

TOWARD A SYNERGETIC ORGANIZATION: THE ROLE OF DYNAMIC CAPABILITIES,  
SOCIAL CAPITAL, AND DIGITAL MATURITY IN ORGANIZATIONAL RESILIENCE  
DURING DISRUPTION

by

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## ABSTRACT

ANAND KANGALA. Toward a Synergetic Organization: The Role of Dynamic Capabilities, Social Capital, and Digital Maturity in Organizational Resilience During Disruption  
(Under the direction of DR. FRANZ KELLERMANNNS)

Firms must continually adapt themselves to survive and outperform competition during rapidly changing environments, both predictable and unpredictable. The dynamic capabilities theory provides a framework for firms to renew and adapt their organizational competencies and capabilities to achieve congruence with the changing market environment. Research has shown that this leads to sustained competitive advantage and superior firm performance. However, resilience during a disruptive event requires the firms to intentionally deviate from their patterned capability-building strategies to respond differentially to turn a challenging environment into a growth opportunity. The study proposes a comprehensive framework that integrates dynamic capabilities and organizational resilience theories with practical examples and empirically examines the resilience phenomenon from the data collected from 204 mid-to-large, established firms. The results show strong evidence that firms with robust strategic sensing, timely decision-making, and change implementation processes in typical business environments have a greater resilience-building meta-capability to achieve counter-trend growth during disruption. In addition, the study investigates the role of the business environment, social capital, and digital maturity. The results show that while digital maturity strengthens the relationship between strategic dynamic capabilities processes and organizational resilience, environmental complexity dampens the relationship. These findings and the proposed framework contribute to the theory and provide useful insights to practitioners.

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## DEDICATION

I dedicate this dissertation to the extraordinary people I draw inspiration from every day - My dad, who lost the battle to cancer but won the war of life, touching everyone on his path through his illustrious career in renewable energy research and simple, selfless thoughts and actions. My mom - the epitome of sacrifice. My wife, my pillar of strength, and my daughter, from whom I learned the true meaning of resilience and determination.

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## CHAPTER 1: INTRODUCTION

Over the last two decades since Teece et al. (1997), strategic management scholars have been intrigued by the questions of how firms overcome inertia to sustain their competitive advantage and how they emerge successfully from unprecedented disruptions that fundamentally alter the market needs and thus their response (Hamel & Välikangas, 2003). The current environmental turbulence and the digital revolution have renewed the interest of theorists and practitioners to understand, more specifically, what causes some firms to be more resilient than others during disruption.

On June 8th, 2020, the National Bureau of Economic Research declared that the US is in recession due to a broad economic contraction (NBER, 2020a) caused by the COVID pandemic. Many iconic brands, such as Neiman Marcus, Brooks Brothers, and Lord & Tylor, have suffered considerable losses due to their inability to swiftly adapt their businesses to respond to changing market and consumer needs. Yet, during the same period, other reputable brands, such as Amazon, Home Depot, and Lowe's, increased their market value by over 60% by quickly reprioritizing their business strategies to align with the consumer and market needs. The imperatives from digital maturity in business and process innovation, strong entrepreneurial orientation, organizational flexibility, the ability to scale rapidly, and agility from a trust-based and transparent relationship with its business stakeholders are plausible explanations of this phenomenon (Ivanov, 2021; Mangalaraj, Nerur, & Dwivedi, 2021; Nandi, Sarkis, Hervani, & Helms, 2020; Zouari, Ruel, & Viale, 2020). Research shows that the business transformation process towards achieving digital maturity involves rethinking traditional organizational routines, services, and roles from a technology-enabled perspective (Kane, Palmer, & Phillips, 2017). Furthermore, strengthening social capital enables gaining crucial information that may be rare market knowledge. Close social

interactions with business partners promote learning and mutual adjustment vital for resilience (Sheng, Zhou, & Li, 2011). However, it warrants an empirical investigation to examine if a firm's ability to anticipate change over time and methodically reinvent itself through the utilization of digital technologies and strengthening social capital provides the foundation and impetus for quickly reacting to, recovering from, and achieving growth during unexpected turbulence.

Firms reconfigure their capabilities, resource-base, and management routines continually to prepare themselves for rapidly changing environments (Teece, Pisano, & Shuen, 1997). The strategic process involves sensing and shaping new opportunities and threats, seizing, and investing in strategic choices, and transforming existing management patterns for gaining competitive advantage (Eisenhardt & Martin, 2000; Teece, 2007). The business environment, in this context, is often characterized as expected uncertainty (Soltani & Izquierdo, 2019). For example, we know that technology is continually evolving, and therefore firms must look to adapt their business models over time. We also expect business and technology innovation to drive changes in the marketplace and consumer behaviors. Eisenhardt & Martin (2000) argued that the firm response even in highly dynamic environments is based on patterning business routines at a high level, guided by simple principles and rules. However, is patterned response plausible in a business environment characterized by uncertainty (Weick & Sutcliffe, 2011)? Some scholars say the strategic process to manage uncertainty is to anticipate the disruption, resist and absorb the operational impact, adapt to market changes, recover quickly to pre-disruption levels, and use the disruption as an opportunity to achieve counter-trend growth (Chen, Xie, & Liu, 2021). This process requires firms to intentionally deviate from their patterned capability-building strategies for addressing risks that can be anticipated and reallocating resources toward resilience-response strategies for growing out of uncertainty.

While researchers have conceptually linked dynamic capabilities and organizational resilience (Kurtz & Varvakis, 2016; Limnios, Mazzarol, Ghadouani, & Schilizzi, 2014; Pavlou & El Sawy, 2011), there is a gap in the empirical investigation of the phenomenon in the context of disruption. Therefore, this dissertation's purpose is twofold (1) to empirically examine the role of dynamic capabilities in gaining resilience during disruption and (2) to understand how digital maturity enables and enhances the firm's resilience capabilities. To examine these questions, I will integrate dynamic capabilities (DC) theory (Teece, 2007; Teece et al., 1997) and organizational resilience (OR) theory (Conz & Magnani, 2020; Pal, Torstensson, & Mattila, 2014) in the context environmental disruption (Dess & Beard, 1984; Li & Liu, 2014), and digital maturity (Frank, Dalenogare, & Ayala, 2019; Herceg, Kuc, Mijuskovic, & Herceg, 2020). The scope and definitions of the key constructs are discussed next.

The DC framework was initially introduced by Teece et al. (1997) as the firm's distinctive capacity to respond to rapidly changing environments by coordinating and reconfiguring business processes and organizational routines for developing difficult-to-trade assets positions and executing growth opportunities. Scholars have since advanced the understanding in several ways. First, Eisenhardt and Martin (200) argued that the capability-building processes are essential for addressing environmental change where markets "emerge, collide, split, evolve, and die", and launch business reconfiguration as a competitive action. Second, Winter (2003) proposed that the DC process involves business-enhancing operations such as product development to strategically extend or modify ordinary capabilities necessary for the firm's short-term survival. Third, Helfat et al. (2007) clarified that the firm's capacity to orchestrate strategic organizational change is purposefully different from deploying ordinary capabilities for current business operations. Fourth, Teece (2007) disaggregated the capability-building ability further as dynamic processes to (a)

sense and shape, (b) seize, and (c) transform opportunities and threats. In line with these advancements in literature, this study defines the term ‘core strategic DC processes’, in the context of environmental disruption, as an aggregate of the firm’s capacity for strategic sense-making, i.e., the propensity to sense opportunities, competitive challenges, and threats (Kump, Engelmann, Kessler, & Schweiger, 2019; Pandza & Thorpe, 2009; Weick, Sutcliffe, & Obstfeld, 2005), timely decision-making (Helfat & Martin, 2015; Sharfman & Dean Jr, 1997; Thielen et al., 2020), and strategic change implementation (Helfat & Martin, 2015).

The increase in environmental disruption since the dot com crash in the late 1990s has shifted the strategic goals of many firms from the traditional profit motives and wealth creation for shareholders to achieving strategic OR to sustain competitive advantage (Hamel & Valikangas, 2003; Linnios et al., 2014). Like the DC perspectives, the conceptualization of OR by scholars has evolved. First, as a proactive measure of the firm to prepare and be ready for the crisis by building redundancy in capabilities, trust with internal and external partners, and keeping resources in reserve (Pal et al., 2014). Second, as an absorptive attribute at the time of crisis to maintain stability, preserve the assets, and achieve equilibrium quickly following the crisis (Bogodistov & Wohlgemuth, 2017; Sin, Musa, & Ng, 2017). Third, as an adaptive attribute with a customized response (Lengnick-Hall & Beck, 2005) to achieve 'punctuated equilibrium', an ecological perspective that denotes shifting from one equilibrium to another to attain operational stabilization and use the turbulence as an opportunity to accelerate innovation and internal change to sustain competitive advantage (Akgün & Keskin, 2014; Burnard & Bhamra, 2011; Dai, Eden, & Beamish, 2017). Fourth, as a reactive attribute that defines the ability of the firm to rebound, bounce back, and return to the equilibrium state that is equal to higher than the pre-disturbance state (Carmeli & Markman, 2011; Su & Linderman, 2016; Watanabe, Kishioka, & Nagamatsu, 2004). While the

attribution of OR as proactive, absorptive, adaptive, and reactive makes theoretical sense, a dynamic lens is necessary for empirical investigation. Firms must navigate through all the unexpected manifestations of uncertainty to sufficiently react to and meaningfully capitalize on environments that threaten their very survival (Lengnick-Hall, Beck, & Lengnick-Hall, 2011). In line with literature, this study defines OR as the aggregate of dynamic processes that help develop the four capability dimensions, namely, (a) strategic flexibility (Golden & Powell, 2000) – to make rapid decisions, learn fast, communicate effectively, and adapt with specificity, (b) redundancy (Pal et al., 2014)– in terms of utilizing unused capacity and multiple sourcing, (c) robustness (Sheffi, 2005) – in building lean processes, reducing process variability, and being quality conscious, and (d) networking (Majchrzak, Jarvenpaa, & Hollingshead, 2007) – interconnectedness for knowledge sharing with internal and external business partners.

The DC and OR perspectives provide a theoretical explanation of how firms adapt to rapidly changing environments. Failure to respond to environmental volatility can negatively impact business performance (Siguaw, Simpson, & Enz, 2006). However, the constructs have come under increasing scrutiny from strategy and management scholars for their boundary conditions, particularly regarding business environments (Pavlou & El Sawy, 2011) and lack of empirical evidence (Hillmann & Guenther, 2021; Thielen et al., 2020). For example, the advocates of contingency view (Miller & Friesen, 1983; Sirmon & Hitt, 2009) posit that the benefits of DC and OR processes are relevant in the environmental context in which it is deployed. Therefore, it is vital to consider the role of the environmental factors operating with and against the business as essential contextual variables in DC and OR research (Helfat et al., 2007; Helfat & Winter, 2011). Further, DC and OR literature conceptualize environmental factors similarly regarding munificence (scarcity), dynamism (uncertainty), and complexity (heterogeneity) (Dess & Beard,

1984). For example, rapid technology change, structural changes in the industry, instability in consumer needs and market demands, and the probability of unanticipated events are important environmental factors impacting the business. Literature also clarifies that environmental disruptions are characterized by rapid and discontinuous changes that are non-linear (Jansen, Van Den Bosch, & Volberda, 2006; Miller & Friesen, 1983; Sirmon, Hitt, & Ireland, 2007). Drawing on this perspective, perhaps the differentiation of the constructs is in the action response specific to the abruptness of the environmental factor. For example, OR literature often associates environmental changes with unexpected (Marcus & Nichols, 1999), rare (Lampel, Shamsie, & Shapira, 2009), surprising (Bechky & Okhuysen, 2011), catastrophic (Majchrzak et al., 2007), or crisis (Rerup, 2009) events such as natural and biological disasters and terror attacks. Thus, for OR, the key differentiators are the environmental disruption dimensions specific to the kind and abruptness of the event, such as time of the event, place of occurrence, frequency, distribution, and magnitude of impact.

Digital transformation is a strategic differentiator for most firms facing disruptive environments. They use disruptive digital technology as a countermeasure for competition in the market and unexpected changes in consumer behaviors (Agarwal & Helfat, 2009). The digital agenda of a firm is more about strategy than technology. Yet, empirical research is lacking in examining the role of the firm's digital maturity and utilization of Industry 4.0 technologies in improving the effectiveness of DC and OR processes (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014; Hess, Matt, Benlian, & Wiesböck, 2016). The comprehensiveness of action goes beyond mere technology implementation to integrating business processes with digital economies. This digital integration enhances dynamic and OR capabilities. For example, it creates new business models, facilitates trust and flexibility in the supply chain, improves customer experience, and

achieves digital interconnectedness with business partners (Liu, Chen, & Chou, 2011). Digital capabilities are also necessary to balance the exploitation activities with the simultaneous building of new exploratory activities related to digital sensing, digital seizing, and digital transforming (Helfat et al., 2009). Thus, it is crucial to consider the firm's digital maturity and the utilization of Industry 4.0 base technologies in DC and OR research.

While digital transformation can be a strategic differentiator, social capital to maintain a robust relationship with the external stakeholders is a tactical necessity for firm performance in a highly turbulent environment characterized by short cycles related to product development and service delivery (Acquaah, 2007). The social capital theory contends that the robustness of the firm's network of relationships enables the valuable flow of information, exchange of scarce resources, and transfer of vital knowledge between network members (Miller, Xu, & Mehrotra, 2015). Further, the firm's absorptive capacity is improved by integrating new knowledge and resources with the existing (Cohen & Levinthal, 1990). This capability is closely associated with the firm's ability to innovate and adapt to market opportunities (Tan, Zhang, & Wang, 2015). Research also shows that social capital improves the firm's reputation and helps the firm obtain legitimacy in the network, which facilitates attracting new partners and offers economic benefits (Rao, Chandy, & Prabhu, 2008). Therefore, it is proposed that, during disruption, strong ties with business stakeholders improve the quality of the response while significantly reducing the reaction time necessary for the response.

This research seeks to make four contributions. While extant DC and OR literature have traditionally been studied with various firm-level outcomes, such as competitive advantage (Li & Liu, 2014), business performance (Wilden & Gudergan, 2015), innovation (Wang et al., 2020), and agility (Amit Kumar & Narain, 2019; Felipe, Roldán, & Leal-Rodríguez, 2016), their

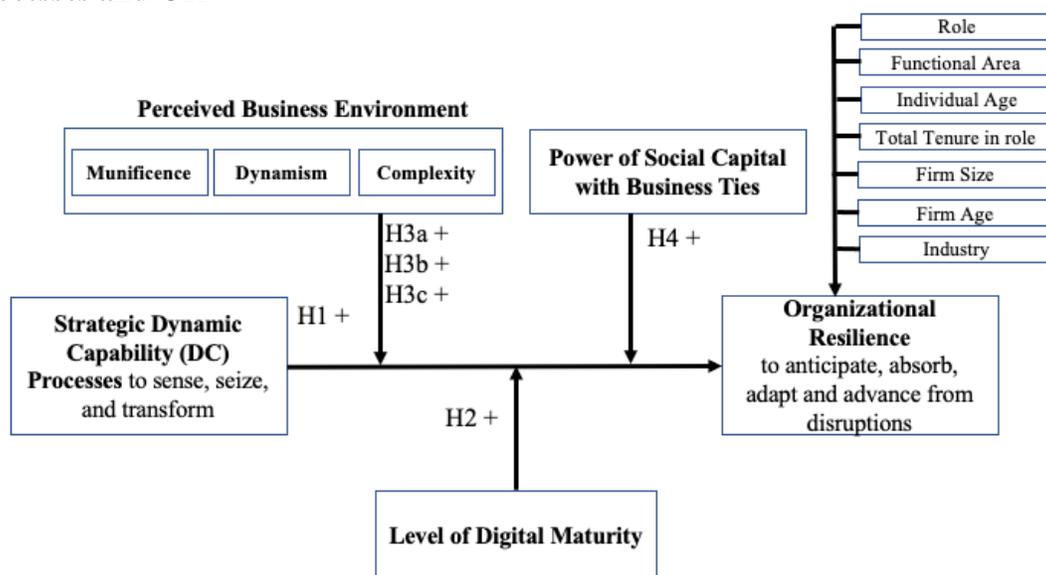
conceptual relationship and boundary conditions are not well understood (Corrales-Estrada, Gomez-Santos, Bernal-Torres, & Rodriguez-Lopez, 2021; Ma, Xiao, & Yin, 2018; Revilla, Bueno, Rivera, & Moreno, 2017). First, the study seeks to fill this literature gap empirically, proposing that the firm's resilience capacity to adapt and grow during disruption is determined by the strength of its strategic DC processes, enhanced by its digital maturity. This key finding will kindle future research opportunities. Second, the study seeks to extend the DC and OR literature by clarifying the boundary conditions and showing that, during turbulence, the resilience process is distinctly different from the firm's DC building process. Third, besides focusing on the 'why,' 'what,' and 'when,' the study provides future research directions on the 'what else' and 'how' for the academic community. Finally, this research seeks also to provide valuable insights to the practitioner community. In summary, the theoretical and practical implications of understanding the extent to which the strategic DC processes are helpful in resilience response and the role of digital maturity in amplifying the effect are rather compelling.

