alpha values ranged from 0.70 to 0.88 across constructs, exceeding the recommended 0.70 threshold. Items with low item-total correlations were refined or eliminated before the main survey. (Nunnally & Bernstein, 2007).

The final survey instrument thus consisted of validated multi-item measures for the three IT affordance dimensions and the three dynamic capabilities, all adapted and tested to ensure reliability and content validity in the organizational IT context.

3.4.3 *Data Collection*

Data for this study were collected through an online survey administered to senior managers and executives across Canadian organizations. The main focus was on firms operating in supply chain and manufacturing sectors, as these industries face significant pressures to leverage IT in order to enhance strategic processes and capabilities. To broaden the applicability of the findings and avoid over-fitting based on the sector, responses from adjacent sectors where IT-enabled processes and dynamic capability building are equally important such as retail, logistics, and distribution were also included. This approach ensured both sectoral depth and cross-industry variation, which are important for theory development in information systems and strategic management research.

Participants were recruited mainly through professional networks on LinkedIn and Emails, using a snowball sampling strategy. Initial invitations were extended to professional contacts of the research team, who were encouraged to further share the survey within their networks. Snowball sampling has been frequently used in IS research to reach specialized respondent groups such as senior executives and managers (Rai & Tang, 2014). To be eligible, respondents were required to hold managerial or executive positions and to have organizational-level knowledge of IT use and strategic processes. This criterion ensured that the responses reflected organizational practices rather than individual opinions. This point is particularly important because one of the primary objectives of this study is to more capture organizational-level rather than individual-level affordances. While affordances originate in user–technology interactions, their relevance to dynamic capabilities lies in how they are collectively enacted and institutionalized within the firm. By targeting senior managers and executives with knowledge of IT use and strategic processes, the study ensures that responses reflect organizational practices and shared routines rather than isolated personal experiences. This distinction strengthens the validity of the constructs by aligning the unit of analysis (the organization) with the theoretical domain of both IT affordances and dynamic capabilities.

The survey emphasized anonymity and required approximately 15–20 minutes to complete. After screening and cleaning for completeness and consistency, a total of 90 valid responses were obtained. Almost all cases represented distinct organizations (or unique business units), thereby ensuring independence across observations. This sample size is consistent with guidelines for PLS-SEM analysis and is sufficient to yield stable estimates of structural relationships among latent constructs (Hair et al., 2019).

3.4.4 *Measurement Model*

Before testing the structural relationships, the measurement model was evaluated using partial least squares structural equation modeling (PLS-SEM). PLS-SEM is particularly appropriate for this study given the presence of multiple latent constructs and indicators and the relatively small sample size (Hair et al., 2019). All analyses were carried out using SmartPLS 4.0 software.

The reliability and internal consistency of the constructs were assessed through Cronbach’s alpha (α), composite reliability (CR), and average variance extracted (AVE). As reported in Table 6, Cronbach’s alpha values ranged from 0.76 to 0.90, while CR values were between 0.86 and 0.94. Both measures are above the accepted threshold of 0.70, indicating strong internal consistency. The AVE values ranged from 0.675 to 0.83, exceeding the 0.50 benchmark (Fornell & Larcker, 1981) and confirming adequate convergent validity. Additionally, all outer loadings were between 0.81 and 0.93, which is above the recommended cut-off of 0.70 and significant at $p < 0.01$, demonstrating that the indicators represent their intended constructs effectively.

Table 6. Reliability and Convergent Validity of the Constructs

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Collaboration Affordances	0.851	0.851	0.91	0.771
Memory Affordances	0.785	0.798	0.874	0.698
Process Management Affordances	0.76	0.77	0.862	0.675
Sensing Capabilities	0.841	0.844	0.904	0.759
Seizing Capabilities	0.897	0.898	0.936	0.83
Reconfiguring Capabilities	0.867	0.868	0.919	0.79

Discriminant validity was assessed using two complementary methods: the Fornell-Larcker criterion and the heterotrait–monotrait (HTMT) ratio. The Fornell-Larcker test (Table 7) shows that the square root of each construct’s AVE (on the diagonal) is greater than its correlations with other constructs, supporting discriminant validity. The HTMT analysis (Table 8) produced values below the conservative threshold of 0.85, with the highest observed ratio of 0.839, further confirming that the constructs are empirically distinct.

Table 7. Discriminant Validity Assessment Using the Fornell-Larcker Criterion

	Collaboration Affordances	Memory Affordances	Process Management Affordances	Reconfiguring Capabilities	Seizing Capabilities	Sensing Capabilities
Collaboration Affordances	0.878					
Memory Affordances	0.032	0.835				
Process Management Affordances	0.226	0.191	0.822			
Reconfiguring Capabilities	0.474	0	0.685	0.889		
Seizing Capabilities	0.51	0.605	0.455	0.315	0.911	
Sensing Capabilities	0.683	0.182	-0.126	0.059	0.298	0.871

Table 8. Discriminant Validity Assessment Using the HTMT Criterion

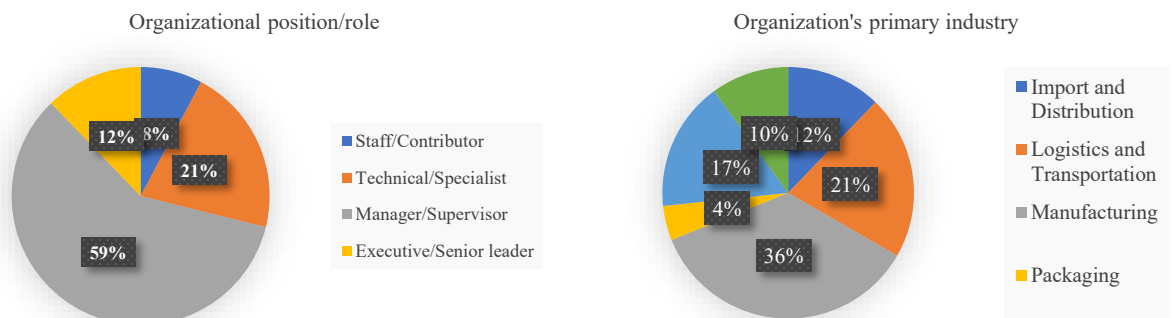
	Collaboration Affordances	Memory Affordances	Process Management Affordances	Reconfiguring Capabilities	Seizing Capabilities	Sensing Capabilities
Collaboration Affordances						
Memory Affordances	0.126					
Process Management Affordances	0.28	0.237				
Reconfiguring Capabilities	0.551	0.058	0.839			
Seizing Capabilities	0.584	0.712	0.543	0.358		
Sensing Capabilities	0.807	0.214	0.157	0.068	0.343	

Given that data were collected from a single survey instrument, the possibility of common method bias (CMB) was also examined. Harman’s single-factor test revealed that the largest variance explained by a single factor was 32.7%, well below the 50% threshold (Podsakoff et al., 2003). Furthermore, the relative strength of the substantive loadings compared to potential method factor loadings indicated that method variance was not a serious concern in this study.

Complementary tests were conducted to further validate the model. The standardized root mean square residual (SRMR) was 0.065, below the recommended maximum of 0.08. The unweighted least squares discrepancy (dULS) and the geodesic discrepancy (dG) values were 0.724 and 0.47, respectively, both lower than the 95% quantiles. Together, these results suggest that the measurement model provides a satisfactory representation of the observed data.

3.4.5 Descriptive Statistics

To provide context for the sample, descriptive statistics were compiled for participants and their organizations. The survey yielded ninety valid responses, with each case representing a distinct firm or unique organizational unit. This ensured independence across observations and sufficient heterogeneity for variance-based analysis.



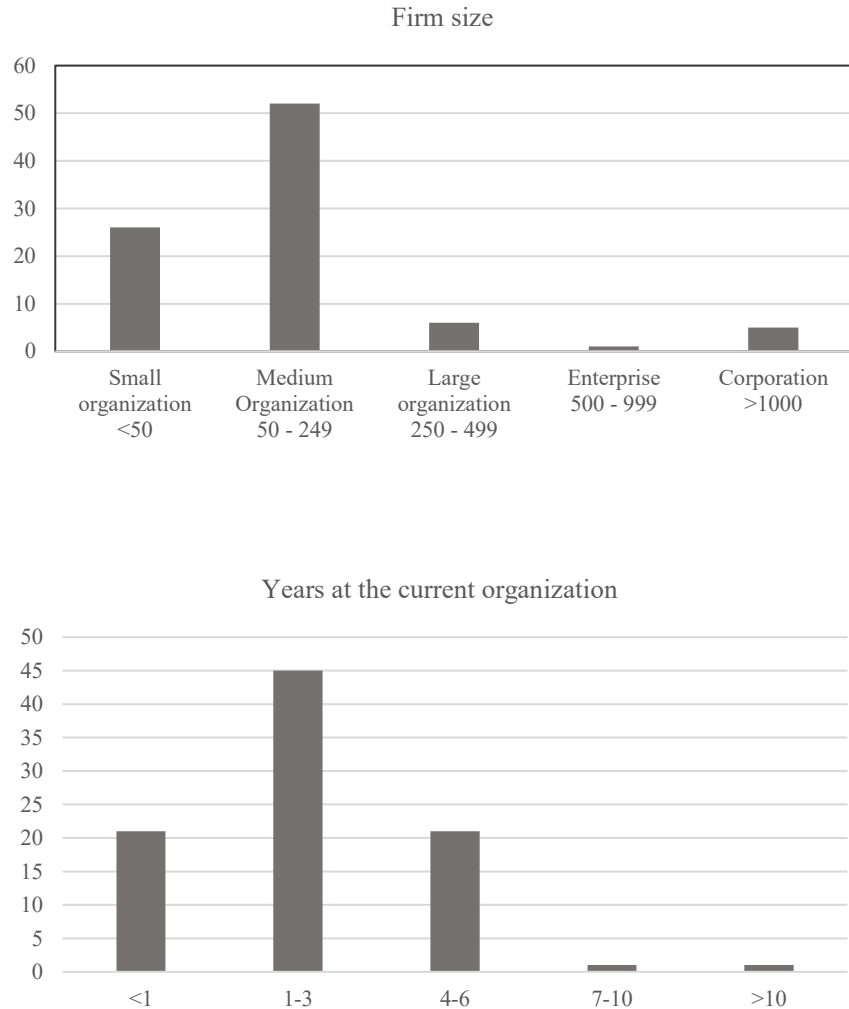


Figure 6: Descriptive statistics

Participants represented a cross-section of organizational roles, standardized into four categories. The majority (53) were managers or supervisors, followed by 19 technical or specialist professionals, 11 executives or senior leaders, and six staff or contributors. This distribution reflects the dataset’s emphasis on managerial perspectives, supported by input from both technical experts and senior decision-makers.

The organizations themselves varied in size. Medium-sized firms (50–249 employees) were most common (52 cases), followed by small firms with fewer than 50 employees (26 cases). Larger organizations were less represented, with six respondents from firms employing 250–499 people, five from corporations with more than 1,000 employees, and one from a firm with 500–999 employees. This distribution indicates that the sample is dominated by small and medium-sized enterprises (SMEs), consistent with the research focus on resource-constrained firms adapting IT to build dynamic capabilities.

As for tenure in the current role, the majority of participants reported relatively short experience: 45 respondents had one to three years of tenure, 21 had less than one year, and another 21 reported four to six years. Longer-tenure cases were rare, with only one participant reporting seven to ten years and one reporting more than ten years in their position.

Industry representation was led by manufacturing (32 cases), logistics and transportation (19), retail (15), and import and distribution (11). Smaller contributions came from technology (8) and packaging firms (4 cases). This reflects both the focus of the survey on supply chain and manufacturing contexts and the broader spread across related industries where IT-enabled affordances and capabilities are central to organizational adaptation.

Taken together, these descriptive statistics indicate that the dataset primarily represents SMEs in manufacturing and supply chain industries, with a strong managerial presence and respondents concentrated in the early to middle stages of their tenure. This composition provides a relevant empirical setting for examining how IT affordances contribute to the development of dynamic capabilities at the organizational level.

3.5 Results and Findings

After validating the measurement model, the next step was to assess the structural model in order to test the proposed hypotheses regarding the impact of organizational IT affordances on dynamic capabilities. Following established PLS-SEM guidelines (Hair et al., 2019), the evaluation involved examining path coefficients, explanatory power (R^2), effect sizes (f^2), and statistical significance obtained through bootstrapping with 5,000 resamples.

Prior to hypothesis testing, collinearity was assessed using the variance inflation factor (VIF). All VIF values were below the conservative threshold of 3.3 except for 2 items which were very slightly above the threshold, indicating that collinearity does not bias the path coefficient estimates (Kock & Lynn, 2012).

The results of the structural model are presented in Table 9 and illustrated in Figure 7. The R^2 values indicate that the three affordance dimensions jointly explain 58.3% of the variance in sensing capabilities, 65.4% of the variance in seizing capabilities, and 57.9% of the variance in reconfiguring capabilities. These values reflect moderate-to-substantial explanatory power according to Chin's (1998) benchmarks.

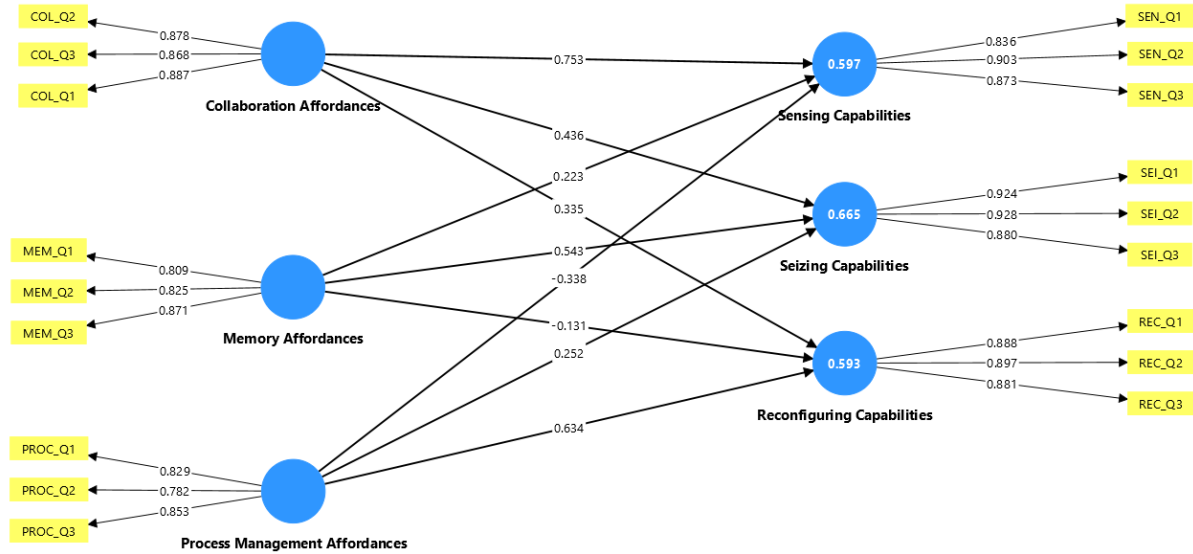


Figure 7: PLS-SEM Results of the Relationship Between IT Affordances and Dynamic Capabilities

Table 9. Structural Model Results: Effects of IT Affordances on Dynamic Capabilities

	Std. Beta	t-value	p-value	R ² (adjusted)	f ²	Supported?
Collaborative Affordances → Sensing Capabilities	0.753	14.15	0.000	0.583	1.333	Supported
Memory Affordances → Sensing Capabilities	0.223	7.147	0.000		0.119	Supported
Process Mgmt Affordances → Sensing Capabilities	-0.338	4.89	0.000		0.26	Not Supported (opposite direction)
Collaborative Affordances → Seizing Capabilities	0.436	3.43	0.001	0.654	0.538	Supported
Memory Affordances → Seizing Capabilities	0.543	9.65	0.000		0.848	Supported
Process Mgmt Affordances → Seizing Capabilities	0.252	1.84	0.066		0.174	Not Supported (nonsignificant)
Collaborative Affordances → Reconfiguring Capabilities	0.335	4.66	0.000	0.579	0.262	Supported
Memory Affordances → Reconfiguring Capabilities	-0.131	2.98	0.003		0.041	Not Supported (opposite direction)
Process Mgmt Affordances → Reconfiguring Capabilities	0.634	11.539	0.000		0.904	Supported

Regarding individual paths, the findings reveal the following effects: For sensing capabilities ($R^2 = 0.583$), Collaborative affordances exerted a strong and highly significant positive effect ($\beta = 0.753$, $t = 14.15$, $p < 0.001$), followed by memory affordances ($\beta = 0.223$, $t = 7.15$, $p < 0.001$). Interestingly, process management affordances showed a significant but negative effect ($\beta = -0.338$, $t = 4.89$, $p < 0.001$), suggesting that in this context, structured process-oriented IT not only doesn't enhance sensing activities but also may constrain it.

In terms of seizing capabilities ($R^2 = 0.654$), Both memory affordances ($\beta = 0.543$, $t = 9.65$, $p < 0.001$) and collaborative affordances ($\beta = 0.436$, $t = 3.43$, $p = 0.001$) significantly contributed to

seizing. Process management affordances had a positive but non-significant effect ($\beta = 0.252$, $t = 1.84$, $p = 0.066$), providing evidence for a weak effect size.

As for reconfiguring capabilities ($R^2 = 0.579$), Process management affordances emerged as the dominant predictor ($\beta = 0.634$, $t = 11.54$, $p < 0.001$), while collaborative affordances also had a significant positive but moderate effect ($\beta = 0.335$, $t = 4.66$, $p < 0.001$). In contrast, memory affordances unexpectedly demonstrated a weak negative effect ($\beta = -0.131$, $t = 2.98$, $p = 0.003$), implying that reliance on memory-related IT affordances may not support reconfiguring capabilities.

Regarding the effect size, almost the same way as path coefficients, results provide insight into the relative contribution of each predictor. For sensing, collaborative affordances exhibited a very large effect ($f^2 = 1.333$), followed by moderate contributions from process management ($f^2 = 0.26$) and memory affordances ($f^2 = 0.119$). In the case of seizing, memory affordances ($f^2 = 0.848$) and collaborative affordances ($f^2 = 0.538$) both had large effects, while process management was weak ($f^2 = 0.174$). For reconfiguring, process management affordances dominated with a large effect ($f^2 = 0.904$), whereas collaborative ($f^2 = 0.262$) and memory affordances ($f^2 = 0.041$) were weaker. According to Cohen's (1988) guidelines, these values confirm the presence of small, medium, and large effects across different affordance–capability paths, further underscoring the heterogeneity of their influence.

Table 9 summarizes the results of testing the nine hypotheses (H1a–H3c). Overall, six hypotheses were supported. Three relationships were not: the path from process-management affordances to seizing capabilities was positive but not statistically significant ($\beta = 0.252$, $p = 0.066$), while two hypothesized positive links (process-management \rightarrow sensing ($\beta = -0.338$, $p < 0.001$) and memory \rightarrow reconfiguring ($\beta = -0.131$, $p = 0.003$)) were significant but negative in direction. These findings indicate that not all affordances uniformly enable dynamic capabilities. In particular, process-management affordances may inadvertently constrain exploratory sensing activities, and reliance on memory affordances can inhibit reconfiguring by anchoring firms to established routines. Thus, while most IT affordances enhance capability development, some simultaneously create structural rigidities that limit adaptive flexibility.