## CHAPTER 2: LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This section is organized as follows: First, I present a literature review of DC and OR theories in the firm's pursuit of gaining competitive advantage during rapid change and resilience to recover and grow from a disruptive event. I also further the OR literature by proposing an integrated OR framework. Next, I clarify the relative differences between DC and OR in the context of the business environment. I use four real-life examples of firm performances before, during, and post-COVID to analyze the relationship between DC and OR. Finally, I advance the conceptual framework by developing the research hypotheses. Figure 1 provides a visual representation of the conceptual model developed in the following sections.

This research empirically investigates the effect of a firm's DC building processes on resilience-response capabilities. The study also proposes that a munificent, dynamic, and complex business environment, increased power of business ties, and higher digital maturity enhance the effect.

**Figure 1: Conceptual model of the moderating effects of perceived business environment, power of social capital, and level of digital maturity on the relationship between strategic DC processes and OR**



## 2.1 Literature Review

### 2.1.1 The Evolution of Dynamic Capabilities Theory

In their seminal paper (Teece et al., 1997) introduced the concept of DC. The authors theorized that firms must possess distinctive competencies and capabilities to gain a competitive advantage in environments characterized by rapid change. The DC perspective is often considered an extension of the firm's resource-based view (RBV) (Wernerfelt, 1984). While RBV holds a more static orientation of the firm's resource base and operational capabilities, DC emphasizes purposeful modifications to the resource base and external environments (Helfat & Peteraf, 2003). Accordingly, the firm capabilities can be broadly classified as operational (ordinary) and dynamic capabilities. Whereas ordinary capabilities are leveraged to maintain the scale and scope of the firm's activities towards its current products, businesses, and customers, DCs are a distinct set of organizational capabilities deployed for managing strategic change (Helfat & Winter, 2011; Winter, 2003).

The classic DC perspective (Teece et al., 1997) holds that the firms gain competitive advantage by coordinating, integrating, learning, and reconfiguring their managerial and organizational '*Processes*,' shaped by their specific difficult-to-imitate asset '*Positions*' and molded by their strategic growth or '*Path*' evolutions. These firm-level capabilities – namely, Processes, Positions, and Paths – include the firm's mission; and organizational skills, resources, and functional competencies necessary to achieve the firm objectives (*Processes*), the customer base, business partners, and intellectual property used to interact with the customers and partners (*Positions*) and executing inorganic growth opportunities such as strategic alliances and entering new markets (*Paths*).

Teece (2007) furthered the theory by proposing that, in a fast-paced, globally competitive environment, the competitive advantage must be sustainable beyond deriving a point-in-time advantage from acquiring a scarce resource. It was proposed that firms achieve sustained competitive advantage through their strategic ability to identify and assess opportunities and threats (sensing), garner resources to address the opportunity and capture value (seizing), and continual renewal of tangible and intangible assets (transforming). In an extension, (Helfat & Winter, 2011) noted that DC also provides the capacity for the firm to influence its external environment.

Furthermore, Teece (2012, 2014) clarified the concept of DC as strategically distinct from ordinary capabilities (Helfat & Winter, 2011; Winter, 2003). While ordinary capabilities enable the firm to perform efficiently, DCs, when combined with good strategies, provide the impetus needed to create new products and services and enter new markets to address emerging customer needs.

Perhaps the most distinguishing feature of DC is the systematic means through which firms can implement strategic change. DC, distinct from ad hoc problem-solving, enables an iterative and reliable performance of practiced and patterned sensing, sizing, and transforming activities directed towards gaining competitive advantage (Eisenhardt & Martin, 2000; Winter, 2003). The DC are also embedded within organizations. For example, Winter (2003) described DC as a higher-level, context-specific “collection of routines” that is built over time and, therefore, hard to imitate (Helfat & Martin, 2015). While environmental dynamism is an essential antecedent to DC (Teece et al., 1997), studies (Helfat & Winter, 2011; Schilke, 2014) clarified that it also exists in relatively stable environments to expand or alter the firm’s business. Table 1 summarizes seminal definitions of DC from the literature.

**Table 1: Seminal Definitions of DC from Literature**

Source	DC Definitions
<b>Teece et al. (1997)</b>	“The firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”
<b>Eisenhardt &amp; Martin (2000)</b>	“The firm’s processes that use resources to match and even create market change. They are organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split evolve, and die”
<b>Zollo &amp; Winter (2002)</b>	“A learned and stable pattern of collective activity through which the organization generates and modifies its operating routines in pursuit of effectiveness”
<b>Winter (2003)</b>	“Framework to develop firm-specific capabilities and renew competencies to respond to shifts in business environment”
<b>Helfat et al. (2007)</b>	“The capacity of an organization to purposefully create, extend, or modify its resource base”
<b>Teece (2007)</b>	“These capabilities can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise’s unique asset base”
<b>Helfat &amp; Winter (2011)</b>	“The capabilities exist and are also relevant in relatively stable environments to expand or alter the firm’s business”

### 2.1.1.1 Dimensionalizing Dynamic Capabilities

DC manifest themselves in many forms and can be captured as a multifaceted construct (Eisenhardt & Martin, 2000; Helfat et al., 2007). The DC construct can be dimensionalized as (a) types of strategic DC processes (e.g., coordinating, integrating, learning, and reconfiguring (Teece et al., 1997); sensing, seizing, and transforming (Teece, 2007)); (b) extent of the routinization of DCs (e.g., iterative and reliable performance of highly practiced and patterned routines (Winter, 2003); (c) functional application of DCs (e.g., new product development, strategic alliance, mergers & acquisition (Eisenhardt & Martin, 2000); (d) DC hierarchies (zero-, first-, second-, and higher-order (Collis, 1994)); and (e) the focal unit of analysis (e.g., individual, team, firm, inter-firm (Adner & Helfat, 2003)). The study presents and examines the DC framework in the next section and discuss the underlying elements of the dimensions and their interactions.

While these dimensions have contributed to the richness and nuanced understanding of DCs, I draw on the strategic processes typology (Teece, 2007) for this research. Traditionally, strategy scholars heavily emphasize the performance-enhancing effect of DCs as the key tenant. For example, studies have found DCs to improve firm performance, such as financial (Adner & Helfat, 2003), operational (Wang, Senaratne, & Rafiq, 2015), market (Wang & Rajagopalan, 2015), and technical (Vanhaverbeke, Belderbos, Duysters, & Beerkens, 2015), and sustain competitive advantage through new products (Pavlou & El Sawy, 2006), markets (Danneels, 2008), technologies (Siguaw et al., 2006), improving speed to market (Swan, Kotabe, & Allred, 2005) and customer value (Saeed, Grover, & Hwang, 2005a). However, the study avoids the classic ‘tautology trap’ (Zollo & Winter, 2002) by not relating DCs to a performance type. Instead, this study acknowledges the competitive differentiation benefit and focuses on application of the strategic DC processes for purposeful identification, assessment, timely decision-making, and implementation of strategic change.

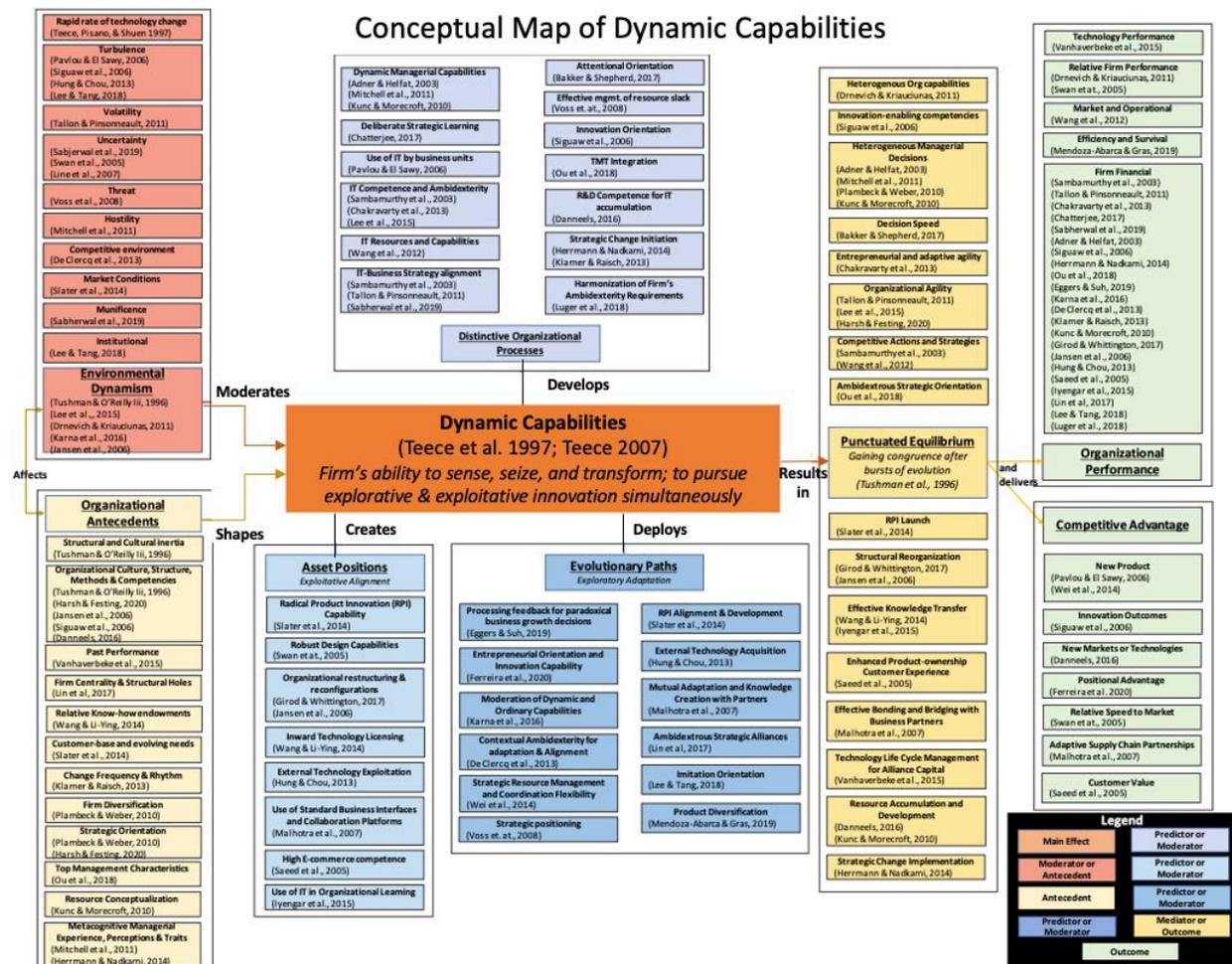
In sum, the strategic DC processes typology (Teece, 2007) focuses on the distinctive firm capabilities for building a thorough understanding of the business environment’s impending opportunities, challenges and threats (sensing), making strategic decisions for growth and innovation (seizing), and reconfiguring firm resources, structure, and capabilities for gaining competitive advantage (transforming).

#### **2.1.1.2 Conceptualizing Dynamic Capabilities**

The current pace of change has necessitated the firms and their leaders to make paradoxical business decisions at an increasing pace and frequency. The DC theory and extant literature provide a framework for firms to continually transform their internal and external resource configurations to create and sustain competitive advantage. The theory has evolved to gain

researchers' recognition for its framework to improve firm competitiveness through predictable change (Pavlou & El Sawy, 2006; Siguaw et al., 2006; Teece et al., 1997). A conceptual model of the DC framework drawn from literature is shown in Figure 2. Accordingly, the contextual antecedents of an organization, such as culture, structure, state of inertia, and strategic orientation, shape the firm's ability to sense, seize, transform, and pursue explorative and exploitative innovations simultaneously. Firms use DC to develop distinctive processes, create hard-to-imitate asset positions, and deploy evolutionary growth paths resulting in punctuated equilibrium (Tushman. & O'Reilly., 1996) and delivering business performance and competitive advantage. The effect of DC on business performance and competitive advantage is influenced by environmental factors, such as munificence, uncertainty, and complexity (Dess & Beard, 1984). While the mechanics of DC is more complex in practice, the simplified view clarifies the overall scope and flow of the theory. For example, while the conceptual model shows that DC develops, creates, and deploys processes, positions, and paths (the 3Ps), in practice, the 3Ps can be iterative and interdependent (Teece, 2007). A brief review of the 3Ps follows next.

Figure 2: Conceptual model of the Organizational Dynamic Capabilities



### 2.1.1.2.1 Distinctive Organizational Processes

Firms are increasingly facing global competition and are under constant pressure to differentiate themselves from the competition. Research posits that the organizational culture, people, process, and technology drive strategic agility and innovation, involving value creation for customers, business partners, and the firm (Siguaw et al., 2006). The agility to detect, sense, and seize emerging opportunities and threats with speed and surprise is imperative for success (Ferreira, Coelho, & Moutinho, 2020). This section synthesizes the literature on the key

organizational processes and leadership capabilities that enable paradoxical decision-making for creating and sustaining competitive advantage.

*Industry 4.0, IT competence and Organizational Agility:* The advent of the fourth industrial revolution (Industry 4.0) has given rise to a new digital infrastructure – intelligent products and processes, which enable real-time communication and connectedness of objects, such as devices and machines, embedded with software and sensors (Buer, Strandhagen, & Chan, 2018). The Industry 4.0 technologies, such as the Internet of Things (IoT), Big Data, and Analytics, along with intelligent manufacturing and supply chains (Frank et al., 2019), through increased computing, connectivity, visibility, and interoperability, are revolutionizing the industry and offer firms significant opportunities for enhancing the organizational agility. The firm's IT competence and infrastructure flexibility (Tallon & Pinsonneault, 2011) to convert available IT resources, assets, and investments into strategic digital applications (Wang, Liang, Zhong, Xue, & Xiao, 2012) with entrepreneurial alertness, results in competitive actions and provides organizational agility (Lee, Sambamurthy, Lim, & Wei, 2015). For example, digital platforms enable firms to forge information- and knowledge-based value-chain collaborations with their partners. This capability enables them to adapt to a rapidly changing business conditions, explore new opportunities, and deter competitors' imitability. However, the firm must align its IT strategies with business objectives and priorities to be effective.

*Aligning IT strategy to business priorities:* When aligned with the firm's strategic business processes, the competitive actions created with IT competence result in sustainable business value (Sambamurthy, Bharadwaj, & Grover, 2003). Strategic business-IT alignment implies achieving a state of congruence with business priorities and integrating IT more effectively into business processes (Sabherwal, Sabherwal, Havakhor, & Steelman, 2019). The business effects are further

optimized during environmental dynamism with IT resource structuring and capability building (Sabherwal et al., 2019; Wang et al., 2012). It involves acquiring, developing, transforming, and divesting of IT physical and logical infrastructures, technology professionals, managerial skills, and relational alignment of IT functions with business partners. While strategic IT investments enhance firm performance in dynamic and uncertain environments, research shows that it could introduce rigidity and reduce the positive effects during stable and munificent conditions (Sabherwal et al., 2019).