With the structural results established, the next section discusses their theoretical and practical implications, with particular attention to the asymmetries and negative effects that emerged.

3.5.1 *Supplementary Configurational Analysis (fsQCA)*

To ensure methodological robustness and triangulate the variance-based results, a supplementary fuzzy-set Qualitative Comparative Analysis (fsQCA) was conducted. This approach, widely recommended in recent methodological literature for validating SEM findings (Rasoolimanesh et al., 2021; Hossain et al., 2024; Pappas, 2021), identifies configurational sufficiency and equifinal causal combinations, providing an asymmetric complement to the symmetric estimations of PLS-SEM. Whereas PLS-SEM estimates the net effects of each affordance on dynamic capabilities,

fsQCA captures configurational sufficiency, identifying combinations of conditions that can lead to high levels of capabilities (Ragin, 2008; Fiss, 2011). This approach provides additional insights into whether affordances act not only as independent predictors but also as elements of equifinal bundles. Results from fsQCA analysis are depicted in table 10.

Table 10. (fsQCA) Results for IT Affordances Leading to Dynamic Capabilities

Outcome	Solution	Causal conditions			Raw coverage	Unique coverage	Consistency	Solution coverage	Solution consistency
		Collaboration Affordances	Memory Affordances	Process management Affordances					
Sensing capabilities	1a	•	●		0.543	0.164	0.872	0.671	0.828
	1b	•		●	0.507	0.128	0.793		
Seizing capabilities	2a	•	●		0.494	0.121	0.944	0.646	0.924
	2b		●	•	0.525	0.152	0.945		
Reconfiguring capabilities	3a	●		•	0.521	0.152	0.919	0.657	0.873
	3b		●	•	0.505	0.136	0.862		

The fsQCA results broadly converged with the PLS-SEM findings. For sensing capabilities, collaborative affordances consistently appeared across sufficient configurations. This supports the SEM result that collaboration is the strongest predictor of sensing. At the same time, fsQCA highlighted that collaboration can be combined with either memory or process management affordances to yield high sensing, pointing to compensatory pathways that variance-based models do not fully capture.

For seizing capabilities, memory affordances consistently appeared as a core element in sufficient configurations, aligning with the SEM finding that memory is the most important predictor of seizing. Configurations also showed that seizing can be achieved either through memory combined with collaboration or through memory combined with process management, illustrating alternative equifinal routes.

For reconfiguring capabilities, process management affordances emerged as a central driver across sufficient solutions, confirming the strong SEM effect. In fsQCA, process management could combine with collaboration or with memory to enable high reconfiguring, suggesting that while process management is indispensable, its complementarities vary across firms.

Taken together, these configurational results reinforce the main conclusions of the SEM analysis that each affordance plays a dominant role in one of the dynamic capabilities. At the same time, fsQCA adds nuance by revealing equifinality and substitution effects, showing that firms can actualize dynamic capabilities through multiple pathways. Nevertheless, SEM is retained as the primary method because the core objective of this essay was to test directional hypotheses and estimate the relative strength of net effects analytical tasks that fsQCA does not address. fsQCA

is therefore used as a supplementary technique, ensuring the robustness of the results while providing additional configurational insights.

3.6 Discussion

By relying on SEM as the primary method and fsQCA as a supplementary robustness check, this essay underscores that directional, variance-based estimates are most appropriate for the research question, while still benefiting from the configurational nuance of fsQCA. The structural model results provide compelling evidence that organizational IT affordances play a determining role in shaping firms' IT-enabled dynamic capabilities. At the same time, the findings also reveal several nuanced and unexpected effects that enrich theoretical understanding of the affordances–capabilities relationship.

3.6.1 Affordances and Sensing Capabilities

Collaborative affordances emerged as the strongest driver of sensing capabilities ($\beta = 0.753$). This aligns with prior research emphasizing the role of IT-enabled collaboration in scanning environments and identifying emerging opportunities (Pavlou & El Sawy, 2010; Teece, 2007). Collaborative technologies enable cross-functional communication within and outside the organization, boundary-spanning interactions, and real-time market intelligence, all of which are foundational for sensing. Memory affordances also contributed positively, though more weakly ($\beta = 0.223$), consistent with the view that organizational memory and knowledge repositories facilitate recognition of patterns and early signals (Antunes & Pinheiro, 2020). This suggests that raw data obtained from external sources can be significantly enhanced when combined with accumulated knowledge and experience, particularly the causal patterns stored in organizational memory over a longer time horizon.

Interestingly, process management affordances had a significant but negative effect on sensing ($\beta = -0.338$). This can indicate that highly routinized, process-driven IT may constrain exploratory search and limit openness to novel signals. This aligns with Teece's (2018) caution that overemphasis on formalized routines can undermine firms' flexibility to sense what is emerging beyond established practices. Thus, while structured processes enhance efficiency, they may inevitably restrain the flexibility needed for effective sensing.

3.6.2 Affordances and Seizing Capabilities

Both collaborative ($\beta = 0.436$) and memory affordances ($\beta = 0.543$) significantly enabled seizing. This resonates with the dynamic capability literature, which emphasizes that opportunity recognition must be complemented by resource mobilization and decision-making supported by knowledge access and collaboration (Teece, 2007; Helfat & Peteraf, 2015). Collaborative affordances enable coordination and alignment across stakeholders, while memory affordances provide historical information and organizational insight necessary for decision-making. The weak

and statistically non-significant effect of process management affordances on seizing ($\beta = 0.252$, $p = 0.066$) suggests that structured IT systems may not directly enhance firms' ability to capture opportunities. While they contribute to efficiency, seizing often requires rapid resource allocation, experimentation, and managerial judgment that process-driven systems cannot easily accommodate. This finding challenges simplistic views of IT as a uniform enabler and emphasizes the contingency of affordance–capability linkages. It highlights the need for scholars and practitioners to move beyond general claims that “IT enables capabilities” and toward a more detailed understanding of how, and under what conditions, different technological affordances shape the microfoundations of dynamic capabilities.

3.6.3 Affordances and Reconfiguring Capabilities

As anticipated, process management affordances were the strongest driver of reconfiguring capabilities ($\beta = 0.634$), consistent with the argument that IT systems supporting workflow integration and process redesign are essential for resource realignment (Eisenhardt & Martin, 2000). Collaborative affordances also contributed positively ($\beta = 0.335$), reinforcing the role of cross-unit interactions in enabling organizational transformation and reconfiguration. Unexpectedly, memory affordances had a negative association with reconfiguring ($\beta = -0.131$). This may indicate that reliance on organizational memory anchors firms to established routines and past practices, hindering radical reconfiguration. It highlights a paradox: while memory aids sensing and seizing, it may simultaneously inhibit reconfiguring.

One useful theoretical lens for interpreting this finding is the organizational strategy typology developed by Miles and Snow (1978). In their framework, organizations differ in how they balance efficiency, stability, and exploration. In particular, Defender organizations prioritize efficiency, operational stability, and well-defined routines, often relying on highly structured processes to maintain consistency and cost control. While this orientation supports reliable execution and operational performance, it may also limit the organization's ability to scan the environment broadly and detect emerging opportunities.

The negative relationship observed between process-management affordances and sensing capabilities in this study appears conceptually consistent with this logic. Process-management technologies often emphasize standardization, workflow control, and procedural transparency, which are characteristics aligned with the defender orientation described by Miles and Snow. Although these systems improve coordination and efficiency, they may simultaneously reinforce existing routines and decision structures. As a result, organizations that rely heavily on tightly structured processes may become less attentive to weak environmental signals, reducing their ability to engage in exploratory sensing activities.

In contrast, Miles and Snow's Prospector organizations emphasize experimentation, flexibility, and continuous exploration of new opportunities. From this perspective, technologies that primarily reinforce process discipline may unintentionally shift organizations toward a defender-

like posture, strengthening operational reliability while constraining exploratory capabilities. The present findings therefore highlight the potential trade-off between efficiency-oriented IT affordances and exploratory dynamic capabilities, suggesting that the strategic orientation of the organization may shape how digital technologies influence capability development.

Together, these results demonstrate that IT affordances can act as both enablers and constraints. They function as double-edged swords, enabling firms to develop certain dynamic capabilities while simultaneously limiting others. This perspective refines our understanding of how IT affordances shape organizational adaptation by revealing both their enabling and constraining effects.

3.7 Theoretical Contributions

This study contributes to the IS and management literature in several important ways. First, it moves beyond earlier studies that perceived IT as a uniform enabler of dynamic capabilities (Pavlou & El Sawy, 2010; Warner & Wäger, 2019). By disaggregating IT into collaborative, memory, and process management affordances, this study demonstrates that different types of IT affordances have heterogeneous and sometimes contradictory effects. For example, collaborative affordances clearly enhance sensing by facilitating open communication and knowledge sharing, while memory affordances help with seizing but appear to constrain reconfiguring. Process management affordances strongly support reconfiguring, yet they reduce firms' openness to new signals and exploratory search. These findings show that IT is not a one-size-fits-all enabler; its effects depend on the type of affordance and the capability in question.

Second, the study emphasizes that IT affordances can emerge as double-edged swords. The negative effects observed (process management reducing sensing and memory reducing reconfiguring) demonstrate that IT affordances can also impose rigidities. This finding supports recent arguments that digital technologies may inadvertently lock organizations into the status quo if not balanced with strategic flexibility (Markus & Rowe, 2021; Svahn et al., 2017). By documenting both enabling and constraining effects, this study advances a more balanced and realistic account of IT's role in organizational change.

Third, the study contributes to clarifying the distinction between IT affordances and dynamic capabilities. While both are linked to IT-enabled adaptation, they are conceptually distinct. Dynamic capabilities (sensing, seizing, reconfiguring) represent higher-order routines for renewing and reconfiguring a firm's resource base (Teece, 2007; Helfat & Peteraf, 2015). IT affordances, by contrast, are action potentials embedded in technology that create the conditions under which such routines can be enacted (Leonardi, 2011; Volkoff & Strong, 2013). The results here provide empirical evidence that affordances significantly explain variance in capabilities ($R^2 = 0.58\text{--}0.65$) but are not equivalent to them.

Fourth, the heterogeneity of observed relationships including positive, negative, and non-significant paths further confirms that affordances are not synonymous with capabilities. If they

were, one would expect uniform, positive relationships across constructs. Instead, the findings support the view of affordances as microfoundations of dynamic capabilities (Helfat & Raubitschek, 2018). They provide enabling conditions, but the development of capabilities depends on how these affordances are actualized through organizational routines and managerial decisions.

Finally, this study extends the literature by modeling affordances as organizational-level constructs. While affordances originate in user–technology interactions (Volkoff & Strong, 2013), their aggregation at scale creates collective patterns that meaningfully shape organizational action possibilities. The strong predictive relationships observed in this study suggest that affordances can and should be treated as organizational-level antecedents of dynamic capabilities, thereby contributing to ongoing debates in IS about the appropriate level of analysis for affordances in digital transformation.

3.8 Conclusion, Limitations and Future Research

This study examined the role of IT affordances in shaping firms' dynamic capabilities. By distinguishing between collaborative, memory, and process management affordances, and by empirically testing their relationships with sensing, seizing, and reconfiguring capabilities, the research clarifies a persistent ambiguity in the IS literature: whether affordances and dynamic capabilities are equivalent constructs. The findings provide robust evidence that they are not. Instead, IT affordances function as antecedents and microfoundations of dynamic capabilities, enabling or constraining their development in distinct ways.

The results reveal that collaborative affordances are central for sensing and seizing, process management affordances dominate reconfiguring, and memory affordances play an ambivalent role supporting seizing but constraining reconfiguring. These patterns highlight the double-edged nature of IT affordances: while they generally expand organizational action possibilities, they can also embed rigidities that hinder adaptation. The explanatory power of affordances ($R^2 = 0.58$ – 0.65 across capabilities) underscores their central role in capability building, while the presence of negative and non-significant paths illustrates their complexity.

Theoretically, this study contributes to IS and strategy research by empirically disentangling affordances from dynamic capabilities, demonstrating their role as organizational-level enablers rather than capabilities per se. It advances the integration of IS research on affordances (Leonardi, 2011; Volkoff & Strong, 2013) with strategic management debates on the microfoundations of dynamic capabilities (Teece, 2018; Helfat & Raubitschek, 2018). Practically, the study provides managers with guidance on tailoring IT investments: collaborative tools to enhance sensing and seizing, process management systems to support reconfiguring, and careful management of memory systems to avoid path dependencies.

Despite its contributions, this study has several limitations that should be acknowledged. First, the cross-sectional survey design limits causal inference; the observed relationships capture

associations at one point in time rather than dynamic evolution. Second, all data were collected from self-reported managerial perceptions, which may introduce common method or perceptual biases despite the steps taken to mitigate them. Third, while the sample of 90 firms provides meaningful insights into Canadian manufacturing and supply-chain contexts, it may limit generalizability to other sectors or countries with different technological or institutional conditions. Finally, the model captures only direct effects of affordances on dynamic capabilities, omitting potential mediators (e.g., learning routines) or moderators (e.g., environmental dynamism) that may further explain variance in capability development.

Although the study provides valuable insights, it also opens several avenues for future research. These can be grouped into methodological, contextual, and theoretical extensions. In terms of methodological suggestions for future research, this research employed a cross-sectional design, which captures relationships at a single point in time. Future longitudinal studies could examine how affordances are enacted and evolve over time, and how their influence on capabilities may vary across phases of organizational transformation. Mixed-method approaches, including qualitative or case-based studies, could provide richer insights into how managers perceive and enact affordances, and how those perceptions moderate the strength of affordance–capability linkages. Also from contextual point of view, the dataset was drawn primarily from manufacturing and supply chain contexts, with some representation from related industries. Future comparative research could explore whether the same affordance–capability relationships hold in highly dynamic sectors such as technology start-ups versus more stable ones such as traditional manufacturing. Additional studies could also investigate whether firm size or industry conditions shape the degree to which specific affordances matter for capability building. Concerning theoretical suggestions, this study modeled affordances as independent predictors, but future research could explore complementarities or trade-offs between them. For example, does reliance on process management affordances weaken the benefits of collaborative affordances for sensing? Moreover, extending the model to include downstream outcomes such as innovation and firm performance would provide a fuller picture of the IT–capability–innovation chain. In particular, examining how affordances indirectly influence business model innovation could connect the insights of this essay with the broader dissertation agenda. Finally, future work should continue to refine the conceptual distinction between affordances and capabilities, building on the view that affordances are technological conditions whose actualization depends on managerial agency and organizational routines.

In conclusion, this study demonstrates that IT affordances are indispensable but distinct drivers of dynamic capabilities. By providing empirical evidence that affordances function as organizational-level enablers and not as capabilities themselves, the research advances theoretical clarity and offers practical insights for digital strategy. Future work can build on these foundations to further unravel the complex interplay between technology, organizational routines, and strategic renewal in the digital age.

3.9 References

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3.10 Appendix

Table 11. Results from card sorting practice

Construct	Initial items	First round agreement	Removed or combined items*	Retained items	Reworded items	Final agreement
Collaborative Affordances	3	94.4%	0	3	0	100%
Memory Affordances	3	77.73%	0	3	1	88.8%
Process management Affordances	3	61.06%	0	3	2	77.73%
Sensing capabilities	4	83.33%	1	3	1	88.8%
Seizing capabilities	6	61.08%	3	3	3	72.1%
Reconfiguring capabilities	4	79.12%	1	3	1	100%

* Since some of the items for seizing capabilities were supplied from the five-dimension DC framework (sensing, coordination, learning, integrating and reconfiguring) some items had to be combined.

Table 12. Survey instrument, outer loadings and weights of measurement indicators

		Outer loadings	Outer weights
Organizational IT Affordances			
Collaborative affordances			
COL_Q1	Our IT enables real-time, synchronous collaboration among individuals and members.	0.887	0.379
COL_Q2	Our IT and digital technology have features that enable collaborative work across teams, departments and organization	0.878	0.381
COL_Q3	IT resources utilized by our organization effectively support collaboration.	0.868	0.38
Organizational memory affordances			
MEM_Q1	Our IT system supports storing, archiving, retrieving, sharing, and reusing organizational knowledge and project history.	0.809	0.331
MEM_Q2	Our IT supports facilitate the creation of knowledge communities for sharing innovative ideas.	0.825	0.419
MEM_Q3	Our IT captures and compiles project information.	0.871	0.443
Process management affordances			
PROC_Q1	IT resources in our organization enable visualization, monitoring the streamlining of business-process workflows.	0.829	0.422
PROC_Q2	Our IT system support task/resource allocation, prioritization, and scheduling in order to sustain business processes.	0.782	0.35
PROC_Q3	Our IT accurately provide information to support business processes.	0.853	0.441
IT-enabled Dynamic Capabilities			
Sensing Capabilities			
SEN_Q1	IT enables our organization to scan the environment and identify new business opportunities and customer needs.	0.836	0.36
SEN_Q2	Our IT enhances our ability to anticipate changes in the business domain through reactive and proactive measures.	0.903	0.396
SEN_Q3	Our IT has helped us in implementing ideas for new products and improving existing products or services	0.873	0.391
Seizing Capabilities			

SEI_Q1	Our IT system provides us with the capability to identify, evaluate, and import new information and knowledge.	0.924	0.381
SEI_Q1	As a result of using IT systems, our organization has the capacity to aggregate relevant information from business partners, suppliers and customers. (e.g. operating information, business customer performance).	0.928	0.357
SEI_Q1	Through our IT, we are prepared to transform existing information into accumulated knowledge and use it in decision-making processes.	0.88	0.36
Reconfiguring Capabilities			
REC_Q1	Thanks to our IT system, we are capable of making adjustments to business processes in cases of priority shifts and unexpected changes.	0.888	0.387
REC_Q2	Our IT system enables us to be capable of reconfiguring processes, adding or removing business partners as needed to develop new productive assets.	0.897	0.358
REC_Q3	Our IT systems have enabled us to seamlessly add an eligible new partner or remove ones that we have terminated our partnership	0.881	0.38

Table 13. Correlations and covariances of the constructs

	Collaboration Affordances	Memory Affordances	Process Management Affordances	Reconfiguring Capabilities	Seizing Capabilities	Sensing Capabilities
Collaboration Affordances	1	0.032	0.226	0.474	0.51	0.683
Memory Affordances	0.032	1	0.191	0	0.605	0.182
Process Management Affordances	0.226	0.191	1	0.685	0.455	-0.126
Reconfiguring Capabilities	0.474	0	0.685	1	0.315	0.059
Seizing Capabilities	0.51	0.605	0.455	0.315	1	0.298
Sensing Capabilities	0.683	0.182	-0.126	0.059	0.298	1

Table 14. Model fit

	Saturated model	Estimated model
SRMR	0.062	0.065
d_ULS	0.65	0.724
d_G	0.444	0.47
Chi-square	225.288	232.779
NFI	0.785	0.778

Transition to Chapter 4

The second essay in this dissertation extended the understanding of how digital technologies underpin organizational adaptability by empirically examining the role of IT affordance actualization in the development of dynamic capabilities. Drawing on the affordance perspective, it demonstrated that technologies contribute to capability formation not merely through possession or investment, but through the actualization of specific organizational affordances that are translated into actionable routines. Using Partial Least Squares Structural Equation Modeling (PLS-SEM) on data from Canadian firms, the study provided strong empirical evidence that these affordances enable the core processes of sensing, seizing, and reconfiguring that form the foundation of a firm's adaptive capacity (Pavlou & El Sawy, 2011; Warner & Wäger, 2019).

Essay 2 thus addressed a traditional gap in the information-systems (IS) and strategic-management literature: while IT has long been recognized as a driver of dynamic capabilities, the precise mechanisms through which technological features become embedded in organizational routines remained underdeveloped (Volkoff & Strong, 2013; Mikalef & Pateli, 2017). By operationalizing affordances at the organizational level and demonstrating their differentiated effects such as the enabling role of collaborative affordances for sensing and the centrality of process-management affordances for reconfiguring, the essay revealed that IT does not automatically create capabilities. Instead, affordances act as microfoundations that must be mobilized and aligned with organizational processes to transform technological potential into dynamic capability enactment (Helfat & Peteraf, 2015).

Despite these advances, Essay 2 was not intended to explore what these IT-enabled dynamic capabilities ultimately achieve. Dynamic capabilities, as theorized by Teece (2007) and Eisenhardt and Martin (2000), are valuable not in isolation but through their outcomes particularly their role in fostering organizational innovation and renewal. Having established the antecedents and formation mechanisms of dynamic capabilities, the next conceptual step is to investigate their consequences, that is, how combinations of sensing, seizing, and reconfiguring shape firms' ability to reimagine how they create, deliver, and capture value. This is exactly the objective of Essay 3, which examines the link between dynamic capabilities and business-model innovation (BMI) as the key pathway through which digital transformation yields competitive advantage.

The choice of BMI as the focal outcome is theoretically motivated. Business-model innovation represents the process through which organizations redefine their value logic (how they generate, deliver, and appropriate value), thereby transforming their competitive positioning (Amit & Zott, 2012; Osterwalder & Pigneur, 2010; Foss & Saebi, 2017). Compared with product or process innovation, BMI captures a higher level of organizational renewal that reflects structural, relational, and financial changes. In the digital era, such transformation is increasingly enabled by IT-driven sensing of market shifts, seizing of emerging opportunities, and reconfiguring of resources and partnerships (Warner & Wäger, 2019). Yet the empirical evidence on how specific combinations of these dynamic capabilities lead to BMI remains scarce. Prior variance-based

studies have largely modeled these relationships linearly, assuming additive and independent effects (e.g., Mikalef & Pateli, 2017). However, innovation outcomes such as BMI are often configurational: different firms may achieve similar results through distinct capability bundles depending on their strategy, digital maturity, or environmental conditions (Fiss, 2011; Misangyi et al., 2017).

To address this gap, Essay 3 adopts a fuzzy-set Qualitative Comparative Analysis (fsQCA) approach to uncover the multiple sufficient configurations of dynamic capabilities that lead to distinct forms of business-model innovation. This methodological progression mirrors the conceptual progression of the dissertation. Essay 2 used PLS-SEM to establish reliable constructs and directional relationships appropriate for disentangling antecedent effects. Essay 3, by contrast, employs a set-theoretic method capable of capturing equifinality (multiple paths to the same outcome) and causal asymmetry (conditions that may be sufficient but not necessary). This dual approach ensures both internal validity in measurement and external validity in interpretation, providing a comprehensive picture of how digital technologies shape organizational renewal (Ragin, 2009; Schneider & Wagemann, 2012).

From a theoretical standpoint, the transition from Essay 2 to Essay 3 represents a move from capability formation to capability deployment and outcome. The previous essay clarified how digital affordances give rise to dynamic capabilities; the current essay investigates what those capabilities do. This sequencing aligns with the broader dynamic-capabilities framework, which conceptualizes capabilities as higher-order mechanisms that enable firms to continuously adapt their business models and strategies (Teece, 2018). By focusing on BMI as the first-order outcome, Essay 3 captures the tangible manifestations of dynamic capabilities in the form of new value propositions, reconfigured activities and partnerships, and redesigned revenue or cost structures (Clauss, 2017; Steininger et al., 2022).

Conceptually, this essay also bridges the exploration–exploitation tension at the heart of dynamic-capability theory. Sensing is inherently exploratory, emphasizing environmental scanning and opportunity recognition; seizing is exploitative, focusing on commitment and execution; and reconfiguring acts as the integrative mechanism that allows firms to pivot between the two (O’Reilly & Tushman, 2013). By examining how different bundles of these capabilities enable distinct BMI dimensions (value offering, creation, and capture) Essay 3 elucidates how ambidexterity is achieved through configuration rather than balance.

Furthermore, Essay 3 deepens the integration between information-systems and strategy research that underpins the dissertation’s overall contribution. Essay 2 demonstrated how IT affordances (an IS construct) feed into dynamic capabilities (a strategy construct). Essay 3 completes this bridge by showing how those capabilities, once developed, reconfigure the firm’s business model, a domain that sits at the intersection of technological and strategic innovation (Nambisan et al., 2017; Foss & Saebi, 2018). Together, these essays depict a coherent transformation chain and

explain how digital technologies shape both the means and the ends of organizational transformation.

In summary, the transition from Essay 2 to Essay 3 marks both a conceptual and methodological point in the dissertation. Conceptually, it shifts focus from understanding the internal mechanisms of capability formation to exploring their external outcomes in business-model change. Methodologically, it moves from linear, variance-based modeling to configurational, set-theoretic reasoning suited for causal complexity. Collectively, these two essays form the empirical backbone of the thesis. Essay 2 explains how digital affordances build dynamic capabilities, and Essay 3 demonstrates how combinations of those capabilities enable business-model innovation. This sequential logic realizes the overarching aim of the dissertation which is to clarify how firms transform digital technologies into strategic agility, innovation, and ultimately, sustained competitiveness in dynamic environments

Chapter 4.
**Essay 3 : IT-Enabled Dynamic Capabilities and Business Model Innovation: Pathways
to Enhanced Firm Performance**

Abstract

Firms increasingly rely on digital technologies not merely to automate processes but to reinvent how they create, deliver, and capture value. This study investigates how combinations of IT-enabled dynamic capabilities (ITDCs) comprising sensing, seizing, and reconfiguring capabilities drive distinct forms of business model innovation (BMI). Drawing on the logic of equifinality and causal asymmetry, the study employs fuzzy-set Qualitative Comparative Analysis (fsQCA) on survey data from 90 Canadian small and medium-sized enterprises across manufacturing and supply chain related sectors. The findings reveal multiple, equally effective capability bundles leading to innovation in value offering, creation, and capture. Reconfiguring consistently emerges as a core driver, while sensing and seizing vary in salience depending on the innovation dimension. The results show that BMI does not follow a linear “sense-seize-reconfigure” sequence but unfolds through substitutable and complementary capability combinations. This configurational perspective enriches understanding of how digital transformation translates into business model change and offers managers practical guidance for prioritizing capability investments under resource constraints.

4.1 Introduction

In today's business environments characterized by rapid advancements in digital technologies and intense market competition, firms must continuously adapt to survive and thrive. Advances in information technology (IT) and data-driven tools have transformed the nature of competitive advantage by reshaping how organizations sense environmental change, seize emerging opportunities, and reconfigure their resources and processes. The capacity to translate technological potential into strategic and organizational outcomes has therefore become a defining capability for modern enterprises. Yet despite widespread investment in digital technologies, many firms struggle to realize tangible benefits because the relationship between IT and organizational innovation is complex, nonlinear, and deeply context-dependent (Mikalef et al., 2021; Warner & Wäger, 2018). Understanding how IT enables firms to innovate their business models and improve performance remains a central challenge for both research and practice.

Early studies grounded in the Resource-Based View (RBV) emphasized that unique, valuable, and inimitable resources form the foundation of competitive advantage (Barney, 1991; Bharadwaj, 2000). However, the RBV has been criticized for its static orientation and its limited capacity to

explain how organizations renew or reconfigure resources under turbulent conditions (Eisenhardt & Martin, 2000; Teece, 2007). To address this gap, the Dynamic Capability View (DCV) extends the RBV by focusing on firms' higher-order abilities to integrate, build, and reconfigure resources in response to environmental change. Dynamic capabilities (DCs) thus represent the organizational routines and processes that allow firms to adapt their strategies and business models to sustain competitiveness over time (Helfat & Peteraf, 2015; Teece, 2018).

In digitally enabled contexts, IT serves as both a resource base and a catalyst for capability development. Technologies such as analytics, cloud platforms, and artificial intelligence expand firms' ability to collect information, coordinate processes, and experiment with new value propositions (Benitez et al., 2022; Kraus et al., 2022). Yet IT by itself is rarely sufficient to drive strategic renewal. The benefits of digitalization emerge only when firms possess the dynamic capabilities needed to sense technological and market opportunities, seize them through effective resource commitment, and reconfigure structures and processes accordingly. Consequently, IT-enabled dynamic capabilities (ITDCs) have become a key theoretical construct linking digital transformation to organizational outcomes (Li & Chan, 2019; Mikalef et al., 2021; Sadreddin & Chan, 2023).

The core premise underlying the dynamic capability view of the firm is that organizations must adapt and integrate their resource base into their strategy and business model. By doing so, they can generate meaningful outcomes such as the development of new products, services, and processes. Ultimately, this enables them to attain superior performance and establish a competitive advantage (Chesbrough, 2010; Raymond et al., 2011; Steininger et al., 2022; Teece, 2018).

In recent years, the concept of digital transformation has garnered significant attention from both researchers and practitioners (Fitzgerald et al., 2014; Kraus et al., 2022; Westerman et al., 2011). Digital transformation is commonly understood as the utilization of technology to enhance business performance (Fitzgerald et al., 2014; Kraus et al., 2022). While there is a general consensus in the fields of information systems (IS) and strategic management regarding the significance of adopting and integrating digital technologies as organizational resources into a firm's business strategy to improve performance, there are still gaps in fully understanding how these technologies and the capabilities enabled by them lead to desired outcomes.

A growing body of research suggests that dynamic capabilities are central mechanisms through which digital technologies influence business model innovation (BMI) defined as the process by which firms create, deliver, and capture value in novel ways (Foss & Saebi, 2017; Steininger et al., 2022). Business model innovation has evolved from a peripheral topic to a strategic imperative: firms increasingly compete not only through products or processes but also through the reconfiguration of their underlying value logic. However, despite conceptual advances, empirical understanding of how specific dynamic capabilities combine to enable different forms of BMI remains limited. Prior quantitative studies have tended to model these relationships linearly, assuming that stronger capabilities uniformly enhance innovation outcomes (e.g., Mikalef &

Pateli, 2017). Such approaches overlook the possibility that distinct combinations of sensing, seizing, and reconfiguring may lead to innovation through multiple, equally effective routes.

Addressing these gaps, the present essay adopts a configurational perspective to examine how IT-enabled dynamic capabilities interact to foster business model innovation. Drawing on the logic of equifinality and causal asymmetry (Fiss, 2011; Ragin, 2009), the study argues that organizations can achieve innovation through diverse bundles of capabilities rather than a single universal pathway. This approach recognizes that the effect of any one capability depends on its conjunction with others and with contextual factors such as organizational size, digital maturity, or market turbulence. Configurational theorizing is particularly relevant for small and medium-sized enterprises (SMEs), which often face resource constraints that require selective capability investments and trade-offs (Falk & Hagsten, 2015; Nguyen et al., 2015).

Within the broader dissertation, this essay builds upon the preceding study that examined how IT affordances contribute to the development of dynamic capabilities. Having established how digital resources are actualized into capabilities, the present essay turns to the outcomes of those capabilities and specifically, how they translate into business model innovation. It thus occupies the second link in the overarching framework connecting IT affordances, dynamic capabilities, and organizational innovation. Methodologically, the essay employs fuzzy-set Qualitative Comparative Analysis (fsQCA) to uncover multiple sufficient configurations of capabilities that lead to innovation across the three principal dimensions of BMI: value offering, value creation, and value capture.

Accordingly, the central research question guiding this study is:

RQ: Which combinations of IT-enabled dynamic capabilities enable firms to achieve distinct forms of business model innovation, and how do these configurations differ across value-offering, value-creation, and value-capture outcomes?

By addressing this question, the essay contributes to three key debates. First, it advances the dynamic capabilities literature by demonstrating that capabilities operate configurationally rather than additively. Second, it enriches BMI research by revealing how different innovation outcomes stem from specific capability bundles. Third, it offers practical guidance for managers seeking to prioritize and orchestrate digital capabilities under resource constraints. The following section reviews the theoretical foundations of dynamic capabilities, IT-enabled capabilities, and business model innovation, culminating in the conceptual model that guides the empirical analysis.

4.2 Literature Review and Model

4.2.1 Dynamic Capabilities

The dynamic capability view (DCV) builds upon the resource-based view (RBV) of the firm by emphasizing the mechanisms through which organizations renew, integrate, and reconfigure their

resource base in rapidly changing environments. Whereas the RBV focuses on the possession of valuable, rare, inimitable, and non-substitutable resources as the foundation of sustained competitive advantage (Barney, 1991; Bharadwaj, 2000), the DCV highlights the renewal of those resources as markets evolve (Eisenhardt & Martin, 2000; Teece et al., 1997). Dynamic capabilities (DCs) therefore represent a firm's higher-order abilities to purposefully create, extend, and modify its resource base to address environmental change (Helfat & Peteraf, 2015; Teece, 2007). They enable strategic adaptation by linking resources to firm-level outcomes such as innovation, transformation, and eventually performance (Ambrosini & Bowman, 2009; Schilke et al., 2018).

Over the past decades, scholars have converged around three interrelated dimensions of DCs which are sensing, seizing, and reconfiguring (Teece, 2018). Sensing refers to identifying and interpreting opportunities and threats in the environment through scanning, learning, and experimentation. Seizing captures the ability to mobilize and commit resources to pursue those opportunities through investment and execution. Reconfiguring includes reshaping existing assets, processes, and structures to sustain strategic fit as conditions change and evolve. These dimensions are not linear stages but overlapping, mutually reinforcing activities that collectively underpin organizational transformation (Warner & Wäger, 2018). Firms that balance them effectively are better equipped to innovate and maintain competitiveness under uncertainty.

Dynamic capabilities differ from ordinary (operational) capabilities in that they enable change rather than stability. Ordinary capabilities are patterned, repetitive routines that ensure efficient functioning of current operations, whereas dynamic capabilities allow firms to renew those routines when the environment shifts (Winter, 2003). Research has further shown that DCs vary in their microfoundations defined as specific managerial and organizational routines that give rise to sensing, seizing and reconfiguring (Eisenhardt & Martin, 2000; Teece, 2018). These microfoundations include managerial cognition, learning processes, and decision-making mechanisms that translate external signals into strategic action (Helfat & Peteraf, 2015).

Although DCs are widely acknowledged as critical for innovation, prior studies often conceptualized their effects as linear to conclude that greater sensing, seizing, or reconfiguring directly enhances innovation or performance. Yet organizations may deploy these capabilities in different combinations depending on context, resource base, or strategic intent. Such linear view likely ignores that several different capability combinations may yield similar results (Fiss, 2011). As such, understanding DCs as interdependent and context-specific combinations rather than independent predictors provides richer theoretical and empirical insights.

4.2.2 IT-Enabled Organizational Dynamic Capabilities

The prevalence and advancement of digital technologies has redefined how dynamic capabilities emerge and operate. Information technology (IT) is not just an enabler but an integral component of how firms sense opportunities, seize them, and reconfigure operations (Li & Chan, 2019; Mikalef et al., 2021). The concept of IT-enabled dynamic capabilities (ITDCs) captures this

integration, describing the firm's ability to leverage digital technologies to orchestrate sensing, seizing, and reconfiguring activities that support innovation and performance (Sadreddin & Chan, 2023; Warner & Wäger, 2018).

Early information-systems (IS) research emphasized the role of IT resources as strategic assets that enhance coordination, communication, and decision-making (Bharadwaj, 2000). However, the strategic value of IT depends on how those resources are mobilized and recombined with other organizational assets which is precisely the function of dynamic capabilities (Pavlou & El Sawy, 2011). Subsequent work has shown that IT infrastructures, digital platforms, and analytics capabilities strengthen firms' sensing and seizing processes by enabling real-time data collection, cross-functional learning, and rapid experimentation (Benitez et al., 2022; Kraus et al., 2022). Similarly, cloud computing and modular architectures enhance reconfiguring by facilitating the reallocation of resources and redesign of workflows (Mikalef & Pateli, 2017).

From a theoretical standpoint, ITDCs represent a synthesis between the digital-transformation literature and the DCV. They encompass both technological and organizational elements including digital tools, analytics, and infrastructures as well as managerial capabilities to interpret and exploit them. Warner and Wäger (2019) argue that successful digital transformation arises when firms integrate digital resources into the dynamic-capability processes that drive change. Li and Chan (2019) define dynamic IT capability as the ability of the IT unit to acquire, integrate, and transform IT resources to meet business goals, whereas Sadreddin and Chan (2023) extend this to firm-wide IT-enabled organizational capabilities that combine digital and non-digital assets.

Evidence from prior studies confirms that ITDCs drive innovation in various ways. Sensing capabilities are strengthened by analytics and market-intelligence systems that help detect emerging customer needs. Seizing is enabled by digital collaboration platforms that support rapid decision-making and resource commitment. Reconfiguring benefits from IT flexibility, allowing firms to realign structures and processes (Mikalef & Pateli, 2017; Mikalef et al., 2016). Yet evidence also indicates that IT investments alone are insufficient. While the above mentioned enablers are mainly platforms and technologies, it is important to understand that without complementary managerial and organizational routines, digital tools may increase complexity rather than capability (Benitez et al., 2022; Kane et al., 2015). This reinforces the view that ITDCs emerge from the interaction between digital resources and organizational competencies.

While prior quantitative research typically models the effect of ITDCs on innovation using regression or structural-equation modeling, such methods assume independent, additive contributions of each capability. However, digital transformation often unfolds through nonlinear, path-dependent interactions. For instance, reconfiguring may compensate for weak sensing, or strong seizing may amplify the effect of moderate reconfiguring. Recognizing this interdependence calls for configurational approaches that capture equifinality which refers to the idea that multiple, distinct capability bundles can yield similar outcomes (Fiss, 2011; Misangyi et

al., 2017). As a result to be able to uncover these kind of patterns the fsQCA method has been adopted in this study.