Research also suggests that strategic business-IT alignment could become a crucial part of how firms strategize for and justify agility to protect performance (Sabherwal et al., 2019; Tallon & Pinsonneault, 2011). Furthermore, agility is a two-dimensional capability with an entrepreneurial dimension that implies an ability to foresee and capture new opportunities proactively, allowing firms to gain early advantages in changing environments, and an adaptive dimension focused on detecting and reacting to market changes. IT competency plays a dual role in shaping both dimensions of agility. It directly enhances the entrepreneurial dimension by providing real-time insights, such as customer feedback, and facilitates the adaptive dimension by implementing requisite actions such as creating operational efficiencies through automation. (Chakravarty, Grewal, & Sambamurthy, 2013). The effective utilization of IT competence by business units to reconfigure and execute business processes can also indirectly help build its competitive advantage in endeavors, such as new product development (NPD). This combination and integration effect of functional/operational competencies with DC is further amplified during environmental turbulence characterized by uncertainty, munificence, and complexity (Pavlou & El Sawy, 2006).

*Dynamic managerial capabilities (DMC) and tolerance to ambiguity:* While such business strategies and strategic IT alignment can improve organizational agility (Tallon & Pinsonneault, 2011) and firm performance (Sabherwal et al., 2019), the heterogeneity can be explained by the dynamism in managerial decision-making capabilities. In other words, heterogeneous managerial decisions, influenced by the underlying attributes of DMC, namely, human-capital skills (acquired, learned, and transferable), social-capital (span of influence and goodwill), and cognition, affect firm performance variance over time (Adner & Helfat, 2003). For example, performance heterogeneity among firms with identical resource positions can be explained by heterogeneity in managerial decisions related to the interplay of resource conceptualization and resource development (Klarner & Raisch, 2013). In contrast, task conflicts caused by differing viewpoints and high competition levels for critical resources hinder the performance outcomes (De Clercq, Thongpapanl, & Dimov, 2013).

Timely strategic decision-making is contingent on the manager's metacognitive experience and experience with ambiguity under dynamic and hostile environments. Metacognition is the higher-order process of reflecting, understanding, and controlling the cognitive process of assessing options, without bias and fear, towards a concrete goal or objective. Erratic strategic decisions are less likely from managers with more significant metacognitive experience and operating in dynamic environments. Conversely, erratic decisions are more likely in hostile environments with low dynamism (Mitchell, Shepherd, & Sharfman, 2011).

*Top Management's (TMT) role in initiating strategic change:* Interestingly, studies on CEO personality traits have shown that the characteristics needed for initiating strategic changes are different from implementing and improving those changes' performance effects. The results show that 'extraversion and openness to experience' promote the initiation; 'emotional stability'

facilitates both initiation and implementation; 'conscientiousness' hinders initiation but improves effects of change implementation; and finally, 'agreeableness' inhibits both initiation and impact of implementation. In essence, the success of a firm's strategic agenda may be contingent on the CEO's selection and characteristics (Herrmann & Nadkarni, 2014). A CEO's humility, executive sense-making for ambidextrous strategic orientation related domain experience to assess options objectively, and the level of perception of control over the environment are other significant factors that influence strategic decision-making and business performance. When humble CEOs are chosen to lead, the top management is more likely to collaborate, possess a shared vision, have fewer pay disparities, jointly make decisions, and adopt an ambidextrous strategic orientation resulting in more robust firm performance (Ou, Waldman, & Peterson, 2018). CEOs with a more ambidextrous strategic orientation, ability to process feedback (Eggers & Suh, 2019), and a moderate perception of control over their environment are most likely to develop ambivalent issue evaluations (simultaneously positive and negative) (Plambeck & Weber, 2010).

*Talent management and organizational learning:* In the DC literature, managing the firm's talent management processes is critical for the organization's value-creation (Harsch & Festing, 2020). Talent Management is a DC that focuses on attracting, hiring, developing, and retaining value-enhancing human capital. Similar to other DCs, it is influenced by internal-firm-strategic and external-environment-competitive factors. Broadly, depending on the size, agility, and complexity of the firm, talent management processes can be tailored – ranging from the network- and autonomy-driven 'individualized' type to popularity- and standards-driven 'sophisticated' type. In general, 'individualized' works well for smaller firms with flatter hierarchies, while 'sophisticated' works well for large enterprises. The value- and culture-oriented 'paternalistic' type works well for moderately sized agile firms (Harsch & Festing, 2020).

Aligning resource conceptualization and human capital investments to firm strategy are critical for capability development (Chatterjee, 2017; Kunc & Morecroft, 2010). Strategy scholars have long held that the performance differences across firms are attributed to better foresight of resource needs than rivals, differentiated internal talent management processes, knowledge asymmetries, variances in learning ability, and knowledge assimilation practices (Chatterjee, 2017; Harsch & Festing, 2020; Kunc & Morecroft, 2010). Deliberate investments in strategic learning to enhance internal technology skills and business-domain knowledge can help develop human capital capabilities and build competitive advantage. While technical skills are necessary to apply and execute innovation solutions, business-domain capabilities create higher order value, including generating those innovation ideas (Chatterjee, 2017).

#### **2.1.1.2.2 Critical Asset Positions**

The strategic posture of a firm is determined by its DCs to reconfigure and transform organizational processes and its ability to successfully develop and build positional assets and protect them against imitation (Teece et al., 1997; Tushman & O'Reilly, 1996). The organizational elements of radical innovation capability function differently from innovation forms used for incremental change. The components comprise strategic intent and innovation characteristics exhibited by the senior leadership, a strong organizational culture oriented towards customers and innovation, a flexible and evolutionary organizational structure with clear objectives, a well-orchestrated radical innovation development process, and a launch strategy differentiated towards customer adoption (Slater, Mohr, & Sengupta, 2014). We discuss the key organizational components essential for gaining a positional advantage in this section.

Structural advantage: The organizational structure of the firm is foundational for achieving its innovation and growth objectives. It must evolve with the firm. Therefore, reorganization of

firm structure can be differentiating, enabling the sustenance of the firms' positional advantage. Firms must, however, consider the rate of environmental change while making reorganization decisions (Girod & Whittington, 2017). During stable environments, infrequent fundamental restructuring may produce better results than incremental reconfigurations. While in dynamic environments, frequent incremental reconfigurations are a better-suited strategy for adaption.

*Open innovation and licensing as mechanisms for positional advantage:* Open innovation as an organizational response involves the integration of external and internal ideas and paths to market. This response creates superior economic value by combining external technology acquired from customers, suppliers, and other knowledge sources, exploiting external technology to develop knowledge to commercialize, and utilizing internal R&D prowess. Robust design capabilities and open innovation (Hung & Chou, 2013) are examples of such a response. Robust design capabilities include the diversity of functionality, aesthetic appeal, technology oriented towards forward-integration, and quality in conformance and efficient issues resolution. The choice of these design capabilities is contingent on environmental factors. We find that the product development process is characterized by technology orientation and aesthetics in stable environments and by functional robustness and forward-integration in technology during uncertain environments (Swan et al., 2005). We also find that the external technology acquisition strengthens external technology exploitation and influences firm performance, especially when internal R&D investments are high and under market turbulence (Hung & Chou, 2013).

Another way firms derive positional advantage is through inward technology licensing (patents, for example). This phenomenon is different from firms' reliance on external technological resources for new product development, which is also an excellent option to reduce internal costs and uncertainty and increase speed to market. Inward technology licensing positively influences new

product development when externally acquired technology becomes a liability for insufficient knowledge transfer, high transaction costs due to weak appropriability regimes, and a higher risk of substitution (Wang & Li-Ying, 2014). Firms with patents can generate additional revenue through licensing agreements. In turn, the licensing performance is enhanced by the licensee's absorptive capacity, knowledge endowment in terms of internal R&D investments, and the strength of the relative shared knowledge base with the licensor (Wang & Li-Ying, 2014). The licensing venture's success is contingent on the effectiveness of the feedback mechanism between licensor and licensee.

*The effects of feedback:* The consequences of feedback have been an area of focus for behavioral theorists and a pertinent factor while considering creation of new difficult-to-trade asset positions, including pursuing new domains that provide growth opportunities for the firm. Studies (Helfat & Martin, 2015; Rindova & Kotha, 2001; Schilke, Hu, & Helfat, 2018) show that negative feedback while pursuing new, inexperienced domains results in retreating to previously known domains, abandoning growth opportunities, and cannibalizing existing businesses, resulting in negative firm performance. Conversely, negative feedback in experienced domains results in both issue-resolving local and recalibrated distant solutions, expanding the firm's opportunities and performance (Eggers & Suh, 2019).

#### **2.1.1.2.3 Evolutionary Paths**

A firm's ambidexterity determines its ability to expand its business operations and boundary conditions beyond the current market, customer-base, or product-lines (Jansen et al., 2006). This ability includes making complex trade-off decisions to simultaneously pursue (capability-building) incremental change by exploiting the present and discontinuous/radical change by exploring the future (Ferreira et al., 2020; Tushman. & O'Reilly., 1996), and adapting

the exploration-exploitation balance (capability-shifting) for optimal business performance (Luger, Raisch, & Schimmer, 2018). Exploration is designed to meet the emerging needs of the customers or markets. It creates long-term value for the firm by developing new capabilities captured through discovery, risk-taking, and experimentation (Jansen et al., 2006). Developing a new business model, creating new customer relationships, and developing new products or services are all examples of exploration (Drnevich & Kriauciunas, 2011; Slater et al., 2014). Conversely, exploitation is designed to meet the existing needs of customers or markets and sustains the value created by exploration through selection, refinement, implementation, and execution (Jansen et al., 2006). Enhancing the existing product or service and improving current business processes to create efficiencies are examples of exploitation (Drnevich & Kriauciunas, 2011). I focus on the key considerations and forms of firm growth strategies in this section.

*The balancing act of pace of change and resources*: Extant literature is divided on the notion of harmonizing the levels of exploration and exploitation. While some define it as equal, others content the balance to be high (low) exploitation coupled with low (high) exploration (Wei, Yi, & Guo, 2014). Recent studies show that the firm's resource level and flexibility in coordination determine the optimal level of exploration to exploitation. Ideally, firms should build their resource and co-ordination flexibility to optimize their relative opportunities; higher resource and co-ordination flexibility generally enables the firms to conduct a higher level of relative exploratory activities, such as new product development (Wei et al., 2014).

Regardless of the degree of harmonization, the organizational routines to initiate and manage strategic change is critically important to overcome inertia (Tushman & O'Reilly Iii, 1996). The constant need to go off-balance to get better while maintaining organizational stability at the same time creates a *change-stability* paradox (Klarner & Raisch, 2013). Scholars have stated

that the fast-paced rhythm and frequency of change prevents firms from the grips of inertia, while stability provides the opportunity to develop differentiating organizational routines. Research has shown that when implemented with caution, rhythm, and frequency of change can influence firm performance contingent on the change characteristics, environmental conditions, and time factors (Klarner & Raisch, 2013).

Research suggests that the firm's ability to effectively manage the allocation of its slack, unabsorbed and rare resources to exploration and exploitation activities will result in the firm's strategic positioning, especially when the perceived environmental threat is high (Lin, Yang, & Demirkan, 2007; Voss, Sirdeshmukh, & Voss, 2008). Research also shows empirical evidence that the boundary conditions where the performance contribution of exploration are significantly higher than exploitation when employed in dynamic environments but less effective than exploitation in more stable environments (Drnevich & Kriauciunas, 2011). In addition to the *change-stability* paradox, firms must also contend with the *agility* paradox.

*The agility paradox:* Whether or not firms with DC will alter, reconfigure, and cannibalize their existing business resources to grow in new paths may be contingent on prior sensing and seizing activities, introducing the *agility* paradox (Teece et al., 1997). Sensing involves deploying the firm's marketing and customer research competencies to perform the environmental scan; while seizing requires deploying technological and R&D competencies to commit resources, including cannibalizing resources from existing ventures and investing in the new path. The firm's ability to add new market-related resources, such as distribution channels and brands, and technological resources, such as patents, enable them to sustain environmental dynamism and grow in new directions. However, research shows that the firms are limited in their ability to utilize their existing skills and resource accumulations for growth in new directions regardless of how well

they serve their current customers. This constraint is primarily because R&D competence tends to predict later technology accumulations while marketing does not predict market-related resource accumulations (Danneels, 2016). The significance of sensing activities, therefore, cannot be emphasized enough.

The firms' attentional orientation and speed to decisions toward prospecting (sensing), developing, and exploiting (seizing) new opportunities have come under scrutiny in research (Bakker & Shepherd, 2017). In general, evidence suggests that the firms that focus strongly on earlier-stage sensing activities are quicker to abandon new ventures sooner than firms that focus more on later-stage seizing. They are also slower in making decisions related to new growth opportunities. While due diligence is a good thing, the opportunity cost of decision speed has to be balanced with the "pull the plug" and "take the plunge" approach (Bakker & Shepherd, 2017). The age and maturity of the firm also should be considered. For example, a strategy to pursue product diversification from the initial firm start-up may be detrimental for operational efficiency but beneficial for firm survival (Mendoza-Abarca & Gras, 2019).

*Building Alliance Capital*: The formation of strategic alliances is a form of exploration and exploitation. Firms can choose the exploitation path to complement resources, reduce risks, and support stability. Alternatively, they can gain access to new knowledge, markets, and technology or adapt to technological discontinuities through exploitation. The centrality and structural hole paths in the network can further amplify the performance effort of alliance formation. However, research suggests that the choice of the type and expanse of formation depends on the company's size. Large firms benefit from ambidextrous forms of alliances, while a focused approach of either exploratory or exploitative forms benefits the smaller firms (Lin et al., 2007). Further, the role and influence of open innovation (Hung & Chou, 2013) via alliance formations and strategies to

externally source knowledge differ in significance across the various technology life cycle phases. In the initial phase of the technology life cycle, firms are still building their internal knowledge-building routines and accumulating internal technology capabilities (technology capital) and are much more likely to benefit from their alliance capital. In the later stages of the technology life cycle, firms have already built up their absorptive capacity through accumulated internal technology capital. High-levels of strategic alliance capital turns ineffective due to the increased risk of technology leakage caused by market competition (Vanhaverbeke et al., 2015).

*IT as an enabler:* Adaptive supply chain partnerships enable firms to gain valuable insights into the partners' broader environments (bridging) and strengthen cooperative ties to adapt for collective gain (bonding) through the information exchange mechanisms. Utilizing boundary-spanning mechanisms such as Standard Electronic Business Interfaces (SEBI) - a multilateral, quasi-open framework - can enable bridging and bonding across supply chain partners without inflexibly binding them (Malhotra, Gosain, & El Sawy, 2007). IT can also be used as an essential learning mechanism for effective knowledge transfer and creating the organization's absorptive capacity to assimilate the knowledge and commercialize it for financial gains (Iyengar, Sweeney, & Montealegre, 2015). For example, IT directly supports the firm's innovation, market, and low-cost differentiation strategies by shortening the innovation cycle, facilitating process automation, enhancing sales capabilities, and reducing costs to procure and serve (Wang et al., 2012).

Scholars posit that IT-based customer and supplier interfaces, such as electronic commerce and supplier collaboration portals, are essential for building value-chains that enable business performance. Customer value is a dynamic concept: the drivers of value differ from prepurchase desires to the inquiry on web site to actual purchase (Saeed, Grover, & Hwang, 2005b). The levers of value continue to evolve through post-sale ownership, usage, and disposal/renewal.

Understanding the customer, product journey, and the life cycle is vital for developing a balanced strategy between building a new customer base and retaining existing customers. Research shows that web site search functionalities for prepurchase situations help enhance short-term performance, whereas enhancing product ownership experience builds customer loyalty and enhances the firm's long-term performance (Saeed et al., 2005b).

*Imitation as a growth strategy:* While a firm's innovation orientation has been well documented in research as a strategic source of inorganic growth, imitation orientation - which involves replicating new ideas, products, and ways of doing business from pioneer competitors - can also be a strategic option depending on environmental circumstances. In fact, the authors in (Lee & Tang, 2018) found imitation orientation to be a viable strategy when firms face institutional uncertainties, an environment characterized by dysfunctional (opportunistic and unfair) competition. Conversely, innovation orientation is a better strategy during uncertainties caused by technological shifts. Regardless of the strategy, the authors (Lee & Tang, 2018) evidenced that either of the orientations, when adopted individually, lead to better firm performance. Adopting them simultaneously, however, hurt firm performance.

*The uncertainty trade-offs:* A high degree of environmental uncertainty brings about two contrasting firm requirements to the front – the need for speed, flexibility, and radical innovation towards long-term performance, and the need for cost reduction, efficiency, and incremental innovation towards short-term survival. Firms should draw caution to the consequences of overexploitation in uncertainty, resulting in a competence trap. At the same time, over-exploration could result in organizational chaos (Lin et al., 2007). In general, pursuing radical or exploratory innovation is a better strategy during environmental dynamism. Conversely, an incremental or

exploitative innovation strategy is more beneficial in competitive environments (Jansen et al., 2006).

### **2.1.1.3 The Environmental Context**

Drawing on the contingent approach (Aragón-Correa & Sharma, 2003), strategic management scholars have recognized that the DC effect is highly context-specific. Environmental factors, such as dynamism, munificence, and complexity, have been studied extensively as significant contributors. For example, (Schilke, 2014) found the effect of DC on firm performance to be strongest at the moderate levels of environmental dynamism. In contrast, the effect grew weaker in an environment characterized by lower and higher levels of dynamism. Business environments with lower or stable levels of dynamism may offer fewer opportunities to seize and transform, whereas higher levels may be too sudden and unpredictable to initiate a planned strategic change (Schreyögg & Kliesch-Eberl, 2007).

Furthermore, resources may be scarce and hard to obtain in a fiercely complex competitive environment making sensing, seizing, and transforming activities crucial for gaining positional advantages. On the contrary, in a less complex environment where resources abundantly available, a relatively weaker DC processes are sufficient to obtain business performance (D'Aveni, Dagnino, & Smith, 2010). DC processes can therefore be applied in principle by firms to compete in both relatively stable and highly dynamic environments (Helfat & Winter, 2011). For example, (Fainshmidt, Wenger, Pezeshkan, & Mallon, 2019) found that combining differentiation and low-cost orientation is a better strategy for higher environmental dynamism, munificence, and complexity levels. In contrast, low-cost orientation is a better strategy in stable, non-munificent, and less complex environments.

#### 2.1.1.4 The Strategic Processes Topology

While the DC literature on processes, positions, and paths (the 3Ps) have contributed to the richness and nuanced understanding of DCs, as a reminder, for this study, I draw on the strategic processes typology by Teece and colleagues (1997; 2007) and conceptualize DC as an independent variable aggregate construct consisting of strategic sense-making, timely decision-making, and change implementation dimensions. The strategic processes typology focuses on the distinctive firm capabilities for building a holistic understanding of the business environment's impending opportunities, challenges, and threats (Strategic sense-making), making strategic decisions for growth and innovation (Timely decision-making), and reconfiguring organizational resources, structure, and capabilities for gaining competitive advantage (Change implementation).

*Strategic Sense-making:* The concept of strategic sense-making was introduced by (Thomas, Clark, & Gioia, 1993) as a creative and cognitive managerial process of scanning the environment, interpreting information, and initiating purposeful action. However, scanning, interpretation, and initiation are not only concerned with external environments. Moreover, the organizational learnings from actions act as a feedback mechanism for interpretation (Daft & Weick, 1984). The interconnectedness between these processes increases the complexity of the question of what comes first. However, (Gioia & Chittipeddi, 1991) clarified that sense-making is about action initiation, enabled by the interpretation of external information and internal organizational learnings. Therefore, sense-making is the cognitive process that, by interpreting, launches purposeful action that leads to meaningful change.

But why do managers and firms engage in sense-making in the first place? (Weick, 1995) argues that sense-making starts with a business circumstance that cannot be fully understood and explained using prior knowledge or experience. It can be a continual proactive mechanism to

understand sources of competitive advantage or a reaction to an external change, such as evolving needs and preferences of consumers and technological evolutions. Further, firms can engage in sense-making “to cope with uncertainty and resolve causal ambiguity” (Weick et al., 2005). This retrospective dimension of DC is, therefore, not only essential for gaining the novel knowledge that explains the exogenous change but also enables the comprehension of the internal progress made in new capabilities development. Although the casual understanding of the sources of competitive advantage is never perfect, the cognitive maps and associations with organizational capabilities are valuable in confirming competitive advantage in the context of the firm’s market and business environment. In other words, sense-making constantly confirms a firm’s capabilities and the exploitation process with its environment. It also enables understanding the appropriateness and usefulness of novel knowledge and its fit into business operations.

*Timely Decision-making:* Decision-making regarding whether to change and what and when to change is an essential component of DC (Moliterno & Wiersema, 2007). Based on the literature, two propensities are relevant to decision-making. First, the timing of the decision to modify existing configurations is foundational. (Eisenhardt & Martin, 2000) articulated that firms can achieve sustained competitive advantage not only by reconfiguration but by doing it sooner. Second, making market-oriented decisions amplifies the effectiveness of decision-making. (Adner & Helfat, 2003) argued that decision-making is not only relevant for DC from a timing perspective but also in the content of the decisions. The business culture of market orientation effectively and efficiently creates superior customer value. Timely, market-oriented decisions capture the essence of the directional tendency of the managerial process to align the firm’s growth to the customer needs, resulting in long-term business value. (Slater, Olson, & Hult, 2006) aptly described decision-making as a strategy-making process of DC to resolve prioritization conflicts, address

strategic trade-offs regarding exploitation and exploration, remedy customer satisfaction situations, and make resource allocation decisions during rapid environmental change.

*Change Implementation:* Most strategy authors agree that one of the most distinguishing features of DC is the management of organizational change (Eisenhardt & Martin, 2000; Teece, 2014; Winter, 2003). The change capability is inherently embedded in the concept of DC. Without the strategic execution of change, firms cannot achieve the objective of creating and sustaining a competitive advantage (Heckmann, Steger, & Dowling, 2016). The concept of organizational change implementation is an emerging stream of literature. It revolves around the capability that enables the organization to build, launch, and implement change initiatives of various scopes and types to fit the strategic needs (Judge & Blocker, 2008; Soparnot, 2011). For example, (Soparnot, 2011) claimed that successful firms pursue the exploitation of existing markets and exploration of new opportunities. Still the skills required to do both simultaneously are not complementary. The study proposed organizational change as the key antecedent of strategic ambidexterity and considers the level of cooperation with various internal functions, the effectiveness of reward systems, internal controls, and change execution.

Further, in organizational change literature, deep and purposeful change has been included in both rapid breakthrough evolution and continuous adaptive change (Macri, Tagliaventi, & Bertolotti, 2002; Romanelli & Tushman, 1994). The revolutionary change consists of the entry of new actors in the firm or marketplace (Hendry, 1996), significant misalignment between the firm and its environment, and significantly reduced performance (Romanelli & Tushman, 1994). In contrast, adaptive change is linked to small steps that can ultimately lead the firm to significant change (Tsoukas & Chia, 2002). A purposeful change towards a goal-directed end state can be significant and adaptive. This type of change follows the teleological change proposed by (Van de

Ven & Poole, 1995), which, rather than prescribing a sequence of events, focuses on the activities involved in the change process toward an envisioned end state or goal by assuming equifinality.

Literature suggests that change implementation is often conceptualized as a hierarchy ranging from lower resource adjustments to significant changes that are made to alter the configuration of the resource base (Collis, 1994; Danneels, 2008; Helfat & Winter, 2011). Moreover, implementation is necessary for both where the problem is explained and the system stays predominately intact and where the solution reframes the problem and modifies the system in itself (Winter, 2003). I define change implementation for this study as the dynamic ability of the firm to coordinate and execute integration and reconfiguration processes related to strategic decision(Law, Wong, & Mobley, 1998).

In sum, strategic processes typology (Teece, 2007; Teece et al., 1997) provides the mechanisms for organizations to build DCs. I conceptualize the DC dimensions as an aggregate construct since the collective value of all dimensions is far greater than the individual. For example, while strategic sense-making yields options or choices based on opportunities and threats, timely decisions are necessary to select the appropriate option based on the business criteria. Furthermore, change implementation is needed to operationalize the chosen option. Therefore, all three dimensions are critically important for deriving the intended value. In the next section, I shift from DC theory to focus on understanding the concept of resilience, its roots, and the evolution of OR theory.

### **2.1.2 The Evolution of Organizational Resilience Theory**

The concept of resilience and the need for making organizations more resilient has gained prominence in business in recent years. It has also gained momentum in management and strategy research in explaining how organizations survive and grow amidst adversity, disruption, and

turbulence (Clément & Rivera, 2017; Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017). Although promising, the concept has been criticized for being unclear and lacking consistent definition (Burnard & Bhamra, 2011). It is therefore vital to start with the theoretical roots of resilience to understand the concept's conceptualization and dimensions from an organizational perspective.

### **2.1.2.1 Theoretical Background of Resilience and the Adaptation Cycle**

Resilience finds its early roots in ecology. The seminal work in complex socio-ecological systems (Holling, 1973, 2001) defined resilience as the “measure of the persistence of systems to absorb change and disturbance while maintaining the same relationships with their population or state variables”. (Folke et al., 2004) proposed that it is about the scope and intensity of disruption a system can endure “before it shifts to a different state of stability with varying controls on structure and function”.

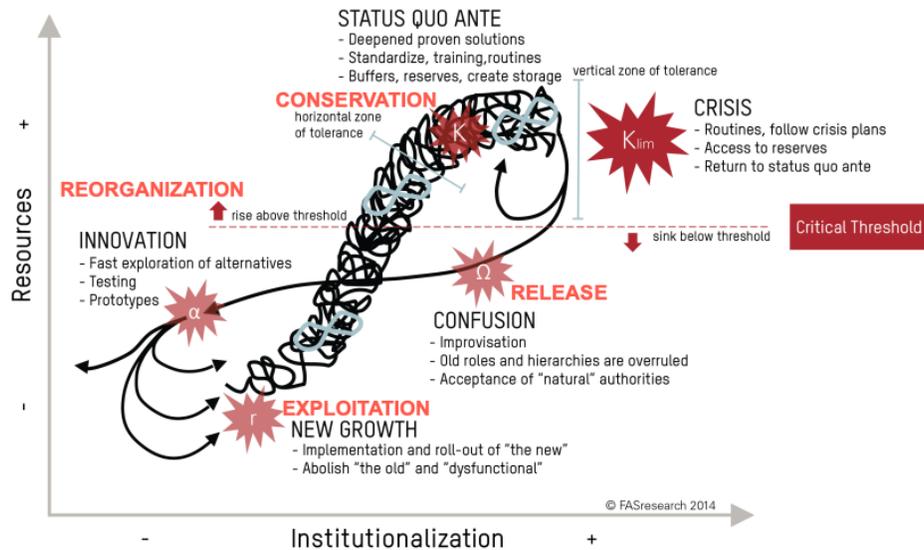
The phenomenon of adaptation is at the core of resilience. In evolutionary biology, (Bock & Von Wahlert, 1965) defined adaptation as a “state of being, a feature having properties of form and function which permit the organism to successfully maintain the synergy between a biological role of that feature and a stated selection force”. Moreover, it is the “process of evolutionary change in the form-function complex of a feature which reduces the amount of energy required by the organism to maintain the synergy of the stated adaptation successfully”. While organisms must exert energy to maintain synergy successfully, the amount of energy available at any time is limited (Reeve & Sherman, 1993).

In socioecology literature, adaptation is a cyclical process regulated by the effect of external disturbances (Folke et al., 2004). This notion follows the premise that complex ecosystems, under duress, do not move toward the next stable state in one move. The systems

alternate between phases of resistance and aggregation and shorter periods of transformation and sustenance (Holling, 2001; Holling & Gunderson, 2002). Resilience is often associated with the ability of the system to bounce back from a disturbance. In contrast, resistance is the ability of the system to absorb a disturbance and attain sustainability over time. Sustainability is the system's ability to sustain and maintain system function over time (Burkhard, Fath, & Müller, 2011; Fath et al., 2015). Therefore, integrating the resilience concept with the adaptation cycle provides a comprehensive understanding of all system dynamics stages.

The adaptive cycle applied to social systems, such as organizations, follows four stages: namely, exploitation, conservation, release, and reorganization (Burkhard et al., 2011). The corresponding outcomes of the four stages are new growth and innovation, controlled development and resistance, dissolution and confusion, and reorganization and innovation. Figure 3 portrays the adaptive cycle of social organizations (Fath et al., 2015). Fath et al. (2015) proposed that many small-scale adaptive cycles are embedded within the exploitation and conservation stages representing modular experimentation and innovation, sending the system towards an upward growth trajectory. A disturbance caused by a crisis tests the system's range tolerance in the conservation stage, which is either met with resistance within the conservation stage or propels the system toward the release stage and dissolution (Burkhard et al., 2011; Fath et al., 2015).

**Figure 3: Adaptive cycle applied to social systems adapted from (Fath et al., 2015).**



The resilience system navigates all four stages of the adaptive cycle (Figure 3). First, a system in the exploitation stage ( $r$ ) has successfully emerged and reoriented itself from the crisis and seeks to activate energy to fuel innovation and growth (Ulanowicz, Goerner, Lietaer, & Gomez, 2009). The goal at this stage is to develop a configuration that is well balanced to scale against internal and external complexity. Innovation comes from experimentation rather than constraint; network connections are built with trust and meaningful feedback mechanisms. “Poverty trap” may result if the system cannot access activation energy from a lack of positive feedback (Holling & Gunderson, 2002). Feedback dynamics are essential for the system to enter the next stage. Second, a system in the conservation stage ( $K$ ) has achieved a level of maturity in structures, routines, and functions that, in the event of a crisis ( $K_{lim}$ ), can either support the system to return to the status quo ante by accessing its reserves to execute its crisis plans or send the system downward toward release stage of dissolution and confusion. A mature system will continue performing at higher activity levels while macro-indicators are relatively stable or start

to deteriorate as a crisis occurs. Resource constraints after disruption spur innovation from information-sharing and co-creation with networks and internal reorganizations (Fath, Jørgensen, Patten, & Straškraba, 2004). On the contrary, the “rigidity trap” can also occur (Holling & Gunderson, 2002). Rigid systems are vulnerable to disruptions due to their lack of network diversity and inability to self-organize with agility. It is always desirable to extend the conservation stage to persist through the crisis with continued development, influenced by preparedness and the collective response from all actors in the system. Third, in the face of extreme crisis and release stage ( $\Omega$ ), the capacity of the system to survive is tested. Vital functions of the systems are identified, reprioritized, and maintained. Crisis coordinators emerge to set the stage for adaptive learning and reorient the system to successfully navigate through the disruption (Nielsen & Ulanowicz, 2011). Failure to survive in this stage results in a “dissolution trap,” a complete breakdown of the system (Holling & Gunderson, 2002). Finally, in the reorganization stage ( $\alpha$ ), the system renews, regenerates, and reorganizes to recover from the disruption and regrow (Schweinberger, Petrescu-Prahova, & Vu, 2014). Complex adaptive systems seldom return to their stable state as before. Depending on its overall capacities exhibited in all stages, the system can achieve a level of structure and function that ranges from worse to better than before.

#### **2.1.1.2 Resilience as a Business Ability**

OR theory draws on resilience theory and the adaptation cycle from socioecology literature. It proposes business organizations as complex systems that gradually develop their structures, processes, and strategies to adapt to competition and environmental changes. Resilience is considered a desirable characteristic in a business context for organizations to successfully deal with various types of adversities they cannot predict (Luthans, Avey, Avolio, & Peterson, 2010; Shin, Taylor, & Seo, 2012). Organizations inevitably face adversity from abrupt events and

conditions threatening their stability and performance (Boin, 2009; Whiteman & Cooper, 2011). For example, natural and human-caused disasters, such as a pandemic, terrorist attacks, and industrial accidents, cause significant adverse ecological, societal, business, and economic consequences with rippling effects (Ambulkar, Blackhurst, & Grawe, 2015; DesJardine, Bansal, & Yang, 2019). Resilience at a firm level is the ability of an organization to anticipate disruption, resist, and adapt by rapidly changing course and reconfiguring organizational resources, optimizing organizational processes, reshaping organizational relationships, recovering quickly from the disruption, and using the disruption to achieve counter-trend growth (Chen et al., 2021). Seminal conceptualizations of OR abilities are shown in Table 2.