4.2.3 Business Model Innovation

Business model innovation (BMI) has become a focal point in management and IS research as firms increasingly compete through novel ways of creating, delivering, and capturing value rather than through products or processes alone (Amit & Zott, 2012; Foss & Saebi, 2017). A business model shows the logic through which an organization creates value for customers and captures value for itself (Clauss, 2017; Osterwalder & Pigneur, 2010). Building on this foundation, Clauss (2017) conceptualizes BMI as changes in a firm's value-creation, value-offering, and value-capture mechanisms. These three dimensions provide a holistic yet analytically separable framework. Value offering innovation involves redefining value propositions, different customer segments, customer relationships management, and channels. Value creation innovation concerns key activities, resources, and partnerships that generate value. And finally, value capture innovation focuses on revising cost structures and revenue models to improve profitability. Together, they capture both the operational and strategic facets of how organizations adapt to environmental and technological change (Clauss et al., 2019; Steininger et al., 2022).

Digital technologies have profoundly influenced how firms innovate their business models. The integration of data analytics, AI, and digital platforms allows firms to explore new markets, customize offerings, and develop service-based or platform-based logics (Kraus et al., 2022; Nambisan et al., 2017). However, as with ITDCs, technology alone does not guarantee innovation; organizational capabilities determine whether digital potential is translated into actual business-model change (Warner & Wäger, 2018). Therefore, BMI can be viewed as a first-order outcome of dynamic capabilities, an intermediate step between capabilities and overall firm performance (Mikalef et al., 2021).

4.2.4 Dynamic capabilities and BMI

Recent studies highlight that DCs are essential drivers of BMI because they enable firms to sense shifts in their environment, seize digital opportunities, and reconfigure their business architecture (Benitez et al., 2022; Steininger et al., 2022). Sensing helps firms identify new customer needs and emerging technologies; seizing facilitates the mobilization of resources to implement new value propositions; and reconfiguring allows the transformation of existing processes, partnerships, and revenue mechanisms. Nevertheless, empirical evidence suggests that these capabilities rarely act in isolation. Firms may rely on different combinations depending on strategic orientation, digital maturity, or external turbulence (Warner & Wäger, 2018). For example, exploration-oriented firms might emphasize sensing and seizing, whereas efficiency-driven firms rely on seizing and reconfiguring. Such variation underscores the value of examining DC–BMI linkages through a configurational lens.

The interplay among sensing, seizing, and reconfiguring reflects the logic of ambidexterity which refers to balancing exploration and exploitation (O'Reilly III & Tushman, 2013). Sensing aligns with exploration by emphasizing search and experimentation; seizing aligns with exploitation by emphasizing execution and resource commitment; and reconfiguring acts as a bridge that enables organizations to shift between the two. Consequently, BMI may arise from different ambidextrous configurations. For example, an outside-in orientation (sensing + seizing) emphasizing external discovery, an inside-out orientation (seizing + reconfiguring) emphasizing internal adaptation, or hybrid paths combining sensing + reconfiguring. These alternative routes correspond closely with the fsQCA mindset and with the broader principle of equifinality in organizational theory (Fiss, 2011; Furnari et al., 2021).

The configurational view is particularly suitable for small and medium-sized enterprises (SMEs), which typically lack the resource redundancy of large corporations. SMEs must prioritize certain dynamic capability investments while compensating for weaknesses in others (Falk & Hagsten, 2015). Understanding which bundles of IT-enabled capabilities yield BMI for SMEs therefore provides both theoretical and practical insights into how digital transformation unfolds under constraints.

4.3 Conceptual Framework and Research Model

Synthesizing the reviewed literature, this essay conceptualizes business model innovation (BMI) as an outcome of diverse configurations of IT-enabled dynamic capabilities (ITDCs). The framework builds on the idea that sensing, seizing, and reconfiguring capabilities interact conjuncturally to produce innovation in different aspects of the business model. Each capability contributes a distinct function of opportunity recognition, resource mobilization, and structural transformation but their joint effect determines whether and how firms innovate.

Figure 8 (Conceptual Framework) illustrates the proposed relationships. IT-enabled sensing, seizing, and reconfiguring capabilities constitute the causal conditions, while BMI that is operationalized through its three dimensions of value offering, value creation, and value capture represents the outcome. The framework assumes that each BMI dimension may arise from different capability configurations, reflecting the multidimensional and context-dependent nature of innovation.

While the Business Model Canvas (BMC) was originally introduced as a managerial framework (Osterwalder & Pigneur, 2010), subsequent research has widely adopted and extended it as a theoretical and empirical construct for studying business model innovation (Clauss, 2017; Foss & Saebi, 2017; Wirtz et al., 2016). In particular, the BMC's nine components have been conceptualized as analytically separable yet interdependent building blocks that jointly capture how firms create, deliver, and capture. Scholars have thus used it not only as a practical tool but as a theoretically grounded representation of a firm's value logic and its mechanisms of renewal (Zott & Amit, 2010; Bocken et al., 2014; Clauss et al., 2019).

Building on this foundation, several recent studies have emphasized that the three dimensions of value offering, value creation, and value capture provide a comprehensive lens through which business model innovation can be understood and empirically examined (Guo et al., 2022; Menter et al., 2023; Sparviero, 2019). For instance, Guo et al. (2022) conceptualize these dimensions as interdependent mechanisms that explain how digital technologies reshape firms' value logic and strategic positioning. Similarly, Menter et al. (2023) empirically operationalize business model innovation through these dimensions, showing that each captures distinct yet complementary facets of how organizations translate dynamic capabilities into performance outcomes. Sparviero (2019) further argues that by structuring the business model around these core dimensions, the Business Model Canvas transcends its managerial origins and offers a theoretically grounded framework for analyzing organizational transformation across economic, social, and environmental contexts. Together, these studies reinforce the use of value offering, creation, and capture as theoretically meaningful constructs that align with the multidimensional nature of business model innovation examined in this essay.

Accordingly, in this study, the BMC serves as a theoretically informed structure for operationalizing business model innovation across its three higher-order dimensions (value offering, value creation, and value capture) which collectively describe the essential processes through which firms translate dynamic capabilities into strategic and financial outcomes.

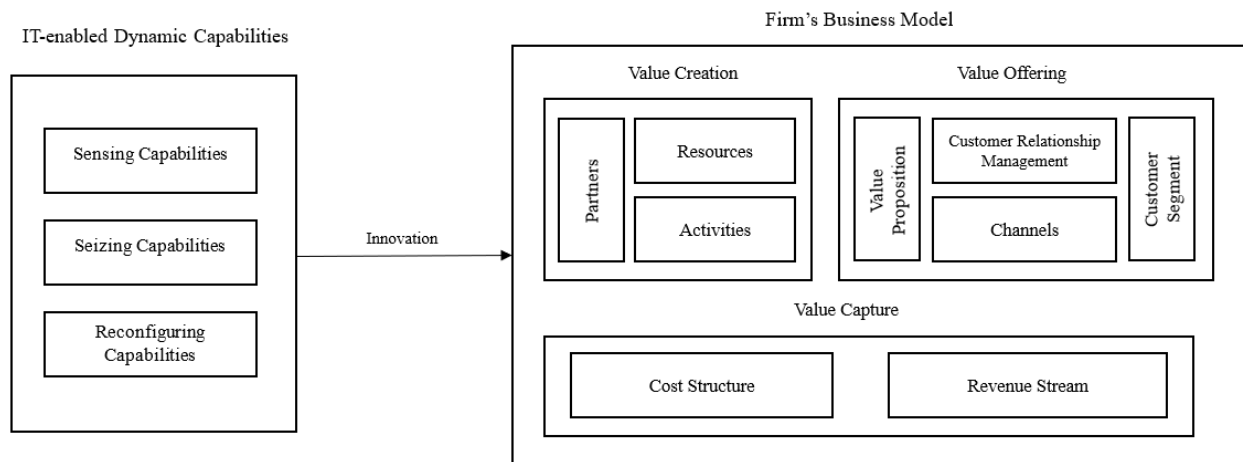


Figure 8: Conceptual Framework Linking IT-Enabled Dynamic Capabilities to Business Model Innovation Dimensions

This conceptualization leads directly to the empirical investigation presented in the following sections, which employ fsQCA to uncover the specific configurations of IT-enabled dynamic capabilities that are sufficient for achieving distinct forms of business model innovation in organizations undergoing digital transformation.

4.4 Methodology and Research Design

This study takes a configurational approach to investigate how different combinations of organizational IT-enabled dynamic capabilities contribute to business model innovation outcomes. Rather than assuming outcomes result from isolated, linear effects, the research is based on the premise that innovation often emerges from interacting conditions, where the presence or absence of certain capabilities may have different implications depending on the broader organizational context (Fiss, 2011; Ragin, 2009). This approach also aligns with the evolving landscape of information systems research, as outlined by Levallet et al. (2020), which highlights the growing adoption of configurational and mixed-method approaches such as fsQCA for capturing causal complexity in IS phenomena. Positioning this study within that broader methodological paradigm underscores its contribution to advancing configurational theorizing in IS by applying it to the relationship between IT-enabled dynamic capabilities and business model innovation (Levallet et al., 2020).

Generally, organizations leverage only a subset of resources and capabilities to achieve innovation and optimal performance due to limitations in available time and financial investment (Barney, 1991; Teece, 2007). This is especially true for small and medium-sized enterprises (SMEs), which typically operate with more constrained resources than large enterprises (Falk & Hagsten, 2015; Lee et al., 2003; Nguyen et al., 2015).

Accordingly, the goal is not to identify a single best path to innovation, but to uncover multiple, equally viable configurations of conditions that lead to BMI outcomes such as value creation, value capture, and value offering. This perspective is particularly relevant when examining complex organizational change driven by digital technologies, where causal asymmetry and equifinality are often observed (Furnari et al., 2021; Misangyi et al., 2017). The complexity of the relationships explored especially the interplay between IT-enabled dynamic capabilities and business model innovation outcomes requires an approach capable of capturing configurational causality. In contrast to methods that are better suited for linear relationships, fuzzy-set Qualitative Comparative Analysis (fsQCA) allows for the identification of multiple, equally valid causal pathways (equifinality) that can lead to similar innovation outcomes.

This approach is also well suited to the research context, where outcomes like value creation, value capture, and value offering are likely influenced by combinations of conditions rather than isolated factors. Additionally, fsQCA enables the distinction between core and peripheral conditions, accounts for causal asymmetry, and reveals how different organizational configurations achieve similar innovation goals. Also, fsQCA fits the relatively smaller sample size of this study and has been increasingly adopted in information systems and management research for its ability to bridge the gap between qualitative and quantitative perspectives (Fiss, 2011; Ragin, 2009).

4.4.1 Data Collection and fsQCA Analytical Procedure

Data for this study were collected through an online survey administered to senior managers and executives across Canadian organizations. The initial focus was on firms operating in supply chain and manufacturing sectors, given their critical role in digital transformation and exposure to IT-enabled innovation pressures. However, to broaden the generalizability of findings, responses from adjacent industries where business model innovation (BMI) and IT-enabled processes play a central role such as retail, distribution, and related service sectors were also included. This approach ensured both sectoral depth and cross-industry variation, which are considered important in configurational analyses (Fiss, 2011; Misangyi et al., 2017).

Participants were recruited mainly through professional networks on LinkedIn, using a snowball sampling strategy. Initial invitations were extended to professional contacts of the research team, who were encouraged to further share the survey within their networks. Snowball sampling has been frequently used in information systems (IS) research to reach specialized respondent groups such as senior executives (Rai & Tang, 2014). To be eligible, participants had to hold managerial or executive positions and possess organizational-level knowledge of IT use and business processes. To ensure the independence of observations, almost every response represented a unique organizational case.

4.4.2 Instrument Development and Pretesting

The survey instrument measured the constructs of dynamic capabilities (sensing, seizing, reconfiguring) and business model innovation outcomes (value offering, value creation, and value capture). Items were developed based on established scales in IS and strategy research (Kump et al., 2019; Mikalef & Pateli, 2017; Pavlou & El Sawy, 2011), adapted to reflect IT-based dynamic capabilities and organizational innovation contexts.

To operationalize Business Model Innovation (BMI), items were developed based on the nine components of the business model framework proposed by Osterwalder and Pigneur (2010): value proposition, customer segments, channels, customer relationships, key activities, key resources, key partnerships, cost structure, and revenue streams. Consistent with prior studies (Clauss, 2017; Foss & Saebi, 2017; Clauss et al., 2019), these components were conceptually grouped into three higher-order dimensions: value offering, value creation, and value capture (to capture distinct yet interrelated aspects of business model renewal). Survey items asked respondents to indicate the extent to which their organizations had introduced significant changes in each of these areas over the past three years, emphasizing innovations enabled or supported by digital technologies. This approach reflects BMI as a multidimensional outcome of organizational transformation rather than a single change event. All constructs were operationalized using five-point Likert scales (1 = strongly disagree, 5 = strongly agree).

The development of the instrument followed a multi-stage pretesting process. First, card sorting was conducted in three iterative rounds with six experts (two academic researchers and four

industry practitioners familiar with the concepts in IS and management). An open sorting procedure was used in the first round to allow experts to classify items into categories they found appropriate. This was followed by closed sorting in subsequent rounds, where items were mapped to predefined constructs. Disagreements were discussed and resolved through mainly refinement of item wording but also a few reallocation or removal of some items. This procedure enhanced content validity and reduced the risk of common biases (Moore & Benbasat, 1991; Venkatesh et al., 2003).

Second, pilot testing was conducted by assessing the reliability of the refined instrument across the expert sample. Cronbach’s alpha values and item-to-construct loadings were examined at this stage. Items with poor loadings were either rephrased or eliminated. This iterative process ensured that each construct displayed satisfactory internal consistency prior to full-scale data collection (Nunnally & Bernstein, 2007).

4.4.3 Measurement Validity

Although the primary analytic method in this essay is fuzzy-set Qualitative Comparative Analysis (fsQCA), the reliability and validity of the measurement instrument were assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM). This step ensures that the constructs used for calibration and configurational analysis meet accepted psychometric standards (Hair et al., 2019).

Reliability was examined through Cronbach’s alpha and Composite Reliability (CR), with all constructs exceeding the recommended threshold of 0.70. Convergent validity was assessed via Average Variance Extracted (AVE), with values above 0.50, and through item loadings, most of which exceeded 0.70. Discriminant validity was confirmed using both the Fornell–Larcker criterion and the HTMT ratio, with all HTMT values below the conservative threshold of 0.85. Finally, Variance Inflation Factor (VIF) values were inspected to rule out multicollinearity, and all values fell well below the commonly accepted cutoff of 5. Results for measurement instrument’s validity and reliability as well as discriminant validity are depicted in table 15 and 16 respectively.

Table 15. Reliability and Convergent Validity of the Measurement Constructs

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Sensing Capabilities	0.841	0.862	0.903	0.757
Seizing Capabilities	0.897	0.900	0.936	0.830
Reconfiguring Capabilities	0.867	0.874	0.919	0.790
Value Offering Innovation	0.776	0.793	0.803	0.364
Value Creation Innovation	0.796	0.790	0.720	0.394
Value Capture Innovation	0.878	0.886	0.917	0.734

Table 16. Discriminant Validity of the Constructs

	Reconfiguring Capabilities	Seizing Capabilities	Sensing Capabilities	Value Capture Innovation	Value Creation Innovation	Value Offering Innovation
Reconfiguring Capabilities						
Seizing Capabilities	0.358					
Sensing Capabilities	0.068	0.343				
Value Capture Innovation	1.009	0.228	0.128			
Value Creation Innovation	0.911	0.597	0.350	0.900		
Value Offering Innovation	0.436	0.997	0.552	0.359	0.667	

As depicted above, reliability and validity checks provided minor mixed results. All constructs demonstrated acceptable internal consistency, with Cronbach’s α and composite reliability values exceeding recommended thresholds. Convergent validity was largely satisfactory, as four of the six constructs achieved AVE values above 0.50. Two outcome constructs, value creation innovation (AVE = 0.394) and value offering innovation (AVE = 0.364) fell below this threshold, indicating weaker convergence. Nevertheless, both were retained due to their strong reliability, their central theoretical relevance, and their established role in BMI research. Discriminant validity was generally supported, although some HTMT ratios (e.g., between reconfiguring and value capture, and between seizing and value offering) exceeded the conventional cutoff of 0.90. This overlap reflects the conceptual proximity of these constructs: reconfiguring is theoretically linked to value capture, and seizing is closely related to value offering. Consistent with prior fsQCA studies, these constructs were retained, and subsequent configurational analysis yielded interpretable and theoretically consistent results. Additional robustness checks, including the removal of lower-loading indicators, did not materially change the measurement results or the subsequent configurational findings.

Together, these assessments confirm that the constructs exhibit satisfactory reliability and validity, providing a sound basis for calibration into fuzzy sets and subsequent configurational analysis.

4.4.4 Full Data Collection

Following these refinements, the final survey was launched online via a google form. To mitigate response bias, the survey emphasized anonymity and required approximately 15-20 minutes to complete. After the cleaning and filtering phase a total of 90 valid responses were collected. Almost each respondent represented a distinct organizational (or in some cases a different unit) case, thereby ensuring sufficient heterogeneity for fuzzy-set Qualitative Comparative Analysis (fsQCA) (Fiss, 2011; Ragin, 2009).

Reliability analyses conducted on the full dataset confirmed acceptable internal consistency for all constructs, with Cronbach’s alpha values exceeding the recommended threshold of 0.70. The final

version of the survey instrument including all items grouped by construct is provided in Appendix A. Survey for DC-BMI Measurement.

To prepare the dataset to be analyzed using the fsQCA method, all constructs were calibrated using the direct method (Ragin, 2008). Following established practices (e.g., Fiss, 2011), we applied the 10th, 50th, and 90th percentiles as anchors for full non-membership, crossover point, and full membership, respectively. Calibration was conducted on the basis of aggregated scores for each construct using the mean of their respective measurement items. Mean aggregation preserves variance among cases while producing stable and interpretable composite scores, which is especially important when dealing with relatively small sample sizes (Mattke et al., 2022). In our case considering the number of items, 90 cases are considered to be relatively moderate to small.

We then generated truth tables for each outcome of interest, applying a consistency threshold of 0.80, which is widely accepted as a benchmark for sufficiency in fsQCA studies (Ragin, 2009; Schneider & Wagemann, 2012). Each row of the truth table represents a unique configuration of causal conditions (the calibrated presence (1) or absence (0) of sensing, seizing, and reconfiguring capabilities) observed across all cases in the dataset. For each configuration, the table reports its consistency (the degree to which cases exhibiting that configuration also exhibit the outcome) and raw coverage (the proportion of the outcome explained by that configuration). Configurations that meet or exceed the established consistency threshold are coded as “1” in the outcome column, indicating that they are considered sufficient for producing the outcome, whereas those below the threshold are coded as “0” and excluded from further analysis (Fiss, 2011; Park et al., 2017). The construction of truth tables is a critical step in fsQCA, as it transforms the calibrated data into a set-theoretic matrix that summarizes all empirically observed combinations of causal conditions and their association with the outcome. This process allows researchers to systematically identify equifinal pathways and serves as the foundation for deriving the intermediate and parsimonious solutions reported in later sections.