**Table 2: Organizational Resilience Abilities**

<b>Abilities</b>	<b>Source</b>	<b>Definition</b>
Anticipate and Prepare	Somers (2009)	“Resilience is more than mere survival; it involves identifying potential risks and taking proactive steps (...) to ensure that an organization thrives in the face of adversity”
	Boin & Van Eeten (2013)	“Precursor resilience prevents budding problems from escalating into a full-blown crisis or breakdown”
	Ortiz-de-Mandojana & Bansal (2016)	“Resilience is the incremental capacity of an organization to anticipate and adjust to the environment”
Resist and Absorb	Lengnick-Hall et al., (2011)	“Resilience is a firm’s ability to effectively absorb, develop situation-specific responses to, and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten organization survival”
	Vogus & Sutcliffe (2007)	“Resilience is the maintenance of positive adjustment under challenging conditions such that the organization emerges from those conditions strengthened and more resourceful”
Respond and Adapt	Home III & Orr (1997)	“Resilience is a fundamental quality (...) to respond productively to significant change that disrupts the expected pattern of event without engaging in an extended period of regressive behavior”
	Reinmoeller & Van Baardwijk (2005)	“Resilience is the capability to self-renew over time through innovation”
Recover and Grow	Linnenluecke, Griffiths, & Winn (2012)	“Resilience is the organizational capacity to absorb the impact and recover from the actual occurrence of an extreme weather event”

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Boin & Van Eeten (2013)

“Recovery resilience means bouncing back to a state of normalcy”

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While most of the definitions and conceptualizations align with the adaptive capability perspective of socio-ecological literature, two aspects are essential to hone in on. The first aspect is survival in the imminence of crisis. This aspect is tied to the organization’s ability to make positive adjustments internally and externally to bounce back to a state of normalcy (Boin & Van Eeten, 2013). The second aspect is that the organization can transform in the face of a challenge to grow further in response to adverse environmental shifts (Lengnick-Hall et al., 2011). This aspect focuses on identifying new opportunities and developing new capabilities that result in superior performance relative to its position and its competition before the crisis as it emerges from the crisis. To understand this more, I investigate the strategy research perspectives.

Strategy research examines the factors that explain the heterogeneity among competitors and an organization's strategic decisions as a result of adaption to changing environments (Acar & Winfrey, 1994). It is related to how OR can ensure successful growth and competitive advantage beyond survival in turbulent times. It postulates that generating competitive advantage through resilience will be a crucial success factor for the organization in the future, and it means that the organization can sense its environment, create opportunities, and realign resources faster than its peers (Chakravarthy, 1982; Farjoun, 2010; Lengnick-Hall & Beck, 2005). Therefore, the core tenant in strategic management is for the organization to achieve an adaptive fit to its external environment by taking intentional measures to reestablish a new equilibrium state at a higher operation level than before (Lengnick-Hall & Beck, 2005). Figure 3 shows the reliance in action. This example is drawn from The Home Depot’s stock performance pre- and post-covid. The stock performance reflects the firm's market valuation and is thus an excellent pseudo for firm

performance. It clearly articulates the firm's anticipation-, resistance-, and absorption-related actions undertaken before the COVID pandemic, whereas response, adaptation, recovery, and growth occur afterward. It also shows that the new equilibrium level is at a higher level than before, indicating superior resilience performance.

**Figure 4: Resilience in Action: Stock Performance of Home Depot pre- and post-COVID pandemic (periods between August 2021 and December 2022)**

Adapted from StockCharts.com



### 2.1.2.3 Conceptualizing Crisis

A resilience response is triggered by the advent of an event of disruption or crisis. Therefore, an understanding of crisis is essential to appreciate the resilience theory better. Management literature conceptualizes crisis broadly as an event and a process.

Regarding crisis-as-a-event, the seminal work of (Hermann, 1963) articulated three critical elements of crisis: (1) threat to high-value priorities of the organization, (2) limited time for response, and (3) unexpected and unpredictable nature of the event. Furthermore, (James, Wooten, & Dushek, 2011) identified three additional components based on the core tenet that the crisis is a

low-probability, high-impact situation that impacts all stakeholders and threatens the organization's viability. They are the event's rarity, significance, and extent of the impact on the stakeholders. The typology of crisis includes all surprising and disruptive events that are unanticipated and nonroutine. They are “rare, isolated in space and time, have a discernable source or cause, and are high impact” (Pearson & Clair, 1998; Shrivastava, Mitroff, Miller, & Miclani, 1988). Examples are oil spills (Pauchant & Mitroff, 1992), the explosion of the Challenger shuttle (Starbuck & Milliken, 1988), terrorist attacks (Schweinberger et al., 2014), the financial crisis (DesJardine et al., 2019), and the COVID pandemic (Ding, Levine, Lin, & Xie, 2021).

In contrast to the event perspective, which focuses on the aftereffects of the crisis, the crisis-as-a-process process perspective focuses on understanding the environment that fosters organizational weakening, the evolution of the crisis, and the organizational response at each stage of the crisis (Roux-Dufort, 2016; Roux-Dufort, 2007). The two key components of crisis in this perspective are (1) development over time and in phases leading up to a triggering event (Mitroff & Pearson, 1993; Roux-Dufort, 2016) and (2) causing disfunction requiring interpretation of the new environment (Roux-Dufort, 2007). Literature suggests that the crisis-as-a-process view is pertinent to the capability-building and resilience-response perspectives. For example, (Turner, 1976) proposed that crisis develops in six stages (1) starting point with notional normalcy, (2) evolves through a period of incubation, (3) triggering an event, (4) onset of a collapse or a consequence, (5) first stage of adjustment to restore normalcy, and (5) final adaptation for achieving new norm. Further, (Shrivastava et al., 1988) argued that “crises are not events but processes extended in time and space”.

#### **2.1.2.4 Conceptualizing Organizational Resilience**

The OR theory has been widely discussed in organizational management and strategy fields. While research in OR continues to evolve, quantitative research is developing more slowly. This slow evolution is primarily due to differences in perceptions regarding dimensions (Kantur & Say, 2015; Vogus & Sutcliffe, 2007). OR is a multifaceted concept with capability-, process-, and outcome-based perspectives (Gittell, Cameron, Lim, & Rivas, 2006; Lengnick-Hall et al., 2011; Ma et al., 2018; Wicker, Filo, & Cuskelly, 2013). First, scholars subscribing to the process perspective consider OR a dynamic and progressive firm response to disruptive or crisis situations and adapt to complex environments. Second, scholars focusing on capability consider OR as a dynamic and flexible synthesis of the organization's predictive, survival, adaptive, coping, and learning capability in response to the crisis. Finally, Outcome-focused scholars consider OR as the ability of the organization to be in a positive adaptive state while facing crisis. In general, scholars with a dynamic view advocate using a capability- or process-based perspective to explore OR, while scholars with a static view suggest an outcome-based perspective. Table 3 presents examples from literature based on the three perspectives with corresponding OR definitions.

**Table 3: Perspective-based Organizational Resilience conceptualizations**

<b>Perspectives (Scholarly view)</b>	<b>Source</b>	<b>Definition</b>
Capability (Dynamic)	Ma et al., (2018)	“Organizational resilience is an organization’s capability that enables organizations to survive, adapt, recover, and even thrive in the face of unexpected and catastrophic events as well as turbulent environments”
	Weick (1996)	“Organizational resilience has been conceptualized as robust, redundant, adequate, and rapid functioning”
	(Ortiz-de-Mandojana & Bansal, 2016)	“Organizational resilience is the ability of an organization to be aware of disruptions and to respond proactively to unexpected events”
	Lengnick-Hall et al., (2011)	“Organizational resilience is the ability of an organization to effectively absorb, develop context-specific responses to, and engage in change activities”
	Duchek (2020)	“Organizational resilience is the ability to anticipate potential threats, to respond effectively to unexpected events, and to learn from these events, resulting in a dynamic capability designed to facilitate organizational change”
	Koronis & Ponis (2018)	“Organizational resilience can be viewed not only as the ability to absorb or adapt to disturbances and changes, but also as the ability to recognize and adapt to unexpected changes”
Process (Dynamic)	McCarthy, Collard, & Johnson (2017)	“Organizational resilience is an evolutionary process in which organizations respond to changes in the external environment by deploying resources”
	Lengnick-Hall & Beck (2005)	“Organizational resilience competence is a process that develops from a combination of cognitive and behavioral competencies at the organizational level as well as knowledge, skills, attitudes, and behaviors at the individual level in contextual conditions”
	Ishak & Williams (2018)	“Organizational resilience is a dynamic structure of organizations that encompasses both typological and quantitative dimensions and covers processes such as reintegration, identity management, communication network building, emotional labor, and improvisational coping”
	McManus, Seville, Vargo, & Brunson (2008)	“Organizational resilience is a function of an organization’s awareness of the overall situation, its management of critical weaknesses, and its ability to adapt in a complex, dynamic, and interdependent environment”
Outcome (Static)	Weick (1996)	“Organizational resilience is the result of designing structures that are a source of resilience for collective perceived power”
	Gittell et al., (2006)	“Organizational resilience is the result of both relational and financial reserves that enable organizations to maintain their relational reserves”

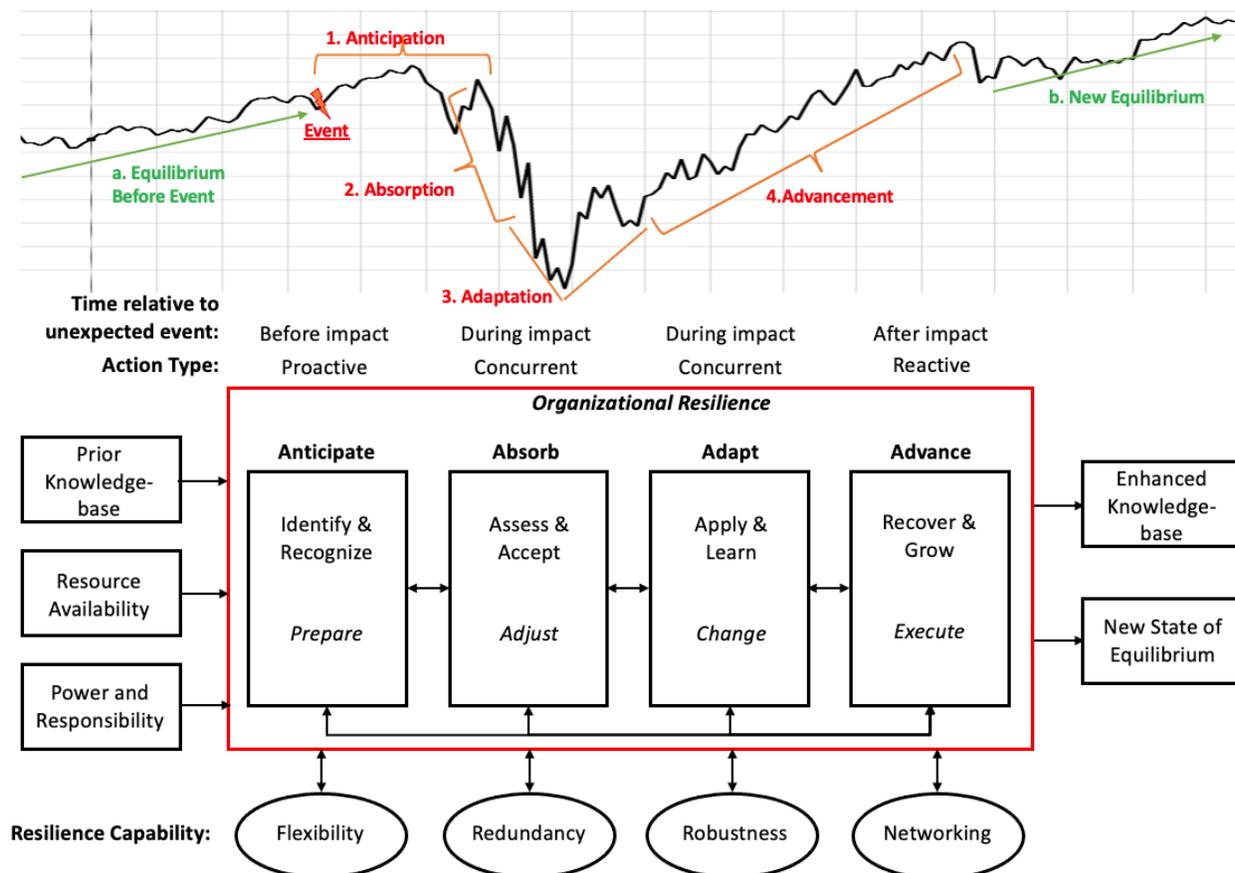
As shown in Table 3, many studies have considered OR as an organizational ability. However, only some have attempted to understand the specific capabilities necessary for resilience. Resilience literature is heterogeneous as it refers to many contexts related to specific issues and utilizes numerous research methods. For example, (Hamel & Välikangas, 2003), through two case studies, found that firms can achieve the resilience results by developing functional and strategic capabilities. (Lengnick-Hall & Beck, 2005) and (Lengnick-Hall et al., 2011) found that focusing on general routines and capabilities can also underlie OR. (Lengnick-Hall & Beck, 2005) notes that a firm's cognitive and behavioral resilience capacity stems from using different organizational routines during disruption. Based on this (Lengnick-Hall et al., 2011), in a study focused on strategic human resource management practices, noted that the firm's resilience capacity is a derivation of a "set of specific organizational capabilities, routines, methods, and processes by which a firm conceptually orients itself, acts to move forward, and creates a set of diversity and adjustable integration."

Further, (Ortiz-de-Mandojana & Bansal, 2016), in a business sustainability study using matched-pair design, described OR as a non-static construct that is a latent, path-dependent set of capabilities developed while facing unexpected events. The study found that the social and environmental practices of the firm help identify, recognize, and mitigate situations that threaten its viability as a business. This process contributes to OR. A capabilities-based approach offers essential insights into how resilience is developed and achieved in practice. Accordingly, I adopt a capabilities-based perspective for theorizing and measuring OR in this study. However, OR literature is fragmented and does not adequately describe the underlying capabilities of the resilience phases and processes. This gap is addressed next by presenting an integrated OR framework.

### **2.1.3 Integrated Organizational Resilience Framework**

OR literature is prescriptive and normative, focusing on attributes, behaviors, and resources that distinguish resilient firms from their less resilient peers. This perspective is not very conducive to understanding how resilience is achieved in practice (Boin & Van Eeten, 2013; Sutcliffe, 2003). For example, it remains unclear if resilient organizations can be designed agnostic of an event (Duit, 2016). However, we can enhance knowledge by extending the process-based and capability-based approaches to build an integrated OR framework. The process-based approach, recognizing the dynamic nature, defines the various stages of resilience. In contrast, resilience capabilities provide a deeper understanding of the mechanisms of resilience. In combination, the two approaches can stimulate a holistic understanding of the resilience phenomenon and form the basis for future research on building resilient organizations. Towards this end, I propose an integrated conceptual framework of OR presented in Figure 5. The conceptual framework, adapted from (Duchek, 2020), portrays the significant stages of the resilience process, namely, Anticipate, Absorb, Adapt, and Advance (4As), and points to the underlying capabilities that collectively defines the meta-capability of OR. Furthermore, I conceptualize the inter-relationships of the different resilient stages with timing, actions, antecedents, and drivers.