Figure 9 below presents an example of the truth table generated for the Value Offering Innovation outcome, illustrating the combinations of conditions, their corresponding consistency and coverage values, and the binary outcome assignments used for subsequent solution derivation (Truth tables for the other 2 outcomes have been mentioned in appendix section).

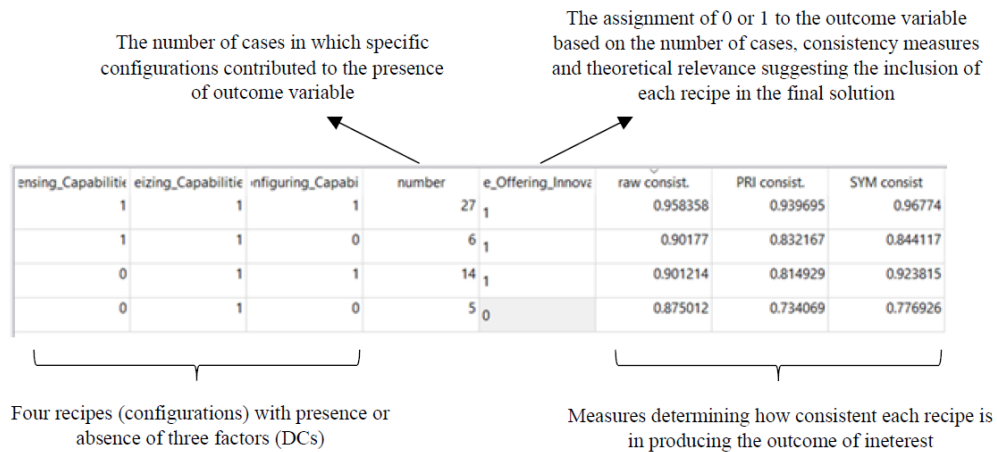


Figure 9: Example of a Truth Table for the Value Offering Innovation Outcome

The assignment of outcome scores for dependent variable (1 = presence, 0 = absence) was based not only on empirical consistency values but also on theoretical relevance as guided by prior literature in information systems and management. Following the practice recommended by Fiss (2011) and further demonstrated in IS research (e.g., Park, El Sawy, & Fiss, 2017), manual calibration decisions were made by considering established theoretical expectations regarding the interplay of IT affordances, dynamic capabilities, and business model innovation. This dual reliance on empirical and theoretical grounds reduces the risk of purely data-driven solutions while ensuring conceptual alignment with prior research.

Three different types of solutions were analyzed: complex, parsimonious, and intermediate solutions. In fsQCA, these solutions differ in how they treat combinations of conditions that do not appear in the data (also known as logical remainders) (Ragin, 2008). The complex solution uses only the observed configurations, making it the most detailed but also the hardest to generalize. The parsimonious solution takes the opposite approach by using all logical remainders to build the simplest possible explanation. The intermediate solution lies between these two, including only those logical remainders that make theoretical sense. Following Fiss (2011), we focused mainly on the intermediate solution because it provides a good balance between empirical accuracy and theoretical interpretability. In this type of solution, core conditions are those that appear in both the parsimonious and intermediate results, while peripheral conditions appear only in the intermediate one.

We used raw and unique coverage to assess the empirical relevance of each configuration. Raw coverage indicates how much of the outcome is explained by a given configuration, while unique coverage reflects the portion of the outcome explained solely by that configuration. In addition, we evaluated consistency, which measures the degree to which cases sharing a specific configuration of conditions also display the outcome (Ragin, 2008; Schneider & Wagemann, 2012). High consistency values indicate that a configuration is reliably associated with the

outcome, similar to how high correlation reflects strong predictive accuracy in variance-based methods (Fiss, 2011). Configurations with raw coverage above 0.10 and consistency above 0.80 were considered both theoretically and empirically meaningful. Borderline configurations were evaluated on a case-by-case basis, with inclusion or exclusion decisions based on their theoretical plausibility and alignment with prior literature on IT-enabled dynamic capabilities and business model innovation as well as consistency measures.

After conducting the fsQCA, a set of configurations were identified for some outcomes of interest. Table 17 (fsQCA Solution Table) summarizes the configurations, indicating which conditions are present (●), absent (⊗), or “don’t care” in each solution (Ragin & Fiss, 2008). We also differentiate between core and peripheral conditions in each configuration by using large symbols for core conditions and small symbols for peripheral ones, as explained in the methodology.

4.4.5 Descriptive Statistics

According to the collected data, participants reflected a cross-section of organizational levels, standardized into four categories. Most respondents (53) were managers or supervisors, followed by 19 technical or specialist professionals, 11 executives or senior leaders, and 7 staff or contributors. This distribution indicates the dataset’s emphasis on managerial perspectives, supported by insights from technical experts and senior decision-makers. The organizations represented also varied in size. Medium-sized firms (50-249 employees) were most common (52), followed by small firms with fewer than 50 employees (26). Larger organizations were less represented, with six respondents from 250-499 employee firms, five from corporations with more than 1,000 employees, and one from a 500-999 employee enterprise.

As for tenure in current roles, the majority of participants had relatively short experience: 45 had one to three years, 21 had less than one year, and 21 had four to six years. Longer-tenure cases were rare, with just one respondent reporting 7-10 years and another more than 10 years. Industry representation was led by manufacturing (32), logistics and transportation (19), retail (15), and import and distribution (11). Smaller contributions came from technology (9) and other sectors (e.g., packaging with 4 respondents).

Taken together, these descriptive statistics highlight that the sample is dominated by SMEs in manufacturing and supply chain industries, with a strong managerial representation and respondents primarily in the early to middle stages of their tenure.

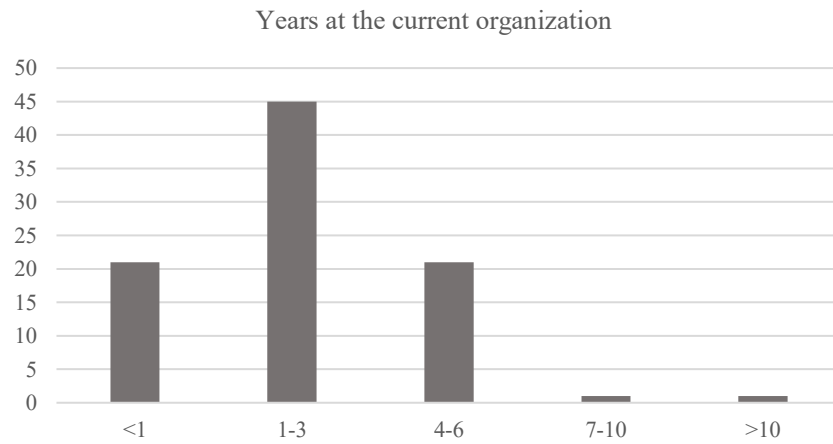
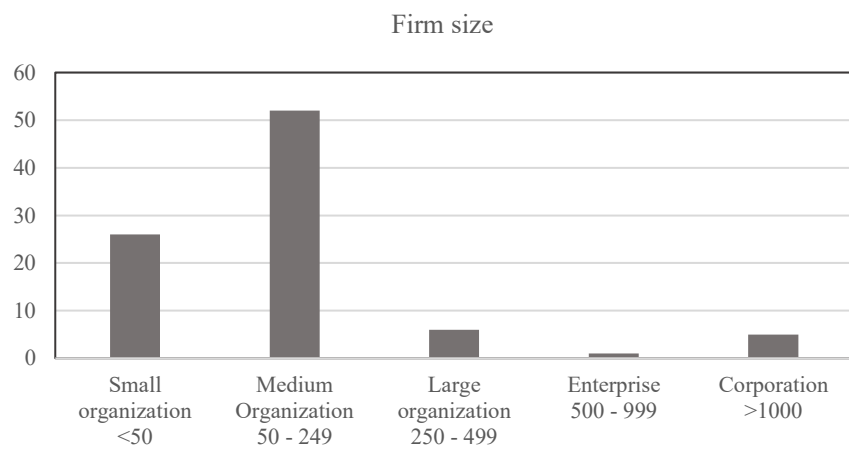
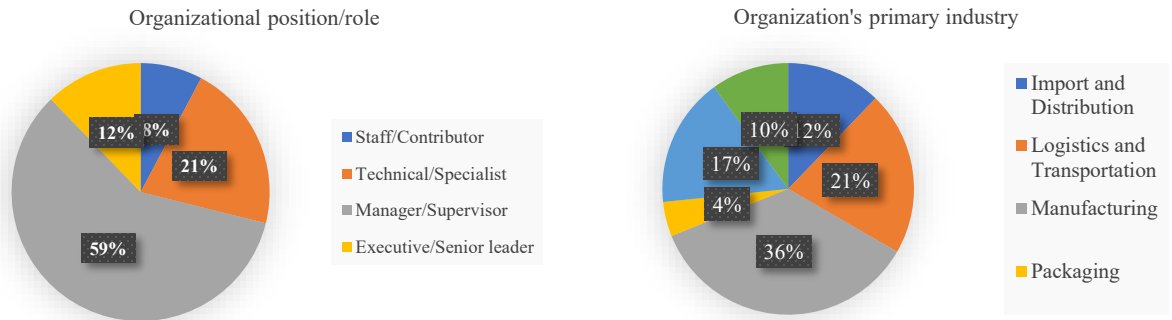


Figure 10: Descriptive statistics

4.5 Results and Findings

In this section, we focus on the configurational recipes for the three main dimensions of a business model: value creation, value offerings, and value capture. In this essay, the independent variables (IVs) are the firm’s dynamic capabilities including sensing, seizing, and reconfiguring while the dependent variables (DVs) are the outcomes of business model innovation (BMI). We examine BMI at two levels of analysis: first, at the higher-order level of its three main dimensions, and second, at the more granular level of the nine components of the business model canvas (e.g., partners, activities, resources, channels, customer relationships, revenue streams). Finally, we compare the results across both levels to determine which approach provides a more meaningful and practical perspective for understanding how dynamic capabilities shape business model innovation.

In the remainder of this study, Business Model Canvas (BMC) terminology is followed (Osterwalder & Pigneur, 2010): offerings (value proposition, customer segments, CRM, channels); creation (partners, activities, resources); and capture (cost structure, revenue streams).

4.5.1 Aggregated BMI categories

For each outcome, we first present the solution (table 17), which reports the configurational pathways identified as sufficient, together with their raw coverage, unique coverage, and consistency values. We then provide an interpretation of these configurations, focusing on their substantive meaning and theoretical implications.

Table 17. fsQCA Results: Dynamic Capability Configurations Leading to Business Model Innovation (aggregated)

Outcome	Solution	Causal conditions			Raw coverage	Unique coverage	Consistency	Solution coverage	Solution consistency
		Sensing capabilities	Seizing capabilities	Reconfiguring capabilities					
Value offering innovation	1a	●	•		0.649	0.140	0.930	0.835	0.897
	1b		•	●	0.659	0.186	0.910		
Value creation innovation	2a	⊗		•	0.470	0.123	0.807	0.803	0.837
	2b		●	•	0.679	0.333	0.854		
Value capture innovation	3a		⊗	•	0.341	0.141	0.950	0.694	0.933
	3b	●		•	0.552	0.352	0.927		

In line with the configurational perspective, the results are interpreted as combinations of conditions rather than isolated causal effects. Each configuration represents a specific set of dynamic capabilities that jointly enables the outcome. Core conditions (●) indicate capabilities that play a central role in the configuration, while peripheral conditions (•) complement the core

elements. Together, these configurations illustrate alternative capability arrangements through which firms can achieve value offering innovation.

Value Offering Innovation (1a; 1b): Two sufficient configurational pathways were identified for value offering innovation, which includes value proposition, customer segments, CRM, and channels.

Configuration 1a: Sensing (● core), Seizing (• peripheral).

Raw coverage: 0.649; Unique coverage: 0.140; Consistency: 0.930.

This pathway suggests that firms can innovate in their value offerings when they are able to sense emerging customer needs and environmental changes, while also seizing opportunities to translate those insights into tangible offerings. Here, the capacity to detect signals in the market acts as the main driver, while resource mobilization plays a complementary role.

Configuration 1b: Reconfiguring (● core), Seizing (• peripheral).

Raw coverage: 0.659; Unique coverage: 0.186; Consistency: 0.910.

This configuration highlights that firms can achieve offering innovation by reconfiguring their internal resources and processes, even without strong sensing capabilities. Reconfiguring provides the flexibility to realign activities with customer expectations, while seizing ensures that mobilized resources are effectively deployed in shaping new value propositions.

Together, these configurations yield a solution coverage of 0.835 and a solution consistency of 0.897. The presence of two distinct configurations illustrates the principle of equifinality, meaning that multiple combinations of dynamic capabilities can lead to the same innovation outcome. Across both solutions, either sensing or reconfiguring emerges as a core driver of value offering innovation, with seizing consistently playing a peripheral role. This indicates two distinct but effective routes: one focused on identifying external opportunities and the other on recombining internal structures. Both confirm the dual importance of exploration and recombination in customer-facing innovations (Teece, 2007; Fiss, 2011).

Value Creation Innovation (2a; 2b): Two sufficient configurational pathways were identified for value creation innovation, which involves partners, activities, and resources.

Configuration 2a: Absence of Sensing (⊗ core), Reconfiguring (• peripheral).

Raw coverage: 0.470; Unique coverage: 0.123; Consistency: 0.807.

This pathway shows that firms can still innovate in value creation without strong sensing capabilities, as long as they focus on recombining and adapting existing resources. It underscores that innovation in core activities and partnerships can be achieved through exploitation and internal adjustments rather than external scanning.

Configuration 2b: Seizing (● core), Reconfiguring (• peripheral).

Raw coverage: 0.679; Unique coverage: 0.333; Consistency: 0.854.

Here, seizing acts as the main driver, supported by reconfiguring. Firms that are able to capture opportunities and align their resources accordingly can develop new activities and partnerships that enhance value creation. This points to the central role of mobilizing and deploying resources effectively.

The two solutions produce a solution coverage of 0.803 and a solution consistency of 0.837. Seizing capabilities emerge as the dominant condition, underscoring the role of resource mobilization in value creation. Sensing plays a limited or even negative role, suggesting that exploitation and deployment often matter more than exploration for creating value in operations and partnerships (Eisenhardt & Martin, 2000; Park & Fiss, 2017). The configurations identified for value creation innovation also illustrate the principle of causal asymmetry, which suggests that the presence and absence of conditions may play different roles in producing an outcome. In other words, the absence of a particular capability does not necessarily mirror the inverse causal process but may instead form part of an alternative pathway leading to innovation.

Value Capture Innovation (3a; 3b): Two sufficient configurational pathways were identified for value capture innovation, which covers cost structures and revenue streams.

Configuration 3a: Absence of Seizing (\otimes core), Reconfiguring (\bullet peripheral).

Raw coverage: 0.341; Unique coverage: 0.141; Consistency: 0.950.

This configuration demonstrates that firms can innovate in value capture mechanisms by focusing on reconfiguring, even when seizing capabilities are absent. Resource recombination alone can enable firms to restructure cost models or revenue streams in ways that enhance financial outcomes.

Configuration 3b: Sensing (\bullet core), Reconfiguring (\bullet core).

Raw coverage: 0.552; Unique coverage: 0.352; Consistency: 0.927.

In this pathway, sensing and reconfiguring jointly drive value capture innovation. Firms that can identify changes in market conditions and reconfigure resources accordingly are more likely to generate new approaches to pricing, revenue generation, or cost management.

Together, these pathways yield a solution coverage of 0.694 and a solution consistency of 0.933. Reconfiguring consistently emerges as the critical condition for value capture innovation, appearing in both pathways, either alone or in combination with sensing. This reinforces the theoretical view that resource recombination is central to sustaining profitability and adapting cost and revenue models under dynamic conditions (Teece et al., 1997; Warner & Wäger, 2018).

The configurational results highlight the complex nature of the relationships between dynamic capabilities and business model innovation. Rather than relying on a single dominant capability, the findings indicate that innovation outcomes emerge from specific combinations of capabilities.

This reflects the principle of causal complexity in configurational research, where outcomes are produced through interacting conditions rather than isolated effects. In addition, the presence of multiple valid configurations illustrates equifinality, suggesting that firms may achieve similar innovation outcomes through different capability arrangements. Some capability conditions also appear across multiple configurations, indicating that certain dynamic capabilities may function as important enabling elements within different innovation pathways.

4.5.2 Disaggregated BMC Components

Analyzing BMI at the level of the nine BMC components complements the three broader BMI dimensions by showing how and why specific dynamic capabilities combine to influence distinct building blocks of a business model. While the three categories capture the overarching logics of value creation, offering, and capture, the component-level view sharpens our understanding by revealing exactly which parts of the business model each capability configuration affects. This dual perspective increases both the explanatory power of the analysis and its practical relevance for managers seeking targeted levers of change.

In the following section, we present the solution table (table 18) for the nine components of the business model canvas. Also, each identified pathway is briefly interpreted to highlight its substantive meaning and implications.

Table 18. fsQCA Results: Dynamic Capability Configurations Leading to Business Model Innovation (disaggregated components)

Outcome	Solution	Causal conditions			Raw coverage	Unique coverage	Consistency	Solution coverage	Solution consistency
		Sensing capabilities	Seizing capabilities	Reconfiguring capabilities					
Value proposition	1d	●	•		0.658	0.142	0.875	0.853	0.850
	2d		•	●	0.710	0.194	0.863		
Customer segments	1e	●	•		0.619	0.132	0.909	0.816	0.898
	2e		•	●	0.683	0.197	0.916		
CRM	1f	•	●	⊗	0.292	0.202	0.861	0.395	0.840
	2f	•	⊗	●	0.192	0.103	0.811		
Channels	1g		●	•	0.603	0.603	0.734	0.603	0.734
Partners	1h		•	●	0.684	0.684	0.875	0.684	0.875
Activities	1i	⊗		•	0.510	0.137	0.892	0.831	0.883
	2i		●	•	0.694	0.321	0.888		
Resources	1j		⊗	●	0.338	0.142	0.883	0.671	0.847
	2j	•		●	0.529	0.332	0.834		

Cost structure	1k	⊗		•	0.492	0.138	0.903	0.771	0.849
	2k		●	•	0.637	0.273	0.839		
Revenue streams	1l		⊗	•	0.348	0.141	0.931	0.707	0.914
	2l	●		•	0.565	0.358	0.913		

Value Proposition (1d; 2d): Two sufficient pathways were identified for value proposition innovation.

Configuration 1d: Sensing (● core), Seizing (• peripheral).

Raw coverage: 0.658; Unique coverage: 0.142; Consistency: 0.875.

Firms with strong sensing capabilities can anticipate changes in customer needs and competitor moves, while seizing ensures that identified opportunities are converted into actionable value propositions.

Configuration 2d: Reconfiguring (● core), Seizing (• peripheral).

Raw coverage: 0.710; Unique coverage: 0.194; Consistency: 0.863.

Here, firms focus on restructuring resources and processes, supported by seizing to mobilize them effectively.

Together, these pathways yield a solution coverage of 0.853 and a solution consistency of 0.850. Either sensing or reconfiguring consistently emerges as the critical driver of value proposition innovation, always supported by seizing. This underlines that firms can either detect new opportunities or realign internal resources to shape compelling value propositions (Teece, 2007; Fiss, 2011). These results align closely with those for value offering innovation, which is expected since the value proposition constitutes a central element of customer-facing innovation.

Customer Segments (1e; 2e): Two sufficient pathways were found for customer segment innovation.

Configuration 1e: Sensing (● core), Seizing (• peripheral).

Raw coverage: 0.619; Unique coverage: 0.132; Consistency: 0.909.

Firms identify new customer segments by sensing unmet needs or emerging markets, while seizing enables them to mobilize resources to address those segments.

Configuration 2e: Reconfiguring (● core), Seizing (• peripheral).

Raw coverage: 0.683; Unique coverage: 0.197; Consistency: 0.916.

Firms can also reach new customer groups by realigning and reconfiguring internal operations.

Together, these pathways yield a solution coverage of 0.816 and a solution consistency of 0.898. Customer segment innovation can be achieved either through sensing external needs or through reconfiguring internal structures, with seizing providing consistent support in both approaches (Warner & Wäger, 2019). These pathways mirror those found for value offering innovation, confirming that both value propositions and customer segments are tightly interlinked in shaping how firms approach markets.

CRM (1f; 2f): Two pathways were identified for CRM innovation.

Configuration 1f: Sensing (• peripheral), Seizing (● core), Absence of Reconfiguring (⊗ core).

Raw coverage: 0.292; Unique coverage: 0.202; Consistency: 0.861.

Firms improve CRM practices by sensing customer signals and acting decisively, even without strong reconfiguring capabilities.

Configuration 2f: Sensing (• peripheral), Reconfiguring (• peripheral), Absence of Seizing (⊗ core).

Raw coverage: 0.192; Unique coverage: 0.103; Consistency: 0.811.

Firms can also enhance CRM by combining sensing with resource reconfiguration, even without seizing.

Together, these pathways yield a solution coverage of 0.395 and a solution consistency of 0.840. CRM innovation does not appear to depend on a single dominant capability but rather on flexible mixes of sensing, seizing, and reconfiguring, consistent with the view that customer management practices are highly context dependent (Fiss, 2011).

Channels (1g): One pathway was identified for channel innovation.

Configuration 1g: Sensing (● core), Seizing (• peripheral), Reconfiguring (• peripheral).

Raw coverage: 0.603; Unique coverage: 0.603; Consistency: 0.734.

Channel innovation is driven by sensing, supported by seizing and reconfiguring, confirming that external awareness is essential for identifying and exploiting new delivery mechanisms (Teece, 2007).

Partners (1h): One sufficient configuration was identified for partnerships.

Configuration 1h: Seizing (• peripheral), Reconfiguring (● core).

Raw coverage: 0.684; Unique coverage: 0.684; Consistency: 0.875.

Reconfiguring emerges as the central driver of partnership innovation, reinforcing the importance of reshaping interorganizational arrangements to maintain adaptability (Warner & Wäger, 2019).

This pattern is similar to value creation innovation, as both activities and partnerships reflect structural aspects of how firms generate value.

Key Process/Activities (1i; 2i): Two pathways were identified for activities innovation.

Configuration 1i: Absence of Sensing (⊗ core), Reconfiguring (• peripheral).

Raw coverage: 0.510; Unique coverage: 0.137; Consistency: 0.892.

Firms can innovate in activities by focusing on reconfiguring, even without strong sensing.

Configuration 2i: Sensing (• core), Seizing (• peripheral), Reconfiguring (• peripheral).

Raw coverage: 0.694; Unique coverage: 0.321; Consistency: 0.888.

Firms can also redesign activities when sensing is combined with seizing and reconfiguring.

These pathways yield a solution coverage of 0.831 and a solution consistency of 0.883. Activities can be innovated through multiple viable combinations of capabilities, reflecting strong equifinality in process-level change (Eisenhardt & Martin, 2000).

Key Resources (1j; 2j): Two sufficient pathways were identified for resource innovation.

Configuration 1j: Absence of Seizing (⊗ core), Reconfiguring (• peripheral).

Raw coverage: 0.338; Unique coverage: 0.142; Consistency: 0.883.

Firms can restructure their resource base primarily through reconfiguring, even without actively mobilizing opportunities.

Configuration 2j: Sensing (• peripheral), Reconfiguring (• peripheral).

Raw coverage: 0.529; Unique coverage: 0.332; Consistency: 0.834.

Firms also innovate resources when they combine environmental awareness with restructuring.

Together, these pathways yield a solution coverage of 0.671 and a solution consistency of 0.847. Resource innovation consistently depends on reconfiguring, supported at times by sensing, aligning with views of resources as dynamic rather than static assets.

Cost Structure (1k; 2k): Two sufficient pathways were identified for cost structure innovation.

Configuration 1k: Absence of Sensing (⊗ core), Reconfiguring (• peripheral).

Raw coverage: 0.492; Unique coverage: 0.138; Consistency: 0.903.

Firms may achieve cost efficiency by reconfiguring processes and resources, even without external scanning.

Configuration 2k: Seizing (• peripheral), Reconfiguring (• peripheral).

Raw coverage: 0.637; Unique coverage: 0.273; Consistency: 0.839.

Firms can also achieve cost innovation by mobilizing resources alongside reconfiguring.

Together, these pathways yield a solution coverage of 0.771 and a solution consistency of 0.849. Reconfiguring is the consistent driver of cost innovation, supporting firms' ability to realign cost structures with changing conditions (Warner & Wäger, 2019).

Revenue Streams (11; 21): Two sufficient pathways were identified for revenue streams innovation.

Configuration 11: Absence of Sensing (\otimes core), Reconfiguring (\bullet peripheral).

Raw coverage: 0.348; Unique coverage: 0.141; Consistency: 0.931.

New revenue models can emerge from resource reconfiguration even when sensing is weak.

Configuration 21: Sensing (\bullet core), Reconfiguring (\bullet core).

Raw coverage: 0.565; Unique coverage: 0.358; Consistency: 0.913.

Combining sensing with reconfiguring enables firms to anticipate shifts and redesign revenue mechanisms.

Together, these pathways yield a solution coverage of 0.707 and a solution consistency of 0.914. Reconfiguring is consistently central to revenue innovation, either alone or paired with sensing, reinforcing its role in enabling financial adaptation under uncertainty (Cristofaro et al., 2025; Ruiz-Ortega et al., 2024; Teece et al., 1997). These findings resemble those for value capture innovation, where reconfiguring also plays a central role, reinforcing the idea that cost structures and revenue streams are shaped by similar capability configurations.

4.6 Theoretical Implications

The implications discussed in this section directly address the central research question of this essay that is which combinations of IT-enabled dynamic capabilities enable firms to achieve distinct forms of business model innovation and extend the theoretical discussions introduced earlier in the paper.

Equifinality in the Relationship between DCs and BMI

The fsQCA results demonstrate that firms can achieve business model innovation (BMI) through multiple, equally effective combinations of dynamic capabilities (DCs) rather than a single dominant pathway. In other words, organizations can reach similar innovation outcomes such as changes in value offering, value creation, or value capture by leveraging different bundles of sensing, seizing, and reconfiguring capabilities depending on their context and strategic orientation. This highlights the equifinal nature of the DC–BMI relationship, where distinct capability configurations can produce comparable results. Such findings resonate with prior

configurational studies in strategic management and information systems. For instance, Fiss (2011) identified several alternative capability combinations leading to high firm performance, while recent research on strategic agility has also shown that firms may achieve agility through various mixes of organizational factors, with no single condition being universally necessary. Consistent with these studies, our results confirm that the pathway to BMI is configuration-dependent different capability bundles can lead to innovation success depending on how firms orchestrate and balance their IT-enabled dynamic capabilities.

Dynamic Capabilities Across BMI Dimensions

The fsQCA findings provide strong support for the argument that business model innovation (BMI) is enabled by configurations of dynamic capabilities (DCs) rather than any single capability acting in isolation. What emerges is a nuanced picture where the relative importance of sensing, seizing, and reconfiguring shifts depending on which dimension of the business model is being innovated. This reinforces the configurational logic in strategy (Fiss, 2011; Ragin, 2008), where causation is conjunctural, asymmetric, and equifinal. Moreover, as Schilke et al. (2018) argue, the effects of capabilities also vary temporally they may matter at different phases of transformation. Our results echo this, suggesting that managers should not only ask “which capability?” but also “when?”.

The Value of Component-Level Analysis

While analyzing BMI at the level of its three main dimensions (value creation, value offering, and value capture) provides a parsimonious and conceptually clear perspective, our study also demonstrates the added value of examining the nine components of the business model canvas individually (Osterwalder & Pigneur, 2010; Clauss, 2017). At the component level, we observed more granular configurational patterns that either reinforce or nuance the higher-order findings (Foss & Saebi, 2017; Wirtz et al., 2016). For example, the results for value proposition and customer segments closely mirror those for value offering innovation, while the results for partners and activities are aligned with value creation. Similarly, cost structures and revenue streams follow patterns consistent with value capture.

This disaggregation highlights that BMI is not uniformly driven by one set of capabilities; instead, different bundles of dynamic capabilities shape specific business model elements in distinct ways. From a theoretical standpoint, this adds resolution to the DC–BMI linkage by clarifying which capability bundles matter most for which specific building blocks. From a managerial standpoint, the component-level insights are highly actionable, pointing executives toward targeted interventions (e.g., reconfiguring for cost and revenue models, sensing for customer-facing elements) rather than treating BMI as a monolithic construct (Bocken et al., 2014).

4.7 Practical and Managerial Implications

Building on these theoretical contributions, the following section connects the configurational findings to practical considerations for managers seeking to leverage IT-enabled dynamic capabilities to drive business model innovation and improved organizational performance.

Value Offering and Delivery Innovation

In terms of value offering and delivery innovation, the consistent presence of Seizing in all sufficient paths highlights that changing “what” a firm offers customers requires decisive action and resource commitment. This resonates with Teece’s (2007) view that opportunities identified through sensing must ultimately be actualized to matter. According to the results, firms can reach new or significantly improved value offerings through two distinct logics: 1- A pull approach or market oriented logic, where sensing feeds into seizing, consistent with explorative innovation. 2- A push mindset or internally adaptive logic, where seizing combines with reconfiguring, suggesting that even without superior foresight, firms can pivot offerings through structural flexibility (Eisenhardt & Martin, 2000; O’Reilly III & Tushman, 2013).

From a practical standpoint, this distinction implies that managers can deliberately choose between an outside-in strategy (scanning markets before acting) or an inside-out strategy (pivoting existing resources). Both can succeed, but they require clarity of intent and aligned organizational support.

This distinction suggests that BMI in value propositions is not exclusively tied to visionary sensing capabilities of a firm but rather the ability to reconfigure internal assets can make up for weak sensing, depending on that firms possess the willingness to seize. Theoretically, this highlights the non-linear and substitutable roles of DCs: a capability like sensing is vital in some contexts, dispensable in others, depending on the bundle it is combined with (Schilke et al., 2018; Wilden et al., 2016). Managers should therefore avoid over-investing in “perfect” sensing if their strength lies in rapid reconfiguration and decisive seizing.

Value Creation Innovation

When it comes to innovating value creation systems, Reconfiguring is the essential capability. Unlike value offerings, where sensing or reconfiguring act as the core conditions in each recipe, innovating activities, resources, or partnerships requires the capacity to redesign internal architectures. This finding supports Warner and Wäger’s (2019) emphasis on organizational agility and continuous renewal as the backbone of digital and business model transformation. It also resonates with ambidexterity research (O’Reilly & Tushman, 2013), which stresses that firms must continually rebalance exploration and exploitation by reshaping internal architectures (Wilden et al., 2013).

Moreover, the absence of sensing in one path points to an important insight that not all innovation is opportunity-driven. Some firms innovate value creation reactively, through internal discovery, efficiency pressures, or crisis, rather than proactive scanning (Kraus et al., 2020; Rindova & Kotha,

2001). This challenges linear models of DCs that emphasize sensing as the “first step” and aligns with Helfat & Peteraf’s (2015) argument that managerial cognition and learning can also trigger change. Thus, BMI can emerge from internal reconfiguration without strong external sensing a finding that adds nuance to traditional sequencing assumptions of sensing → seizing → reconfiguring (Pavlou & El Sawy, 2011). For managers, this highlights that effective innovation does not always demand heavy investments in market foresight internal pressures and adaptive learning can suffice to trigger transformation.

Value Capture Innovation

The value capture dimension highlights perhaps the most striking case of causal asymmetry. One successful configuration explicitly involves the absence of seizing, yet firms still innovated in revenue and cost models through reconfiguration (Bock et al., 2012; Clauss, 2017). This shows that innovating “how” value is captured does not always demand new investments or external opportunity pursuit; it can stem from creative recombination of existing assets (e.g., pricing model shifts, cost restructuring). Managers in resource-constrained contexts may find this particularly relevant: cost innovation can be pursued through restructuring rather than market-seeking (Amit & Zott, 2012).

At the same time, another path combines sensing with reconfiguring, showing that firms can also innovate their profit formula by perceiving new monetization opportunities in the environment (Massa et al., 2017). Together, these paths map onto the two primary theoretical logics of profitability: cost efficiency versus revenue expansion. Both require reconfiguring, but one relies on internal resource recombination, while the other depends on external sensing. This reinforces that dynamic capabilities enable not just product or process innovation, but conceptual reframing of value logic (Sosna et al., 2010; Teece, 2018).

Overall, both the theoretical and managerial implications reaffirm the central premise of this essay: that IT-enabled dynamic capabilities shape business model innovation not through isolated effects but through equifinal combinations that explain how firms create, deliver, and capture value in digitally transforming environments.

4.8 Contributions to the IS and Management Literature

Building on the theoretical patterns identified earlier, this section discusses how the findings contribute to ongoing debates about dynamic capabilities, business model innovation, and organizational ambidexterity.

One of the key theoretical insights emerging from this study concerns how dynamic capabilities relate to the dual innovation orientations of exploration and exploitation within organizations. Insight from these results suggest that, in the dynamic capabilities framework, each capability can be broadly associated with distinct innovation orientations. Sensing capabilities are most closely aligned with explorative innovation, as they involve scanning the external environment,

identifying emerging trends, and recognizing new opportunities (Lichtenthaler & Lichtenthaler, 2009; Teece, 2007). Exploration focuses on experimentation, novelty, and the pursuit of untested possibilities, and sensing provides the necessary informational foundation for these activities. Firms with strong sensing capabilities are better equipped to detect shifts in market needs, technological advancements, or competitive landscapes which positions them to initiate exploratory moves (Jansen et al., 2006; Zhou & Li, 2012).

In contrast, seizing capabilities are more strongly linked to exploitative innovation. Seizing focuses on mobilizing resources, making strategic commitments, and scaling proven opportunities to generate value. While exploration identifies “to be,” exploitation concentrates on “as is” by refining existing products, processes, and business models. In this sense, seizing is about realizing returns from prior discoveries and optimizing established paths rather than entering into entirely new territory (Benner & Tushman, 2003; He & Wong, 2004; Raisch et al., 2009).

Reconfiguring capabilities, however, present a more complex position. Rather than fitting neatly into either the explorative or exploitative category, reconfiguring serves as a bridge between the two. Reconfiguring involves reshaping and re-aligning the firm’s resource base to adapt to changing conditions, enabling the organization to pivot between exploration and exploitation as needed (Gibson & Birkinshaw, 2004; O’Reilly III & Tushman, 2013). This capability supports organizational ambidexterity, ensuring that a firm can shift its strategic posture leveraging existing strengths when conditions favor exploitation, or reallocating resources toward novel opportunities when exploration becomes necessary. In this sense, reconfiguring embodies adaptability, allowing firms to navigate dynamic environments without being locked into a single mode of innovation (Wilden et al., 2013).

From this perspective, the interplay of sensing, seizing, and reconfiguring capabilities can be seen as a dynamic cycle rather than a static division of roles (Peteraf et al., 2013). Sensing initiates the search for opportunities, seizing transforms selected opportunities into value, and reconfiguring ensures that the resource configuration remains aligned with strategic priorities. Understanding these relationships provides a stronger theoretical basis for interpreting the fsQCA results, particularly when evaluating how different configurations of these capabilities contribute to diverse innovation outcomes across the dimensions of business model innovation. This supports the idea of sequential ambidexterity (O’Reilly & Tushman, 2013), where firms cycle between exploration and exploitation rather than pursue both simultaneously (Birkinshaw & Gupta, 2013; Simsek, 2009).

Overall, these results suggest that simultaneously harnessing and applying both explorative and exploitative innovation appears to be nearly impossible for most organizations (Raisch et al., 2009). This may be because the alignment of systems and organizational culture with one of these approaches tends to shape the overall mindset of the organization toward either exploration or exploitation. In other words, an organization that has been conditioned to follow one of these mindsets may struggle to act otherwise particularly when it comes to translating that mindset into

meaningful performance outcomes that require deliberate and coherent action (He & Wong, 2004). Alternatively, this selective approach to innovation could also stem from the practical limitations of investing in both strategies at the same time. For managers, this means that focusing on sequential ambidexterity alternating between modes may be more realistic than attempting simultaneous ambidexterity (Birkinshaw & Gupta, 2013; Raisch et al., 2009).

In addition to the configurational recipes for BMI, several other broader insights also emerge from this study. Firstly, the results show that weaknesses in one DC can be offset by strengths in another. Lack of sensing can be compensated by strong reconfiguring; lack of seizing can be compensated by sensing plus reconfiguring. This confirms the configurational view that DCs interact in substitutive ways, enriching the microfoundations perspective (Helfat & Peteraf, 2015). Secondly, multiple distinct recipes support each BMI dimension. This aligns with the idea that there is no “one best way” to innovate business models. Firms may reach similar outcomes through exploratory, externally driven strategies or exploitative, internally adaptive strategies both justifiable depending on context.

Another point that is worthy to mention concerns the linear sequencing of DCs. Classical models often depict DCs as a sequence (sense → seize → reconfigure). Our findings somehow contrast this, showing that BMI can emerge from different entry points: sometimes sensing and reconfiguring separately pair with seizing (value offering), sometimes reconfiguring occurs without sensing (value creation), and sometimes sensing + reconfiguring suffice without seizing (value capture). This points to a more modular and flexible application of DCs than linear process models suggest. This finding also illustrates what Mattke et al. (2022) describe as the complementary value of QCA in IS research: by revealing asymmetric and equifinal causal paths, configurational approaches uncover forms of causation that variance-based methods often obscure. For DC–BMI research, this suggests that relying exclusively on regression or SEM risks oversimplifying how capabilities combine in practice.

An additional consideration concerns the potential sensitivity of configurational results to sample size. fsQCA is particularly suitable for small-to-medium samples; however, the configurations identified in this study may evolve as the number of observations increases. With a larger sample, additional combinations of dynamic capabilities may emerge, potentially revealing new pathways to business model innovation or altering the relative importance of specific conditions. While the current results provide valuable insights into how sensing, seizing, and reconfiguring capabilities interact to produce innovation outcomes, future research using larger datasets could further validate and refine the identified configurations. Such studies may help assess the stability of the observed causal patterns and explore whether alternative capability combinations become salient across broader organizational contexts.