**Figure 5: Integrated Conceptual Organizational Resilience Framework adapted from (Duchek, 2020)**



### 2.1.3.1 The four stages of OR (4As)

The process-based OR literature notes the dynamism of resilience as an “interaction between the organization and the environment” (Williams et al., 2017). Resilience, through this lens, is an effective response to disruptive events - before, during, and after the event (Linnenluecke, Griffiths, & Winn, 2012; Williams et al., 2017). Accordingly, based on this premise, I propose that the foundation of the OR framework includes four stages, namely Anticipate, Absorb, Adapt, and Advance (4As as shown in Figure 4). The four successive stages are specific action responses (proactive, concurrent, reactive) to the timing (before, during, and

after impact) of the unexpected event. This temporal structure follows similar approaches used in the crisis management literature (Boin, 2009; James et al., 2011; Pearson & Clair, 1998).

The resilience stages are based on OR literature that describes resilience as an offensive adaptive response to unexpected events (Lengnick-Hall et al., 2011; Limnios et al., 2014; Weick & Sutcliffe, 2011) rather than a defensive recovery mechanism. Accordingly, the first stage, Anticipation, refers to identifying and recognizing the potential threat and determining the magnitude of impact on the entire internal and external system surrounding the firm (Somers, 2009). Anticipation involves preparing the organization to withstand the impact of the disruption before the effect is actually felt (Boin & Van Eeten, 2013). It also refers to the firm's ability to detect critical evolutions in the system (within the firm and in its environment) and develop cognitive awareness to recognize the disruption's impact before it is felt proactively (Somers, 2009; Teixeira & Werther, 2013). It is important to note that this is only a preventative measure and cannot eliminate the impact. However, some firms can anticipate and react to the unexpected faster than others who adopt a wait-and-see approach. (Madni & Jackson, 2009) found that the capability related to the anticipation stage can reduce the intensity of negative consequences of the imminent impact. They define anticipation as the forward-looking ability of environmental change, such that current decisions and actions cause the right outcomes to avert or alleviate the impact of disruptions in the future. In sum, anticipation builds a potential for OR that needs to be more evident and realized by the organization.

The second stage, Absorption, is an offensive response at the onset of the impact and comprises purposeful coping efforts to assess and accept the effects (Rerup, 2009). Absorption involves adjusting the organizational routines and resources, both internal and external, to reduce the intensity of the impact (Lengnick-Hall et al., 2011). Many examples in the literature describe

the coping mechanisms of absorption to resist destruction. For instance, (Home III & Orr, 1997) describes using various productive responses to cope with the negative impacts. Whereas (Mallak, 1998) notes building and executing positive adaptive behaviors matched with the imminent situation. The overall ability to cope starts with assessing and accepting the potential impact of the impending crisis event. For example, at an individual level, resilient people have a practical understanding and firm grasp of reality (Coutu, 2002a). At an organizational level, the resilience phenomenon presents a cognitive challenge as the future is still unpredictable and unknown. Firms, therefore, tend to be in denial, waiting to gain more information (Hamel & Välikangas, 2003). This delayed realization causes slower reaction times. For this reason, firms must develop the ability to assess and accept the problem as quickly as possible. (Hamel & Välikangas, 2003) also propose that assessment and acceptance dimensions include three elements: understanding the firm's environment, understanding the systems' operational state, and assessing and becoming aware of possible failures.

The third stage, Adaptation, is a countermeasure taken by the organization during the impact. It comprises reconfiguration strategies to learn, develop and implement new solutions and changes (Lee, Vargo, & Seville, 2013; Weick & Sutcliffe, 2011). Adaptation involves reflection, learning, and implementing transformational changes with agility to achieve a flatter turnaround toward organizational advancement (Limnios et al., 2014; Madni & Jackson, 2009). Learning at this stage improves the firm's knowledge base, triggering a feedback loop to enable incremental changes. In other words, firms must reflect on the crisis and incorporate the learning into the existing knowledge base. Simultaneously, they must also execute on that knowledge to induce change (Edmondson, 2002). Learning is the “ongoing process of reflection and action characterized by asking questions, seeking feedback, experimenting, reflecting on the results, and

considering errors and unexpected outcomes of actions” (Edmondson, 2002). Furthermore, organizations can learn from other related or similar incidents (Madsen, 2009). This lessons-learned aspect is crucial since any failure that occurs in one system can recur in another like system for similar reasons. This phenomenon is known as isomorphism. For example, accident rates in the US airline industry declined as they applied lessons learned from the accidents in the US railroad industry (Baum & Dahlin, 2007). This decline may suggest that accidents are an essential source of learning. Further, the new knowledge generated from the lessons learned is translated into new behaviors. Additionally, transformational change achieved from high-level learning will result in improved norms, values, methods, and practices (Visser, 2007). For example, (Kendra & Wachtendorf, 2003) argues that resilient organizations show “a willingness to overturn or bypass experience, knowing that the current troublesome situation, although encountered previously, may, in fact, have quite novel features; requiring inquiry and ingenuity to address.” In other words, organizations must simultaneously trust and question their past experiences while adapting to a new event.

The fourth stage, Advancement, is a measure of achieving accelerated and differentiated growth. Advancement involves executing transformational change strategies across the entire value system to turn a challenging environment into an opportunity to enhance the existing knowledge base and achieve a new higher state of equilibrium (McManus, Seville, Vargo, & Brunson, 2008; Ortiz-de-Mandojana & Bansal, 2016; Williams et al., 2017). In this context, it is essential to know that new practices can cause new problems that require more changes. Research shows that a two-thirds of change initiatives fail due to resistance, change fatigue, and lack of communication (Sirkin, Keenan, & Jackson, 2005). Therefore, managing change directed toward advancement is critical for resilience.

### **2.1.3.2 The Interactions Between Resilience Stages**

The resilience stages do not operate in a silo. They are overlapping and strongly interdependent. For example, the anticipation stage is closely associated with the absorption stage. On the one hand, assessing and acting quickly on information gathered about an imminent event is crucial. But on the other, firms with a broad range of actions also tend to show an ‘ecology of thought,’ i.e., a wide range of perceptions of critical developments, from critical thinking to taking immediate, incremental, and iterative steps to mitigate risks (Whiteman & Cooper, 2011). Furthermore, the absorption stage is closely associated with the adaptation stage. Accepting the crisis builds the foundation for retrospection, learning, and change management. Absorption and adaptation happen concurrently and iteratively during the crisis after the initial impact is felt. Learning occurs regardless of the outcome (success or failure), enhancing the firm’s capabilities by broadening the spectrum of actions. Similarly, adaptation and advancement are also closely connected. Organizational advancement propels the recovery effort from adaptation to achieve differentiated growth. In sum, all four stages build on each other and have feedback loops and backward influence mechanisms to make the reliance process more effective.

It is essential to focus on developing all underlying capabilities (i.e., flexibility, redundancy, robustness, and networking) of all stages for achieving higher levels of OR. Collectively, the underlying capabilities form the meta-capability of OR (Somers, 2009). I discuss these capabilities in more detail in the section dedicated to discussing the dependent variable for this study. For now, it is essential to understand that these capabilities help firms develop both a high resilience potential and the ability to realize it (Lengnick-Hall et al., 2011; Madni & Jackson, 2009). I propose that the strength of interaction between the potential and realized resilience,

facilitated by the meta-capability, is why some firms are more resilient than others during crisis or disruption.

The effective development and deployment of the core capabilities of the firm, such as strategic flexibility - the ability to learn fast and quickly adapt routines and strategies, building redundancy of resources, fostering a culture and practice of robust and lean thinking and processes, and integrating knowledge through networks are instrumental in resilience response activation during a crisis (Burnard & Bhamra, 2011; Lengnick-Hall & Beck, 2005; Sheffi, 2005). Thus, for this study, I operationalize flexibility, redundancy, robustness, and networking as the meta-capability of OR. I discuss this as dependent variable dimensions in the section following next. Next, I focus on the key antecedents and drivers of the proposed OA framework.

### **2.1.3.2 Key Antecedents and Drivers**

The meta-capability of OR depends on various contextual factors. OR is a highly complex construct, and the capabilities are deeply embedded in the social structures of the system. This complexity implies that it is neither simple nor straightforward to describe the factors and conditions critical for developing and realizing OR. However, the key antecedents (prior knowledge base) and drivers (resource availability and power and responsibility) are essential to understand.

Knowledge base: Firm's prior knowledge base can enable or hinder the pace of anticipation, acquisition of new knowledge, and pursuant assimilation process of innovation. While prior knowledge base discerns and defines the locus of the knowledge search necessary for anticipating, it can also restrict the research to only the known and proximate areas (Helfat, 1994; Rosenkopf & Nerkar, 2001; Stuart & Podolny, 1996). For example, firms may ignore external signals and information that may not be close to the existing knowledge base but relevant for

recognizing the imminent threat. In addition to developing a broader perspective beyond the firm's core business, they must also develop a broad knowledge base that considers changes that are internal and external to the firm (Beinhocker, 1999).

Prior knowledge base is important for other resilience stages beyond anticipation stage. For example, lessons learned from former crisis and knowledge about successful actions provide critical insights for the absorption, adaptation, and advancement stages. For example, (Sutcliffe, 2003) notes that a comprehensive knowledge base can help organizations develop effective action plans and facilitate the execution of the most suitable for a given situation. A robust knowledge base can also help with continually learning and internalizing the new knowledge. It forces firms to have deeper, constructive conversations over superfluous, simple interpretations (Haunschild & Sullivan, 2002).

*Resource Availability:* Firms must reconfigure their resources quickly in response to disruptions. This action includes assigning resources for actively scanning the environment, reassigning existing resources from exploration to exploitation, and gaining access to new resources to mitigate operational risks during disruption. Research shows that a diverse and accessible set of resources are foundational for timely reactions during disruptive conditions (Lengnick-Hall et al., 2011; Vogus & Sutcliffe, 2007). Resource, in this context, includes human, technology, and financial facets. First, dedicating sufficient resources for environmental scanning is critical for identifying critical developments in the industry, economy, and market. Slack resources, including tapping into external partners, are vital for reconfiguration during the anticipation and absorption stages. Rebalancing exploration and exploitation activities require strategic orientation, mature learning mechanisms, and diversity in the resource pool (Lengnick-Hall & Beck, 2005; Visser, 2007). Second, technology is an enabler for business innovation and

continuity during the absorption and adaptation stages. In the context of crisis management, technology is about reconfiguring existing methods, tools, and platforms for sustaining business performance (Dong, 2021). In the advancement stage, technology can be leveraged as a differentiator.

Finally, Financial resources act as a buffer for containing the negative impacts of a crisis (Pal et al., 2014). Studies have shown that financial resources can assist businesses recover from an acute crisis (De Carvalho, Ribeiro, Cirani, & Cintra, 2016; Lampel, Bhalla, & Jha, 2014). For example, (Gittell et al., 2006), in their study on airline industry responses to September 2011, found that airlines with more significant financial resources, i.e., with higher cash levels on hand versus debt) were able to reassign staff (instead of laying them off) for faster recovery. In sum, organizations need unused capacity, multiple sourcing options, and parallel processing ability to function during and recover from the disruption adequately.

*Power and Responsibility:* To successfully implement change during the adaptation and advancement stages, firms must translate their new knowledge into new behaviors and network strength to power relationships. Moreover, cognitive processes and organizational learning are associated with power relationships (Mallak, 1998). Power actors can foster or hinder organizational change processes. Innovation is not possible when a power relationship impedes the learning process. For example, they can influence and impact the application of new knowledge through the resource allocation processes (Lengnick-Hall et al., 2011). Research shows that power based on expertise and experience is superior to a hierarchical position. For example, decentralization, self-organization, and shared decision-making provide the flexibility necessary for adaptation in unpredictable environments (Lampel et al., 2014). In other words, organic

structures improve strategic decision-making and resilience, while mechanistic structures impede the decision-making process and amplify the impact of the disruption.

### **2.1.3.3 Meta-capability of Organizational Resilience**

The OR theory draws from socioecological literature and characterizes OR as an ability of the firm to anticipate disruption, resist, and adapt by rapidly changing course and reconfiguring organizational resources, optimizing organizational processes, reshaping organizational relationships, recovering quickly from the disruption, and using the disruption to achieve counter-trend growth (Chen et al., 2021). The four stages of the resilience framework, namely, anticipate, absorb, adapt, and advance, rely on the meta-capability of OR, namely flexibility, redundancy, robustness, and networking. The meta-capability of OR is focal to this study as the dimensions of the outcome or independent variable construct.

*Flexibility*: Building resilience presumes that disruption and threat during a crisis can be a source of opportunity for growth. Strategic flexibility is required to capitalize on such opportunities. Strategic flexibility is the ability of the organization to change direction at short notice at a low cost (Vargo & Seville, 2011; Vossen, 1998). It can take the forms of operational and structural flexibility. Operational flexibility involves rapid decision-making, effective internal and external communications, and the ability to quickly adapt routines and strategies to absorb the impact and turn that into a growth opportunity through rapid learning (Sheffi, 2007; Vossen, 1998). On the contrary, Structural flexibility involves developing the firm's adaptive capacity, such as creating and executing contingency plans to reroute orders and logistical support to alternate business partners and executing customer-centric responses based on market intelligence (Peck, 2006; Sheffi & Rice Jr, 2005). This study defines flexibility as the organization's ability to achieve

priorities and objectives on time to contain losses from disruptions and turn them into growth opportunities (Sheffi, 2007).

Redundancy: Having collateral pathways, i.e., multiple alternative courses of action, bestows OR (McManus, Seville, Brunsten, & Vargo, 2007). Collateral pathways draw complex adaptive systems where when a system experiences a disruption in one path, the alternative route is utilized to achieve the same goal (Marion, 1999). Redundancy is foundational for collateral pathways and includes extra components or resources in the system that are immediately necessary for the system's functioning but essential during unpredictable failure. For example, (Sheffi & Rice Jr, 2005) examined the supply chain disruptions of the transportation sector during acute artificial and natural disasters and found that firms with additional resources beyond normal levels in reserve were more resilient in their response. Other examples of building redundancy include creating parallel processes, utilizing unused capacity, multiple sourcing, and using various channels to satisfy customer needs (Sheffi, 2007). From a managerial perspective, it also includes the decision-making ability to deploy alternate strategies (Lengnick-Hall et al., 2011). However, firms must balance the cost of creating redundancy with the loss of short-/mid-term profits and long-term economic benefits of resilience (Linnenluecke et al., 2012).

Robustness: Robustness is the degree to which a system can cope with disruption, withstand stress, and maintain functionality without degradation (Duchek, 2020). In other words, it is the extent to which the system is sensitive to exogenous influence. Sensitivity can be exhibited through the system's performance upon exposure to the adverse event (Zhou, Sheu, & Wang, 2017). The primary characteristic of robustness is the ability of the system to withstand and absorb the strain while maintaining its functionality (Hillmann & Guenther, 2021). The act of

withstanding and absorbing stress could include making business process changes and changes to the mode and type of operation.

Robustness also builds reliability through lean thinking and practicing a quality-aware culture (Christopher & Rutherford, 2004). They are also effective in deploying contingency plans during disruption, enhancing the organization's ability to implement internal control and continuous improvement measures that stabilize operational processes and reduce variability in supply chain and inventory levels (Mangan & Lalwani, 2016; Tang, 2006).

*Networking:* Networking is the extent of internal and external stakeholder connectedness for reducing disruption risks and developing long-term resilience (Coutu, 2002b). Network in this context refers to "a structure of interdependence involving multiple organizations or parts thereof, where one unit is not merely the formal subordinate of the other in some larger hierarchical arrangement (O'Toole, 1997)." Networking produces outcomes at the network and organizational levels. The benefits at a network level include factors, such as member commitment and quality of relationships, that drive success for all participants in the network (Klaster, Wilderom, & Muntslag, 2017). At an organizational level, networking drives legitimacy, reputation (Huang & Provan, 2007), transparency, information flow (Pal et al., 2014), collaborative decision-making (Berardo, 2009), cost savings (Klaster et al., 2017), and effective operations (Ortiz-de-Mandojana & Bansal, 2016). Network participants' success is critical for the network's success, but the individual participants' success does not imply the effectiveness of the network (Provan & Milward, 2001). Literature suggests that network centrality affects the organization's ability to obtain the right resources at the right time to succeed (Ibarra, 1993).

Research has shown resilience as an essential outcome of networking (McEntire, 2012). Networking enables focal organizations to access products, knowledge, skills, and resources

critical for survival and growth during disruptions caused by unexpected conditions. While networking can add value in all stages of resilience, it is essential during the absorption and adaptation stages (Andrew, Arlikatti, Siebeneck, Pongponrat, & Jaikampan, 2016; McEntire, 2012). Studies have emphasized bonding and bridging as effective networking strategies for improving resilience outcomes (Andrew et al., 2016). For example, bonding built mutual trust and shared commitment- essential ingredients for collective action. In addition, bridging helps establish connections with actors that are otherwise disconnected. This coordination contributes to obtaining, synthesizing, and developing alternative ideas collaboratively. Such organizational networking and interconnectedness across the value chain reduces the risk of disruption and builds more extraordinary interpersonal skills necessary for rapid decision-making (Sullivan-Taylor & Branicki, 2011). Similarly, (Demmer, Vickery, & Calantone, 2011) highlighted that Organizations could build self-renewing network structures and processes by incorporating customers into the value chain and adding joint-innovation and collaborative decision-making aspects to the network. In sum, the study focuses on the level of interaction, transparency in information flow, investments, and collective decision-making in the network (Pal et al., 2014).

In sum, the four stages of the resilience framework, namely, anticipate, absorb, adapt, and advance, rely on the meta-capability of OR, namely flexibility, redundancy, robustness, and networking. In other words, the meta-capability enables the organization to survive and grow during disruption. While literature links specific capabilities to certain stages, an aggregate of all capabilities is necessary for superlative resilience response. Therefore, this study considers OR meta-capability in aggregation. In the next section, I seek to clarify the two focal constructs, DC and OR.

### 2.1.4 The Environmental Context

The environmental context must be considered to understand the relationship between DC and OR. Environment is defined as “the pattern of all external conditions and influences that affect the organization’s life-cycle” (Brown, Brown, Brown, & Eisenhardt, 1998). Table 4 shows a multi-level model, adapted from (Igor & J, 1990), of environmental activity in which an organization operates ranging from level 1 for minimum to level 5 for maximum (Kiple & Lewis, 2009).

**Table 4: Levels of Environmental Activity adapted from (Igor & J, 1990), along with the environmental context for Dynamic Capabilities and Organizational Resilience**

Level	1	2	3	4	5
Environmental Activity	Repetitive	Expanding	Changing	Discontinuous	Surprising
Change Visibility	Visible, Recurring	Visible, Forecastable	Visible, Predictable	Limited visibility, Partially predictable	No visibility, Unpredictable
Rapidity of Change	Stable, Slower than response	Incremental, Matching response	Historically driven, Matching response	Discontinuous, Faster than response	Disruptive, Faster than response
Familiarity of events	Familiar	Extrapolable	Extrapolable	Expectable, Preparable	Unexpected
Typical scope	National, Economic	National, Economic	Regional, Technological	Regional Technological	Global Socio-Political

Environmental context for DC
Environmental context for OR

Level 1 is characterized by a stable, repetitive environment in which changes are visible and recurring. Organizations can plan and respond timely to familiar events. The business environment is expanding in Level 2. The change is slow, incremental, and visible, though demand exceeds supply. At level 2, the organization can respond adequately by predicting the change and forecasting the needs. The environmental changes are fast and historically driven in Level 3. The demand is differentiated by purchase power and differentiated products. The organizations can still predict and prepare at level 3 by using historical trends for forecasting. In level 4, the environment departs from the historical trends and becomes discontinuous. Past success is no

longer a guarantee for future success. The rapid change with limited visibility still offers partial predictability for the organizations. The pace of change is faster than organizations can respond.

To be successful in levels 1 through 4, organizations must reconfigure their internal and external resources, products, and services using their strategic DC processes. In other words, the organization's ability to sense, seize, and transform (Teece, 2007) can create and sustain competitive advantage in environments characterized by activity that ranges from familiar and predictable (level 1) to discontinuous and partially predictable (level 4).

However, in level 5, change occurs without notice as a surprise. It provides no visibility, and the event is entirely unpredictable by the organization. The pace of change is highly disruptive, affecting the global socio-economic-political environment. The intensity is further exasperated when level 5 occurs with level 4, i.e., when the disruptive event happens in a discontinuous environment. This increase in intensity alters the existing patterns of firms solely focused on their competitors and threats from unrelated industries (Ansoff, Antoniou, & Lewis, 2004). To be successful in level 5, organizations must utilize their OR meta-capability to anticipate disruption, resist, and adapt by rapidly changing course and reconfiguring organizational resources, optimizing organizational processes, reshaping organizational relationships, recovering quickly from the disruption, and using the disruption to achieve counter-trend growth (Chen et al., 2021).

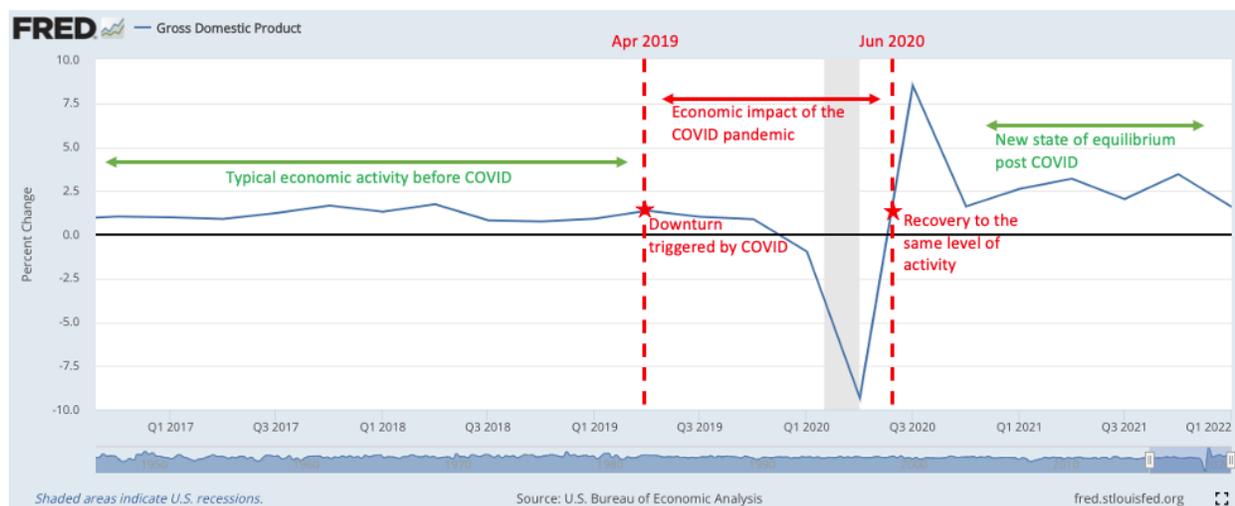
In sum, for understanding the relationship between DC and OR, it is essential to distinguish the typical, predictable economic activity (levels 1 to 4) from economic activity triggered by a surprising, unanticipated event, such as a crisis. At the onset of a crisis, adaption is impossible without recognizing the complex interaction of the socioeconomic and political effects on the business (García-Morales, Ruiz-Moreno, & Llorens-Montes, 2007). Therefore, DC alone does not

guarantee or imply OR. I use four examples to clarify this further in the context of the COVID-19 pandemic.

The National Bureau of Economic Research, in February 2020, formally declared that the US economy is in recession owing to a broad contraction of the economy (NBER, 2020b) induced by the COVID pandemic. However, the pandemic triggered an economic downturn as early as April 2019 based on the trend observed in Gross Domestic Product shown in Figure 6. The economic activity did not return to the same April 2019 level until June 2020. For the four examples, I use the period between April 2019 and June 2020 to describe OR response.

**Figure 6: The Economic Performance of the US between Q1 2007 and Q1 2022 showing typical activity before COVID, disruption during COVID, and resumption of a new level of typical activity post-COVID.**

Source: US Bureau of Economic Analysis

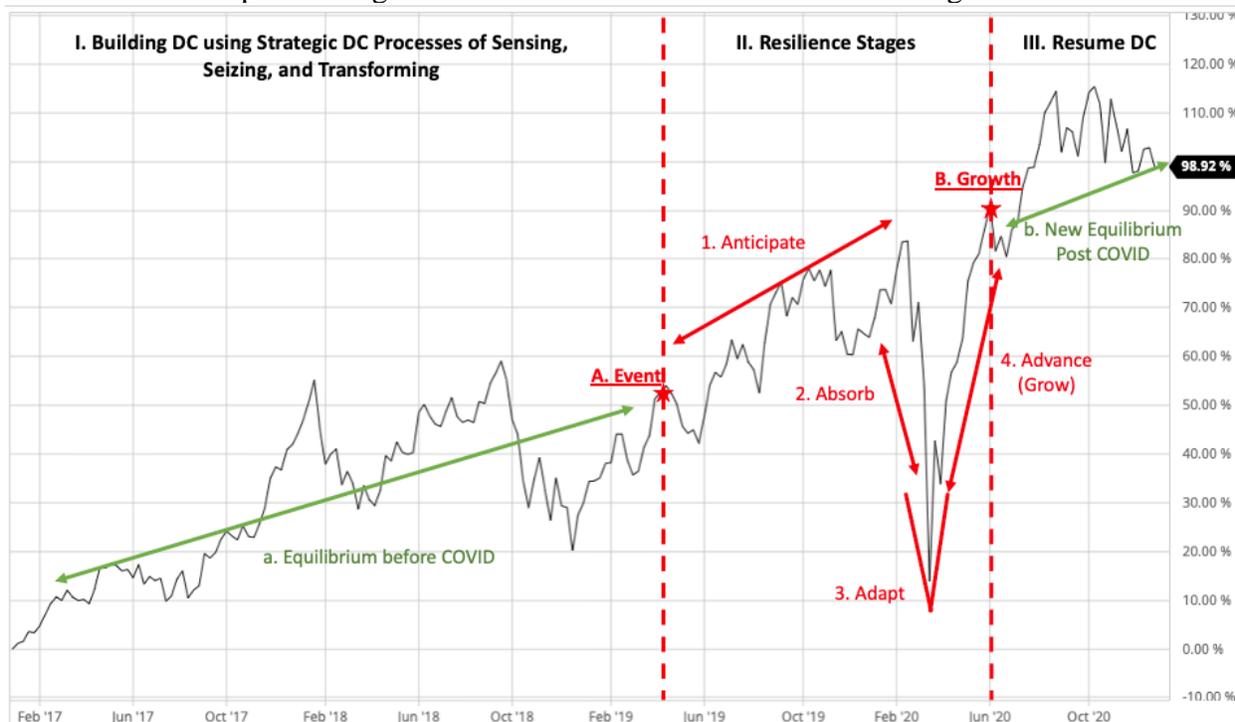


The first example describes a firm that emerged from the disruption successfully with a new equilibrium higher than the level at the start of the pandemic indicating business growth and sustained competitive advantage. Figure 7 shows the trend in stock price change of Home Depot, Inc. The stock performance reflects the firm's market valuation and is thus an excellent pseudo for firm performance (Zhu, 2000). The upward trend observed (a) before the pandemic (event A)

indicates the firm's superior DC ability during typical environments (levels 1 to 4). The firm's exit from the economic effects of COVID (level 5 at point B) after successfully enduring the resilience stages (II) to achieve a higher level of equilibrium (b) indicates the firm's prowess in using OR meta-capability to turn unpredictability as an opportunity for growth. We can hypothesize that the firm's DC is positively correlated with OR.

**Figure 7: DC and OR in action for Home Depot (Ticker: HD) from February 2017 (pre-COVID) to December 2020 (Post-COVID)**

The trend of stock price changes is sourced from New York Stock Exchange



The second example describes a firm that emerged from the disruption successfully but with a new equilibrium lower than the level at the start of the pandemic indicating basic survival and coexisting with the competition. Figure 8 shows the trend in stock price change of Bed Bath and Beyond. The downward trend observed (a) before the pandemic (event A) indicates the firm's relatively inferior DC ability during typical environments (levels 1 to 4). The firm's exit from the economic effects of COVID (level 5 at point B) after successfully enduring the resilience stages

(II) to achieve a level of equilibrium (b) indicates the firm's ability to use some OR meta-capability to survive (B) the disruption. While DC may have caused OR, the resumption of DC (III) toward an upward trend may suggest something else at play for OR other than DC.

**Figure 8: DC and OR in action for Bed Bath And Beyond (Ticker: BBBY) from February 2017 (pre-COVID) to December 2020 (Post-COVID)**

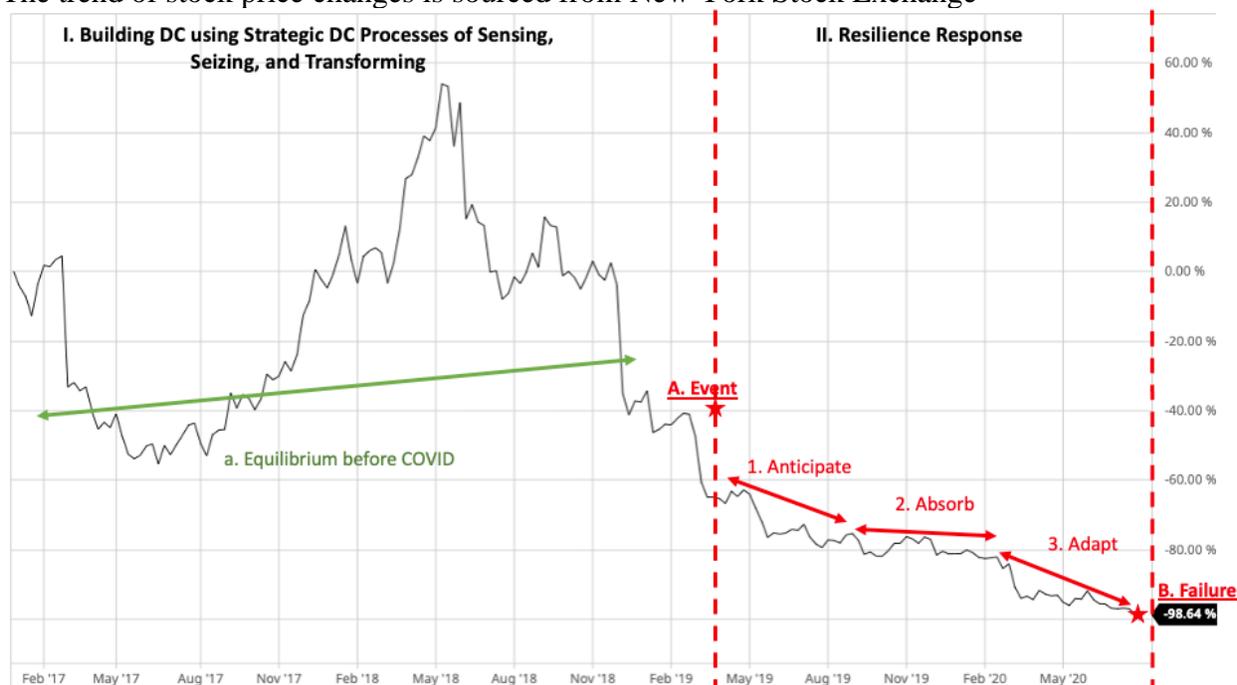
The trend of stock price changes is sourced from NASDAQ



The third example describes a firm with higher levels of DC before the pandemic but failed during the disruption. Figure 9 shows the trend in stock price change of Tailored Brands. The relative strength of DC during a typical environment (levels 1 to 4) observed by volatile upward trend (a) before the pandemic (event A) is replaced by a notable decline during resilience stages (II) and business failure (B). The demise may be attributed to the lack of meta-capability for OR. Thus, in this example, relatively higher levels of DC do not imply OR.