From a managerial perspective, these findings suggest that leaders should carefully map their firm’s capability profile to identify whether bundles of DCs can substitute for one another. Rather than overinvesting in all three capabilities simultaneously, firms may achieve BMI by strategically

leveraging their strongest bundles. This reduces wasteful capability-building and aligns innovation strategies with contextual realities such as turbulence, resource availability, or crisis pressures.

4.8.1 *Synthesizing the Configurational Findings*

To synthesize the configurational insights discussed above, this section summarizes the key patterns derived from the fsQCA results as a set of theoretical propositions. These propositions directly reflect the equifinal and asymmetric configurations identified across the dimensions of business model innovation and extend the contribution of this study to the IS and management literature.

Table 19. Theoretical Propositions Derived from Configurational Analysis

BMI Dimension	Proposition
Value Offering Innovation	Proposition 1: In the presence of either strong sensing or reconfiguring capabilities (core) with weak seizing capabilities (peripheral), or reconfiguring (core) with seizing (peripheral), value offering innovation was observed.
Value Creation Innovation	Proposition 2: In the presence of strong seizing capabilities (core) supported by weak reconfiguring capabilities (peripheral) value creation innovation was observed, while sensing capabilities were not required.
Value Capture Innovation	Proposition 3: In the presence of strong reconfiguring capabilities (core) either alone or in combination with weak sensing capabilities, and sometimes in the absence of seizing capabilities, value capture innovation was observed.
BMC Component Level	Proposition 4: At the component level, innovation in customer-facing elements especially value proposition and customer segments was most strongly associated with sensing capabilities, innovation in structural and value creation elements (partners, activities, resources) with seizing capabilities, and innovation in elements related to financial performance (costs, revenues) with reconfiguring supported by sensing capabilities.

These results confirm that there is no “one best way” to achieve BMI; instead, firms rely on equifinal and asymmetric bundles of capabilities. Weakness in one capability (e.g., sensing) can be compensated by strength in another (e.g., reconfiguring), and the required bundle shifts depending on which business model element is being innovated. This configurational view advances both theory and practice by moving beyond linear cause-effect models to show which combinations work, under what circumstances, and for which BMI outcomes.

4.9 Conclusion and Limitations

This study aims to not only explore the different configurational pathways through which IT-enabled dynamic capabilities shape business model innovation (BMI), but also to ask how BMI itself should best be measured as a single overarching construct, as three outcome dimensions (offering/delivery, creation, capture), or as a more granular set of nine business model components. In particular, the study considered whether grouping the nine components into the three broader

categories of value offering/delivery, creation, and value capture offers a meaningful and valid way to represent BMI.

The results show the value of using a configurational approach for questions of this kind. By applying fsQCA, the study highlights that innovation does not follow one universal route but can be achieved through different combinations of dynamic capabilities depending on the context. This not only echoes prior work on equifinality but also adds weight to the argument that causal processes in strategy and IS are best seen as conjunctural, asymmetric, and path-dependent. At the same time, comparing BMI at the aggregated and disaggregated levels illustrates both the benefits and trade-offs of different ways of operationalizing this complex construct.

The findings also add more insight to how dynamic capabilities are understood. Instead of unfolding in a fixed sequence of sensing, seizing, and reconfiguring, the evidence suggests that these capabilities can substitute for one another, or come together in different bundles, to enable innovation. This more flexible view opens the door for future research on when and how particular capability configurations emerge, and how they change over time. Longitudinal studies, cross-industry comparisons, or combining configurational methods with variance-based ones could further enrich these findings.

Lastly, the study makes clear that business model innovation is not a uniform process. Looking at value offering/delivery, creation, and capture separately while also recognizing their interdependencies provides a more realistic big picture of how firms actually innovate. Future research could extend this by examining how digital technologies and IT affordances interact with dynamic capabilities in each of these areas, and by studying the organizational settings that allow firms to switch between different pathways as conditions change.

While these findings provide meaningful theoretical and empirical insights, the study also has several limitations that should be acknowledged. The analysis relies on cross-sectional data, which limits inferences about how dynamic capability configurations evolve over time. Longitudinal research could clarify these temporal dynamics. In addition, the sample is restricted to Canadian firms, so the findings should be interpreted with caution when generalizing to other institutional or cultural settings. Finally, the calibration thresholds and construct groupings, though grounded in theory, involve researcher judgment that future studies could refine using alternative operationalizations or robustness checks. Another potential limitation concerns the operationalization of business model innovation using the building blocks of the Business Model Canvas. While this approach offers conceptual richness and alignment with practice, it is not yet a widely established measurement approach in empirical research, which may limit direct comparability with prior studies. Recognizing these limitations provides direction for future research and situates the current study as a basis for continued exploration of IT-enabled dynamic capabilities and business model innovation.

In short, this essay shows that a configurational and multidimensional perspective can sharpen our understanding of how IT-enabled capabilities drive business model change in dynamic

environments. Overall, the findings of this essay demonstrate that business model innovation emerges from specific combinations of dynamic capabilities rather than from the independent effect of individual capabilities. By identifying multiple configurational pathways linking sensing, seizing, and reconfiguring capabilities to different dimensions of business model innovation, the study highlights the complex and multifaceted nature of organizational adaptation. These results complement the previous essay, which examined how IT affordances contribute to the development of dynamic capabilities, and together they provide a more comprehensive understanding of how technology-enabled capabilities translate into concrete innovation outcomes at the business model level.

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4.11 Appendix

Table 20. Survey Instrument

		Outer loadings
IT-enabled Dynamic Capabilities		
Sensing Capabilities		
SEN_Q1	IT enables our organization to scan the environment and identify new business opportunities and customer needs.	0.836
SEN_Q2	Our IT enhances our ability to anticipate changes in the business domain through reactive and proactive measures.	0.903
SEN_Q3	Our IT has helped us in implementing ideas for new products and improving existing products or services	0.873
Seizing Capabilities		
SEI_Q1	Our IT system provides us with the capability to identify, evaluate, and import new information and knowledge.	0.924
SEI_Q1	As a result of using IT systems, our organization has the capacity to aggregate relevant information from business partners, suppliers and customers. (e.g. operating information, business customer performance).	0.928
SEI_Q1	Through our IT, we are prepared to transform existing information into accumulated knowledge and use it in decision-making processes.	0.88
Reconfiguring Capabilities		
REC_Q1	Thanks to our IT system, we are capable of making adjustments to business processes in cases of priority shifts and unexpected changes.	0.888
REC_Q2	Our IT system enables us to be capable of reconfiguring processes, adding or removing business partners as needed to develop new productive assets.	0.897
REC_Q3	Our IT systems have enabled us to seamlessly add an eligible new partner or remove ones that we have terminated our partnership	0.881
Business Model Innovation		
Value offering		
PROP_Q1	We regularly address new, unmet customer needs.	0.834
PROP_Q2	Our products or services are very innovative in relation to our competitors.	0.795
CUS_Q1	We regularly take opportunities that arise in new or growing markets.	0.718
CUS_Q1	We are constantly seeking new customer segments and markets for our products and services.	0.864
CRM_Q1	We emphasized innovative/modern actions to increase customer retention (e.g. CRM).	0.887
CRM_Q2	We recently took many actions in order to strengthen customer relationships.	0.726
CHA_Q1	We regularly utilize new distribution channels for our products and services.	0.468
CHA_Q2	We consistently change our portfolio of distribution channels.	0.744
Value creation		
PAR_Q1	We regularly evaluate the potential benefits of outsourcing or opportunities that arise from integration of new partners into our processes.	0.905
PAR_Q2	Our organization is constantly searching for new collaboration partners than can help us to further develop our business model.	0.901

ACT_Q1	Existing processes in our organization are regularly assessed and significantly changed if needed.	0.696
ACT_Q2	We utilize innovative procedures and processes during the manufacturing of our products or providing our service.	0.773
RES_Q1	Relative to our competitors our technical equipment is very innovative.	0.704
RES_Q2	We regularly utilize new technical opportunities in order to extend our product and service portfolio.	0.826
Value Capture		
COS_Q1	Our production costs are constantly examined and if necessary, amended according to market prices.	0.790
COS_Q2	We regularly utilize opportunities which arise through price-quantity strategy and price differentiation.	0.838
REV_Q1	We regularly utilize opportunities which arise through price-quantity strategy and price differentiation.	0.885
REV_Q1	We recently complemented or replaced one-time transaction revenues	0.908

Table 21. Truth table for Value Offering Innovation

ensing_Capabilitie	eizing_Capabilitie	nfiguring_Capabi	number	e_Offering_Innova	raw consist.	PRI consist.	SYM consist
1	1	1	27	1	0.958358	0.939695	0.96774
1	1	0	6	1	0.90177	0.832167	0.844117
0	1	1	14	1	0.901214	0.814929	0.923815
0	1	0	5	0	0.875012	0.734069	0.776926

Table 22. Truth table for Value Creation Innovation

ensing_Capabilitie	eizing_Capabilitie	nfiguring_Capabi	number	e_Creation_Innova	raw consist.	PRI consist.	SYM consist
1	1	1	27	1	0.936941	0.904967	0.93606
1	0	1	5	0	0.851591	0.690141	0.694741
0	0	1	11	1	0.837727	0.663123	0.77844
0	1	1	14	1	0.826858	0.625359	0.756907

Table 23: Truth table for Value Capture Innovation

ensing_Capabilitie	eizing_Capabilitie	nfiguring_Capabi	number	e_Capture_Innova	raw consist.	PRI consist.	SYM consist
1	1	1	27 (47%)	1	0.928118	0.892308	0.96164
0	1	1	14 (71%)	1	0.92271	0.87029	0.905376
0	0	1	11 (91%)	1	0.942441	0.910779	0.911896
1	0	1	5 (100%)	0	0.945417	0.90181	0.904512

Chapter 5. General Discussion and Conclusion

5.1 Thesis Theoretical Contributions

This dissertation contributes to the information systems and management literature by advancing an integrative theory of how organizational IT affordances shape dynamic capabilities (DCs) and how configurations of these capabilities drive business model innovation (BMI). Collectively, the three essays build a coherent Affordance–Capability–Innovation framework that clarifies foundational constructs, refines their relationships, and demonstrates their configurational interplay in digitally transforming firms (Hess et al., 2020; Karimi & Walter, 2021; Teece, 2018; Vial, 2021).

5.1.1 Reframing IT Affordances as Organizational-Level Antecedents of Dynamic Capabilities

A first theoretical advance lies in reconceptualizing IT affordances as organizational-level phenomena that function as antecedents to dynamic capabilities. While much of the affordance literature remains rooted in user-level interactions, this dissertation distinguishes between individual and organizational affordances (stable, routinized action potentials that emerge when similar enactments is repeated across units) (Faraj & Azad, 2012; Zammuto et al., 2007). By empirically validating this aggregation through survey data from senior managers, the research confirms that affordances can indeed be modeled at the organizational level as collective patterns that shape what the firm can do (Leonardi, 2011; Volkoff & Strong, 2013).

This shift moves the debate beyond the simplistic view of IT as a centralized and rigid capability. It also differentiates IT resources (technological assets), IT affordances (enacted action potentials), and dynamic capabilities (higher-order routines). In doing so, it contributes to the microfoundations literature by specifying how digital artifacts condition the development of sensing, seizing, and reconfiguring routines clarifying the generative mechanism that links technology to capability formation. This theoretical clarification extends the sociomaterial view (Leonardi, 2011; Volkoff & Strong, 2013) by positioning affordances not just as mediators between technology and action but as microfoundations of building or improving capabilities and mechanisms through which digital artefacts expand or constrain a firm’s bundle of strategic routines.

5.1.2 Extending the Microfoundations and Boundaries of Dynamic Capabilities

The dissertation also advances theory by providing a comprehensive conceptualization and operationalization of dynamic capabilities. Essay 1 mapped the literature to define DCs as learned, repeatable, and purposive routines that enable organizational renewal through sensing environmental changes, seizing opportunities, and reconfiguring assets (Ambrosini & Bowman, 2009; Barreto, 2010). Essay 2 then operationalized these dimensions using validated reflective

scales, offering rare empirical precision on the construct's structure and measurement. This dual theoretical-empirical treatment contributes to DC research by translating abstract conceptualizations into measurable organizational capabilities.

Furthermore, the findings reveal that DCs are not universally beneficial or sequentially ordered. Process-management affordances, for instance, strengthen reconfiguring yet constrain sensing, while memory affordances help seizing but may hinder reconfiguring. These double-edged and context-dependent effects challenge the linear “sense → seize → reconfigure” assumption and instead support a contingent, path-dependent view in which capabilities interact asymmetrically (Peteraf et al., 2013; Schilke et al., 2018; Steininger et al., 2022).

5.1.3 Conceptualizing and Operationalizing the DC–BMI Relationship

Another major contribution lies in conceptualizing and empirically specifying the link between dynamic capabilities and business model innovation which is a relationship long acknowledged but rarely operationalized in detail. By treating BMI not as a single construct but as a multidimensional outcome encompassing value offering, value creation, and value capture, the dissertation connects the micro-level routines of DCs with the macro-level reconfiguration of business models (Amit & Zott, 2012; Clauss, 2017; Foss & Saebi, 2017; Osterwalder & Pigneur, 2010).

The fsQCA analysis in Essay 3 provides an operational mapping of which DC bundles (e.g., sensing + seizing, seizing + reconfiguring) lead to high levels of each BMI dimension, thereby translating the abstract notion of “capabilities enable innovation” into empirically verifiable configurations. This conceptual and operational integration bridges a long-standing gap in DC literature by showing how and through which combinations of routines business model change actually occurs (Greckhamer et al., 2018; Park et al., 2020).

5.1.4 Advancing the Configurational Understanding of Business Model Innovation

Building on these foundations, the dissertation strengthens the configurational view of BMI. The fsQCA findings reveal asymmetry and equifinality in the DC–BMI relationship: multiple distinct capability bundles can lead to similar innovation outcomes, and the absence of one capability does not imply the opposite effect. This insight underscores that BMI is not driven by one universal formula but by context-specific combinations of DCs that reflect each firm's constraints and priorities (Misangyi et al., 2017).

The study also observes that while the nine building blocks of the Business Model Canvas display nuanced behavior, they generally align with the three higher-order dimensions of value offering, creation, and capture. This small divergence indicates that BMI's internal components behave slightly (but not significantly) different from the aggregate dimensions, confirming the validity of the three-dimension structure while acknowledging a slight within-category heterogeneity. This adds to BMI theory by showing that innovation can group around different but connected parts,

giving a more granular understanding of how business models evolve (Amit & Zott, 2012; Clauss, 2017; Osterwalder & Pigneur, 2010).

5.1.5 Linking Business Model Innovation with Exploration and Exploitation

The findings also integrate BMI theory with the broader exploration–exploitation literature. Across configurations, sensing capabilities predominantly underpin explorative innovation, oriented toward discovering new opportunities and markets, while seizing drives exploitative innovation, focusing on deploying and scaling proven opportunities. Reconfiguring acts as the adaptive bridge between the two, enabling firms to shift their resource base and balance exploration and exploitation over time (O'Reilly III & Tushman, 2013; Raisch & Birkinshaw, 2008; Wirtz et al., 2016). This mapping positions BMI as the systemic manifestation of both modes of innovation and clarifies how dynamic capabilities orchestrate the balance between novelty and efficiency advancing the theoretical connection between DC theory and ambidexterity research.

5.1.6 Theoretical Implications for the SME Context

The decision to focus on small and medium-sized enterprises (SMEs) further contributes theoretically.

SMEs operate under pronounced constraints of resources, time, and managerial attention, making substitution and complementarity among capabilities particularly salient. This scarcity justifies adopting a configurational lens: rather than building all capabilities simultaneously, SMEs must combine and sequence limited resources into viable bundles that yield innovation (Bresciani et al., 2021; Doern et al., 2019; Kraus et al., 2020).

The dissertation thus extends dynamic-capabilities theory into resource-constrained contexts, demonstrating that the principles of equifinality and asymmetry are not only methodological insights but reflections of real managerial trade-offs in small-firm settings (Park & Fiss, 2017).

5.1.7 Integrating Variance-Based and Configurational Logics

Finally, the dissertation contributes methodologically and theoretically by integrating variance-based (PLS-SEM) and configurational (fsQCA) reasoning to analyze the same phenomenon from complementary angles. The PLS-SEM analysis explains how much each affordance contributes to DC development, while fsQCA reveals which combinations of DCs suffice for BMI. Together, they produce a more complete understanding of causation (directional, sufficiency-based, and asymmetric) showing how different methodological logics can coexist within a unified theoretical framework (Fiss, 2011; Greckhamer et al., 2018; Misangyi et al., 2017).

5.2 Thesis Practical and Managerial Implications

Beyond its theoretical contributions, this dissertation offers several actionable implications for managers, consultants, and policymakers seeking to strengthen organizational adaptability and innovation in the digital era. The findings collectively argue that investing in IT is necessary but

not sufficient for achieving performance excellence. Sustainable competitive advantage arises not from the possession of digital resources alone but from the firm's ability to actualize their affordances into dynamic capabilities and orchestrate those capabilities toward targeted forms of business model innovation (Mikalef et al., 2021; Steininger et al., 2021). Accordingly, this research provides a framework that managers can use to diagnose their current digital affordance landscape, identify which dynamic capabilities to build or reinforce, and target specific forms of business model innovation through concrete, real-world actions.

5.2.1 Moving Beyond IT Investment: From Possession to Actualization

Many firms assume that digital transformation begins and ends with technology acquisition such as new ERP systems, collaboration platforms, or analytics tools. However, this dissertation demonstrates that IT investments, while necessary, are insufficient unless organizations also cultivate the capabilities to sense opportunities, seize them through coordinated action, and reconfigure structures accordingly.

Managers should therefore treat IT systems not as end goals but as enablers whose value depends on the behaviors and routines they make possible. For example, collaboration tools produce value only when teams use them to share insights across boundaries (sensing), data warehouses matter only when memory routines transform information into decisions (seizing), and workflow automation delivers strategic benefit only when processes are revisited and redesigned (reconfiguring). This shift from "owning technology" to "actualizing technology" reframes digital transformation as an organizational challenge rather than a purely technical one (Volkoff & Strong, 2013; Steininger et al., 2021).

5.2.2 A Capability-Based Roadmap for Digital Transformation and Business Model Innovation

The combined results from the PLS-SEM and fsQCA analyses yield a practical roadmap for managers seeking to prioritize and sequence their capability-building efforts:

- To enhance sensing: focus on collaborative IT affordances such as digital workspaces, cross-functional communication platforms, and data-sharing mechanisms. These tools expand environmental awareness and collective problem framing.
- To improve seizing: emphasize memory affordances, including decision logs, knowledge repositories, and analytics dashboards that support evidence-based decision-making and resource commitment.
- To enable reconfiguring: invest in process-management affordances, such as integrated workflow systems and automation that facilitate the rapid rearrangement of activities and resources.

Managers can thus use the affordance–capability mapping established in this dissertation as a diagnostic tool to decide where to invest next depending on which capability or business model dimension they wish to improve (Osterwalder & Pigneur, 2010; Wirtz et al., 2016).

Additionally, the configurational results of Essay 3 translate into a managerial playbook for targeting specific innovation outcomes.

- For value offering innovation (new propositions, channels, or customer relationships): strengthen sensing and seizing together. This combination helps firms identify changing customer needs and act swiftly to redesign offerings or reach new segments.
- For value creation innovation (partners, activities, resources): emphasize seizing and reconfiguring. Mobilize resources decisively, redesign partnerships, and reallocate assets to enhance productivity or collaboration.
- For value capture innovation (cost and revenue models): prioritize reconfiguring, complemented by sensing. Reconfiguration supports internal cost optimization, while sensing reveals new monetization opportunities.

These recipes give managers tangible, non-theoretical guidance: to innovate in one aspect of their business model, focus on the specific capabilities and affordances most associated with that outcome rather than attempting to build all capabilities at once. The framework thus transforms abstract theory into a set of decision rules for capability orchestration (Schneider & Wagemann, 2012; Park & Fiss, 2017).

5.2.3 Coping with Crises and Environmental Turbulence

The findings also hold direct relevance for firms operating in turbulent or crisis environments, such as those experienced during the COVID-19 pandemic. The first essay demonstrated that dynamic capabilities serve as the backbone of organizational resilience as they enable firms to anticipate shocks (sensing), respond decisively (seizing), and restructure operations (reconfiguring). Building on this, the empirical essays reveal which IT affordances support each phase of that process. Managers can therefore use the proposed framework as a practical crisis response toolkit. Before a crisis, they can invest in collaborative affordances to strengthen environmental sensing and establish early warning systems. During a crisis, memory affordances can be leveraged to coordinate decision-making and quickly reuse proven solutions. After the crisis, process-management affordances can be activated to reconfigure organizational structures, integrate new digital workflows, and institutionalize learning. By aligning specific affordances and capabilities with different phases of turbulence, firms can make resilience an operational reality rather than an abstract concept (Clampit et al., 2022; Dovbischuk, 2022; Dyduch et al., 2021).

5.2.4 Tailoring Digital Transformation to the SME Context

For small and medium-sized enterprises (SMEs), the results provide an especially relevant guide. Resource scarcity means SMEs cannot build all dynamic capabilities simultaneously; they must instead rely on sequenced and substitutable bundles. The configurational findings show that firms can achieve innovation through multiple viable routes some emphasizing exploration (sensing), others exploitation (seizing or reconfiguring). This insight encourages managers in SMEs to prioritize selective investments rather than emulate large firms' comprehensive transformation programs. For instance, a small manufacturer can focus first on process-management affordances to reconfigure internal operations before expanding its sensing capabilities through advanced analytics. Such targeted progression offers a realistic path toward digital maturity without overextending limited resources.

5.2.5 Guiding Principles for Digital Strategy Execution

From the cumulative findings of this research, several guiding principles can inform managerial practice. First, managers should think in terms of affordances rather than features, emphasizing what technologies enable rather than what they contain. Second, organizations should aim to build capabilities rather than merely implement systems, viewing digital tools as scaffolds for learning and adaptability. Third, sequencing should be intentional, with capability development prioritized according to specific innovation goals and contextual constraints. Fourth, managers should adopt a configuration logic, acknowledging that different bundles of capabilities can lead to similar outcomes and that there is no single best path to success. Fifth, it is essential to balance exploration and exploitation by designing sensing and seizing initiatives that complement rather than compete with each other. Finally, learning should be institutionalized after crises by transforming ad hoc digital improvisations into formalized routines and governance mechanisms. Collectively, these principles provide a pragmatic and actionable framework for guiding digital transformation efforts in uncertain and dynamic environments (Wilden et al., 2013; O'Reilly & Tushman, 2013; Schneider & Wagemann, 2012).

5.3 Thesis Limitations

Like all empirical research, this dissertation has several limitations that must be acknowledged. These limitations do not undermine the validity of the findings but instead define the boundaries within which the results should be interpreted and point toward fruitful directions for future inquiry. They concern the context, methodology, measurement, and conceptual scope of the study.

5.3.1 Contextual Boundaries

The empirical studies were conducted primarily among Canadian small and medium-sized enterprises (SMEs), with a focus on manufacturing, supply chain, and closely related sectors. While this setting provided a theoretically meaningful environment it inevitably limits generalizability.

SMEs face different governance structures, resource endowments, and digital maturity levels than large enterprises. Therefore, while the configurational findings highlight the substitutability and complementarity of dynamic capabilities under constraints, similar patterns might manifest differently in large or digitally native firms. Replicating the model across diverse industries, geographies, and firm sizes would help verify the robustness of the proposed Affordance–Capability–Innovation framework.

Furthermore, the research was conducted during a post-crisis period following COVID-19. Although this provided a rich empirical backdrop for observing digital adaptation and resilience, it also means that respondents' perceptions may have been shaped by recent disruption. The extent to which the identified relationships hold in more stable environments remains to be examined (Clampit et al., 2022; Dyduch et al., 2021).

5.3.2 Methodological, Design, and Measurement Limitations

This dissertation faces several methodological, design, and measurement constraints that should be acknowledged when interpreting its findings. The empirical essays used a cross-sectional survey design, which restricts the ability to infer causality or observe changes over time. Although the relationships among IT affordances, dynamic capabilities, and business model innovation (BMI) were theoretically grounded and statistically supported, the data represent a single point in time. Because dynamic capabilities evolve through learning, experimentation, and reconfiguration, future research should use longitudinal or panel designs to examine how affordance actualization and capability development co-evolve and to verify whether the causal directions observed here hold over time (Wilden et al., 2013; Hair et al., 2019).

The sample size ($n = 90$), while sufficient for both PLS-SEM and fsQCA, also limits generalizability. Larger samples would allow finer subgroup analyses, cross-industry comparisons, and stronger validation of configurational results. Moreover, data were collected from single respondents (mostly senior managers) which may introduce common-method variance and single-informant bias. Although these respondents were chosen for their broad organizational perspective, future studies should triangulate survey data with objective indicators, archival data, or multiple informants to improve validity.

Measurement limitations also warrant consideration. All constructs were latent and perceptual, measured through reflective multi-item scales. Despite acceptable psychometric properties (Cronbach's α , CR, AVE, HTMT), some measurement error and subjective interpretation remain possible. BMI was measured through three aggregated dimensions (value offering, value creation, and value capture) which were validated but showed partial convergence, suggesting overlap among closely related elements. Analyses at the component level (the nine building blocks of the Business Model Canvas) indicated slight, though nonsignificant, differences, reinforcing the need for more granular measures capable of distinguishing specific business model components.

Similarly, IT affordances were modeled as three organizational-level constructs which simplify the diverse range of digital affordances in modern ecosystems. Emerging technologies such as artificial intelligence, the Internet of Things, blockchain, and advanced analytics generate new affordances (e.g., predictive, autonomous, integrative) that may interact differently with dynamic capabilities (Barrett et al., 2015; Constantinides et al., 2018). Future research should refine and extend these measures to better reflect the evolving digital landscape.

5.3.3 Conceptual and Theoretical Delimitations

The dissertation deliberately focused on the organizational level of analysis, treating affordances as collective, routinized action potentials. This aggregation is theoretically justified but abstracts away from the individual-level mechanisms through which affordances are first perceived and enacted (Leonardi, 2011). In addition, the study conceptualized dynamic capabilities as sensing, seizing, and reconfiguring, following the Teece framework. While this structure is widely adopted, it does not capture the full heterogeneity of capability types, such as learning, integrating, coordinating, or orchestrating, which may play distinct roles in digital contexts. Expanding the model to include these intermediate routines would provide greater granularity and might uncover alternative pathways to innovation (Wilden et al., 2013; Pavlou & El Sawy, 2011).

Finally, although this dissertation integrates variance-based and configurational reasoning, it remains limited to the capability–innovation link. It does not explicitly examine downstream performance outcomes (e.g., profitability, resilience, or market share) nor the feedback loops through which successful innovation further enhances capability development.

5.4 Future Research Directions

Building on the insights and boundaries discussed above, several promising avenues emerge for extending and deepening the contributions of this dissertation. These directions aim to refine theoretical understanding, enhance methodological rigor, and expand the empirical scope of research on IT affordances, dynamic capabilities, and business model innovation in the digital era.

5.4.1 Multi-Level and Cross-Level Examinations of Affordance Actualization

While this dissertation focused on organizational-level affordances, future work could unpack how they emerge from individual-level interactions with technology. A multi-level approach could link micro-level perceptions and enactments of affordances (e.g., how employees or managers perceive opportunities in digital tools) to meso-level routines and macro-level capability formation (Burton-Jones & Volkoff, 2017; Leonardi, 2013). This perspective would connect sociomaterial enactment theory with capability microfoundations research, clarifying how individual cognition, digital literacy, and social structures influence the collective realization of IT affordances. Experimental or ethnographic studies within organizations could offer rich insights into how affordance actualization unfolds across levels of analysis and how governance mechanisms can amplify or constrain this emergence (Volkoff & Strong, 2013; Heaton, 2023).

5.4.2 Broadening the Scope of Affordances and Capabilities

The digital landscape continues to evolve rapidly with technologies such as artificial intelligence, machine learning, blockchain, and IoT, which create new categories of affordances such as predictive, autonomous, and integrative (Barrett et al., 2015; Bygstad et al., 2016). Future research should expand the typology of affordances beyond collaboration, memory, and process management to include these next-generation digital affordances, testing whether they generate distinct or hybrid capability patterns.

Similarly, the notion of dynamic capabilities could be broadened to include learning, integrating, coordinating, and orchestrating subroutines, thereby capturing finer microfoundational mechanisms. Comparative analyses could explore whether these routines substitute for, or reinforce, sensing, seizing, and reconfiguring in different technological contexts.

5.4.3 Integrating Performance and Resilience Outcomes

Although this dissertation focused on business model innovation as the primary outcome, future research should examine downstream effects on performance and resilience. Specifically, how do different DC–BMI configurations translate into financial, operational, or sustainability outcomes. Longitudinal modeling could test whether certain configurations yield superior results in stable environments, while others enhance adaptability in turbulent conditions (Breznik, 2019; Rebs et al., 2019; Clampit et al., 2022). By linking the ACI chain to tangible performance metrics, future studies could bridge the gap between theoretical insight and managerial accountability which is an essential step for demonstrating the practical value of digital transformation research.

5.4.4 Cross-Industry and Cross-Country Comparative Studies

Because the current research is situated primarily in Canadian SMEs within supply chain and manufacturing contexts, there is an opportunity to test the framework across different industries and institutional environments (Nambisan et al., 2017; Verhoef et al., 2021). Service sectors, platform-based businesses, and public organizations may display unique affordance structures and capability configurations. Likewise, cross-country studies could explore how institutional factors such as digital infrastructure, regulation, or cultural orientations toward technology moderate the relationships among affordances, capabilities, and innovation. Such comparative designs would enhance external validity and help identify whether the observed equifinal configurations are universal or context-specific (Kraus et al., 2018; Li et al., 2018).

5.4.5 Extending to Network and Ecosystem Levels

Dynamic capabilities increasingly operate across organizational boundaries as firms engage in digital ecosystems and platform collaborations (Nambisan et al., 2017; Vanhaverbeke, 2017). Future research could extend the ACI framework to the inter-organizational or ecosystem level,

examining how shared digital infrastructures, co-created affordances, and joint capabilities enable collective business model innovation (Adner, 2017; Jacobides et al., 2018; Thomas et al., 2022).

Questions worth exploring include: How do ecosystem partners coordinate sensing and seizing activities? How are reconfiguring routines distributed among participants? What governance mechanisms sustain capability complementarity across firms? Addressing these questions would broaden the framework's applicability to modern, networked forms of organizing (Thomas & Autio, 2020).

5.4.6 Managerial Cognition, Decision-Making, and Governance Mechanisms

Another promising avenue involves examining the cognitive and governance dimensions that shape how firms actualize IT affordances and deploy dynamic capabilities (Hodgkinson & Healey, 2011). Future work could explore how managerial mental models, digital mindset, and leadership styles influence the orchestration of affordances into capabilities (Helfat & Peteraf, 2015; Martins et al., 2015). Similarly, governance structures (centralized versus decentralized decision rights, data ownership policies, or digital strategy alignment) may moderate how effectively firms translate technological potential into strategic action. Integrating these behavioral and structural aspects would provide a more holistic explanation of how capability-building is enacted and sustained.

5.5 Thesis Overall Conclusion

This dissertation aims to investigate how organizations transform digital technologies into strategic advantage through the development of dynamic capabilities and the pursuit of business model innovation. Across three interconnected essays, it developed and empirically validated a unified framework that links IT affordances, dynamic capabilities (DCs), and business model innovation (BMI). Together, these studies provide a comprehensive account of how technology-enabled action potentials are actualized into adaptive capabilities and, in turn, translated into new forms of value creation, delivery, and capture (Osterwalder & Pigneur, 2010; Clauss, 2017).

The findings from the first essay further reinforce that crises such as COVID-19 expose the centrality of dynamic capabilities in ensuring organizational survival and recovery. During the pandemic, firms most capable of sustaining performance were those that rapidly sensed shifts in demand and supply, seized emerging digital opportunities, and reconfigured resources through collaboration, agility, and innovation. The systematic review revealed ten recurrent strategies across industries including digital transformation, agile rethinking, human-resource support, partnership formation, customer-centric adaptation, and social responsibility among them all of which associate with and can be enforced by sensing, seizing, and reconfiguring processes. These crisis-era behaviors illustrate that resilience is not a passive state but the result of continuous capability enactment under extreme turbulence (Clampit et al., 2022; Wilden et al., 2013). Moreover, the review highlighted that while large firms leveraged scale and digital infrastructures

to remain stable, small and medium-sized enterprises survived by relying on flexibility, partnerships, and rapid learning.

Empirically, the results show that specific affordances contribute distinctively to capability development. Collaborative affordances strengthen sensing and coordinating capabilities, enabling firms to identify and respond to new opportunities more quickly. Memory affordances enhance learning and integration, helping firms reuse and recombine existing knowledge; however, when too deeply embedded, they risk reinforcing inertia rather than agility. Process-management affordances bolster reconfiguring capabilities, allowing organizations to streamline workflows, redesign structures, and institutionalize learning after disruption. These differentiated effects underline that not all technologies contribute equally to adaptation since what matters is how their potential is enacted and combined (Mikalef & Pateli, 2023; Saedikiya et al., 2024).

At the capability level, findings reveal that sensing, seizing, and reconfiguring interact in nonlinear and sometimes asymmetric ways. Firms that balance exploration and exploitation by pairing strong sensing with reconfiguring or seizing capabilities are more likely to achieve significant business model innovation. Yet the pathways to innovation are plural (Fiss, 2011; Park & Fiss, 2017). Configurational analysis showed several equifinal combinations leading to successful outcomes: sensing and seizing jointly drove new value creation initiatives; reconfiguring and collaborative affordances supported innovation in value delivery; and the integration of sensing with process affordances enabled new value-capture mechanisms. This diversity of paths illustrates that digital transformation is not a uniform process but a set of alternative, context-dependent routes toward renewal.

These findings also reveal that business model innovation acts as the organizational expression of dynamic capability enactment. Changes in value creation, delivery, and capture are not isolated strategic moves but manifestations of underlying learning, coordination, and reconfiguration processes. Firms that systematically align affordances and capabilities with their innovation intent (whether exploratory or exploitative) are better able to sustain transformation and resilience. For resource-constrained SMEs, in particular, success depends on assembling the right bundles of digital affordances and capabilities rather than attempting to develop them all simultaneously (Dyduch et al., 2021; Bresciani et al., 2021).

From a theoretical standpoint, the dissertation contributes to bridging the longstanding divide between the information systems and strategic management literatures. By integrating the concept of IT affordances with the framework of dynamic capabilities, it explains how digital tools and infrastructures become embedded within the routines and decision processes that shape strategic outcomes (Bharadwaj et al., 2013; Pavlou & El Sawy, 2011). The proposed ACI framework offers a multilevel explanation of digital transformation: it identifies the technological preconditions (affordances), the organizational mechanisms (capabilities), and the strategic outcomes (innovation). This integration clarifies that technological resources alone are inert; value emerges only when they are collectively enacted through organizational processes.

Methodologically, the dissertation demonstrates the complementarity of variance-based and configurational approaches in studying complex organizational phenomena. Essay 2 employed partial least squares structural equation modeling (PLS-SEM) to quantify the directional effects of IT affordances on dynamic capabilities, revealing that collaborative, memory, and process-management affordances have heterogeneous and sometimes double-edged influences. Essay 3, using fuzzy-set qualitative comparative analysis (fsQCA), uncovered multiple, equifinal configurations of dynamic capabilities that lead to different dimensions of BMI. This methodological duality shows that variance and configuration are not competing logics but mutually reinforcing lenses. While, one identifies average effects, the other uncovers alternative causal paths (Fainshmidt et al., 2020). The configurational findings provide further insight into the asymmetric and context-dependent nature of capability building (Schilke et al., 2018; Eisenhardt & Martin, 2000). They reveal that firms can achieve similar innovation outcomes through distinct combinations of capabilities where some emphasize exploration through sensing, others highlight exploitation through reconfiguring or seizing. This pattern of equifinality is particularly pronounced among small and medium-sized enterprises (SMEs), which operate under resource constraints that prevent comprehensive capability development. For such firms, building the right bundle rather than the full set of capabilities becomes the key to survival and growth (Kraus et al., 2020).

Collectively, the three essays converge on the conclusion that business model innovation is the most visible and practically manageable expression of dynamic capability enactment. Transformations in value offering, value creation, and value capture represent the organizational materialization of sensing, seizing, and reconfiguring. The study's findings demonstrate that changes in how firms design, deliver, and monetize value are not isolated ways of creativity but the outcomes of deliberate capability orchestration enabled by digital affordances.

Beyond its theoretical contributions, the dissertation also offers a broader conceptual message about the nature of organizational adaptation in the digital age. It argues that digital transformation or basically any change on the basis of information technology is a recursive process (Vial, 2019; Verhoef et al., 2021). The affordances provided by technology shape the development of dynamic capabilities, and these capabilities, once institutionalized, redefine the firm's capacity to exploit new technological opportunities. This cyclical relationship underscores that digital transformation has no finite endpoint but it is an ongoing process of sensing change, seizing possibilities, and reconfiguring structures in pursuit of renewed competitiveness (Teece et al., 2016).

In conclusion, this dissertation advances a coherent explanation of how firms convert digital potential into organizational adaptability. It shows that technology does not create advantage but capability does. The organizations that will thrive in turbulent and uncertain environments are not those that possess the most advanced systems but those that can continuously reimagine what those systems allow them to do. The overarching lesson, therefore, is that digital transformation is not a technological journey but a capability-based one. It is a process through which firms learn to

translate technological affordances into the dynamic capabilities that sustain business model innovation, resilience, and long-term renewal.

5.6 References

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