**Figure 9: DC and OR in action for Tailored Brands Inc (Ticker: TLRD) from February 2017 (pre-COVID) to December 2020 (Post-COVID)**

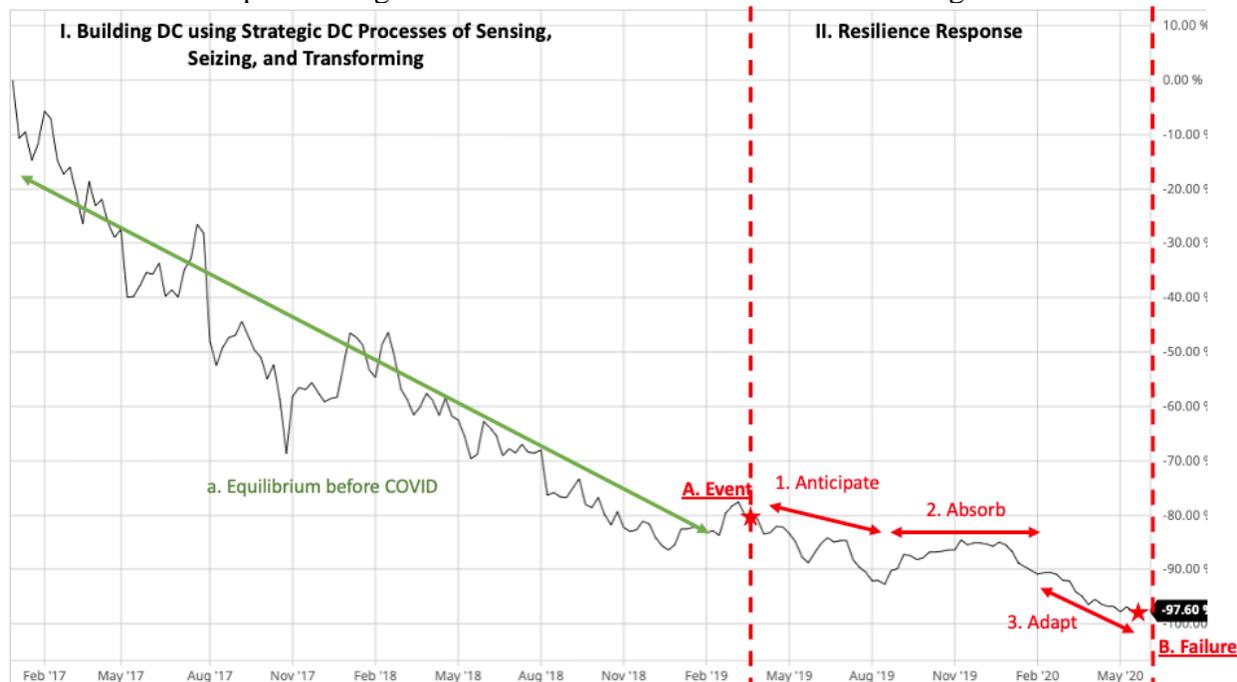
The trend of stock price changes is sourced from New York Stock Exchange



The fourth and final example describes a firm with decreasing levels of DC before the pandemic and ultimately failed during the disruption. Figure 10 shows the trend in stock price change of JC Penny. The lower levels of DC during a typical environment (levels 1 to 4) observed by the downward trend (a) before the pandemic (event A) are met with little resistance during resilience stages (II) and culminate in business failure (B). Similar to Tailored Brands' example, the demise may be attributed to the lack of meta-capability for OR. However, lowers levels of DC may or may not be correlated with OR.

**Figure 10: DC and OR in action for JC Penny (Ticker: JCP) from February 2017 (pre-COVID) to December 2020 (Post-COVID)**

The trend of stock price changes is sourced from New York Stock Exchange



In sum, the environmental context is essential to distinguish between DC and OR. In practice, as observed from examples, the firm's DC does not imply OR. Hypothesizing and empirically testing the relationship will address the research gap while providing meaningful, practical insights. I develop the study's hypotheses in the next section.

## 2.2 Hypothesis Development

### 2.2.1 Relationship Between Dynamic Capabilities and Organizational Resilience

DCs are construed as higher-order strategic processes for reconfiguring resources and related business routines for regaining congruence with repetitive (level 1), expanding (level 2), changing (level 3), and discontinuous (level 4) environmental activities and sustaining competitive advantage (Burnard & Bhamra, 2011). For example, disruptive innovation (level 4) can cause a rapid decline in the firm's performance if it is unprepared for the strategic shift. The firm must

sense and anticipate the change early and build the necessary DCs to handle the disorganization and direct the firm to strategic renewal ahead of the competition (Eisenhardt & Martin, 2000; Pavlou & El Sawy, 2011; Teece et al., 1997). Such DCs are developed not just in functional expertise but also to operate under various environmental conditions, including adversity/crisis (level 5). Furthermore, such DCs must be committed to memory as patterns, routines, rules, or heuristics and be available in similar circumstances (Danneels, 2012; Helfat & Martin, 2015).

Responses to adverse or crisis events (level 5) also require reconfiguring resources and business routines (Peteraf, Di Stefano, & Verona, 2013). For example, firms had to shift and reconfigure rapidly to respond to the economic shutdown, supply chain disruptions, and changes in consumer behaviors caused by the COVID pandemic. Some firms could anticipate, absorb, adapt, and advance faster and better than others. Whereas (Eisenhardt & Martin, 2000) argued that the firm response, even in highly dynamic and uncertain environments, is based on patterning business routines at a high level and guided by simple principles and rules, the challenge is in the change visibility (lack thereof), rapidity (speed of disruption), familiarity (unexpected), and scope (global or expansive). Therefore, I propose that the strength of its core strategic DC determines the firm's resilience capacity to adapt and grow during disruption.

Dynamically adapting to the changing business environments by reinventing the business models and strategies may sound straightforward (Hamel & Valikangas, 2003). But such reconfigurations require making trade-off decisions between many competing choices and incompatible strategic forces with unknown consequences. Business renewal during a discontinuous, partially predictable environment (level 4) requires more than a desire for change. It involves simultaneously making paradoxical decisions between exploration and exploitation and short-term profits and long-term growth. This DC is also relevant for dealing with unpredictable

environments arising from a crisis or adverse event (level 5). In such circumstances where speed of response is critical, the patterns or heuristics committed to memory from DCs can be adapted to provide cognitive shortcuts to make strategic decisions with uncertain and limited information, allowing faster action. In other words, Firms can utilize the strategic DCs to develop crisis-specific resilience heuristics that lead to a growth-oriented response. While firms with a lower degree of DCs are either slower to respond as such patterns or heuristics may not exist or are not fully committed to memory. They also tend to focus more on survival- and recovery-oriented responses than turning a crisis into an opportunity for growth.

Another paradoxical decision relevant in partially predictable (level 4) and unpredictable (level 5) environments is the choice between efficiency and flexibility (Walker & Salt, 2012). For example, redundancy increases the flexibility and adaptability of a system while reducing efficiency, thus implying a trade-off. Gaining redundancy at the cost of deliberately reducing efficiency represents a counter-intuitive management action. However, efficiency and flexibility are not an either-or choice. DCs that overlap to deliver similar outcomes under different conditions (level 4 and level 5) help in inoculating firms to prepare for anticipated adversities. Thus, strategic DCs gained in level 4 conditions can better prepare firms to anticipate level 5 conditions and help develop the meta-capability necessary for resilience, despite the cost of losing efficiency in the short term.

Resilience building can, therefore, trigger a deliberate heuristic response to specific threats. Firms learn to adapt such heuristics committed to memory from DC and deploy it with an orientation towards achieving higher growth rather than merely recovering to previous performance levels (Bingham, Eisenhardt, & Furr, 2007). Furthermore, the strategic DC processes (Teece, 2007) align well with the intervention points of building and executing the meta-capability

of resilience before (sensing), during (seizing), and after (transforming) the crisis. The DC framework (Teece, 2007; Teece, 2014; Teece et al., 1997) can, therefore, provide the foundation for organizational resilience. DCs signify change where firms attract and develop resources by making rational choices based on opportunities available. As such, resilience is primarily concerned with adaptation to challenging, unpredictable conditions, and applying DCs helps rebuild efficient yet flexible performance.

Hence, I posit that-

**Hypothesis 1:** Organizations with more robust strategic dynamic capability processes have a greater resilience-building meta-capability to grow from disruptions.

### **2.2.2 The Moderating Role of Business Environments**

Central to the DC-building process and resilience phenomenon is the observation that firms often operate under challenging environmental conditions that generate and shape their resource, asset, and path reconfigurations. Although many different environmental conditions influence the change in configurations, the study focuses on three - Munificence, Dynamism, and Complexity. Evolutionary theories recognize these conditions as the “key influencers of strategic resource-allocation decisions and capability-building processes among firms” (Keats & Hitt, 1988; Sirmon et al., 2007; Subramaniam & Youndt, 2005; Weerawardena, O’cass, & Julian, 2006). Significant changes in their levels can increase the organization's vulnerability and change impact.

Munificence is the “degree to which the environment can support and sustain a continuous rate of organizational growth” (Dess & Beard, 1984). In other words, it is the extent of resource abundance in the firm's industry. It signifies the expanding demand in the industry and the abundance of critical resources required by the firms operating in that industry (Castrogiovanni, 1991). For example, A munificent environment may imply an abundant and accessible technically

trained workforce, a robust infrastructure, favorable economic conditions facilitated by governmental subsidies or incentives, lower interest rates for business financing, the existence of alternative economically viable inputs, and consumer willingness to pay a higher price for differentiated products (Aragón-Correa, 1998; Aragón-Correa & Sharma, 2003; DeCarolis & Deeds, 1999). It influences the DC and resilience-building firm processes of identifying, obtaining, and developing/exploiting resources.

First, at higher levels, it provides buffers that help firms build efficiency, redundancy, and flexibility essential for sustaining growth during reasonably predictable environments (levels 1 to 4) and preparing for adversity (level 5). In other words, munificence offers firms the buffer to refine their existing resource, asset, and path configurations and the resources to absorb disruptions and sustain current configurations. In contrast, scarce resources propel new thinking and firm strategies to create new organizational configurations.

Second, firms may find more opportunities to transform their close relationship with customers and business partners into a collaborative process (Harrison & St. John, 1996; Jawahar & McLaughlin, 2001). It maximizes resource utilization to meet changing stakeholder demands. It also improves long-term relationships conducive to all environmental conditions but is especially significant for sustaining and growing from unpredictable events (level 5) (Harrison & St. John, 1996).

Third, munificence facilitates firms to invest differentially in innovation processes, routines, and structures (Sharma, 2000). It provides greater managerial discretion to experiment and explore while making strategic efficiency-flexibility, exploration-exploitation trade-off decisions that influence both DC and OR (Russo, 2003).

Finally, the effect of strategic DC processes and firm performance may increase in resource-abundant industries, as the quality of resources in the environment reduces the probable deficiencies of poor resource configurations. (Sirmon et al., 2007). Thus, when the greater resource availability from the industry environment complements the firm's capacity to generate higher value from resources, they produce enhanced resilience capabilities essential for achieving higher growth levels during a crisis or adversity.

As previously hypothesized, strategic DCs gained in partially predictable level 4 conditions can better prepare firms to anticipate crisis, a level 5 condition, and help develop the meta-capability necessary for resilience. A munificent environment amplifies the effect of DC on OR. The abundance of critical resources and an industry environment conducive to growth affords firms to equally focus on building DCs to sustain competitive advantage and resilience capabilities to prepare and grow from disruptive events (Rueda-Manzanares, Aragón-Correa, & Sharma, 2008). In other words, munificence provides firms with greater discretion for investing in efficiency and flexibility simultaneously without the need for a trade-off decision. On the contrary, environments with low munificence increases the significance of managing resources effectively because they may not be available or accessible when needed, increasing the significance of timely decision-making in identifying, selecting, and developing the right resources to ensure the firm's success. Firms are, therefore, forced to make trade-off decisions between efficiency and flexibility that impact their ability to focus on building DC and OR capabilities equally. Thus, reducing the effect of DC on OR.

Munificence, therefore, moderates the DC and OR as firms (a) gain access to critical resource pools and (b) can better prepare and equip these resources to create valuable configurations for varying environmental conditions.

Thus, I posit that -

**Hypothesis 2a:** The effect of the organizations' strategic dynamic capability processes on their resilience-building meta-capability is amplified in business environments perceived to be munificent.

Dynamism is the degree to which change and uncertainty are prevalent in the firm's industry (Datta, Guthrie, & Wright, 2005; Robert Baum & Wally, 2003). It is measured by the frequency and amount of change in the environment. The uncertainty stems from unstable conditions in the business environment and lack in the information needed by the firms to identify and understand cause-and-effect relationships (Carpenter & Fredrickson, 2001; Keats & Hitt, 1988). Such information deficit affects the firm's ability to manage its resources effectively to create value. For example, a lack of information regarding potential competitors' actions affects the firm's resource-leveraging strategies to develop capabilities to outperform rivals and gain and maintain a competitive advantage.

Dynamism is also related to the managerial perception of one or more components of the general business environment (Dess & Beard, 1984), such as the extent of innovation and the imbalance between supply and demand (Henderson, Miller, & Hambrick, 2006). In the context of the business interfacing with its natural environment, the environment is perceived to be dynamic when managers are uncertain, for example, about the evolution and feasibility of future technologies (such as the utilization of Blockchain, Artificial Intelligence, and Augmented Reality) or about the changes in preferences and expectations of customers regarding their products and services, or about the changes in legislation and its impacts on the firm's strategic choices (Majumdar & Marcus, 2001).

Such dynamism may encourage firms to engage in experimentation and innovation with their internal and external business partners and stakeholders, thereby simultaneously building strong DC and OR reconfigurations. Furthermore, engaging with the broader stakeholders to forecast future events, deploy preventive measures, rather than reacting to the events when they occur, reduces uncertainty (Aragón-Correa & Sharma, 2003). This proactive collaboration with a wide range of business partners across the value chain helps anticipate future trends and adopt innovative strategies that build DCs for sustaining competitive advantage during relatively stable and predictable environments (levels 1 to 4) and resilience capabilities for anticipating, absorbing, adapting, and advancing from adversity or crisis (level 5) (Miles, Snow, Meyer, & Coleman Jr, 1978; Milliken, 1987).

Research suggests that the relationship between management practices for integrating and reconfiguring the 3Ps (processes, positions, and paths) and business outcomes, such as creating competitive advantage during reasonably predictable yet rapid change (levels 1 to 4) and adapting to grow from disruptive events (level 5), depends on the managerial perception of the business environment, such as environmental dynamics (Simerly & Li, 2000). Moreover, given that the firms operate in a complex environmental dynamism characterized by an irregular rate of change and uncertainty, such a complex environment is likely to impact their strategic DC processes and steer them toward preparing for OR (García-Morales, Jiménez-Barrionuevo, & Gutiérrez-Gutiérrez, 2012). I thus argue that dynamism shapes the firm's strategic DC processes so that firms acquire the skills, knowledge, competencies, and capabilities for resilience while responding to uncertainty. Consistent with the literature, the study argues that environmental dynamism is a necessary boundary condition that influences the relationship between DC and OR. Thus, firms

are likely to invest in OR to build their capacity for resilience and innovation at higher levels of perceived environmental dynamism.

Therefore, I posit that -

**Hypothesis 2b:** The effect of the organizations' strategic dynamic capability processes on their resilience-building meta-capability is amplified in business environments perceived to be dynamic.

Complexity refers to the degree of heterogeneity in the environment related to customers, competition, product choices, resource interdependence among firms in the industry, and hostility introduced by concentration-dispersion (Dess & Beard, 1984). Heterogeneity includes the number of factors to consider in the decision environment, including firm-internal and industry/market-external conditions and the dissimilarities among them (Duncan, 1972). Heterogenous environments impose more significant constraints on the firms, requiring a greater level of cognition of the exogenous influences and a range of highly relevant strategic DC- and OR-building activities (Tung, 1979).

The resource dependency perspective of complexity requires firms also to consider the number and variety of interactions with various business partners or stakeholders in the value chain and the extent to which specialized knowledge is necessary to cope with that complexity (Dess, Ireland, & Hitt, 1990; Sharfman & Dean Jr, 1997). Moreover, resource reconfigurations are far more complex to manage for firms competing in industries requiring high levels of many inputs and producing high levels of many outputs than firms competing in industries requiring fewer levels and variety of inputs and outputs (Dess et al., 1990). For example, a change in the firm's organizational structure induced by product diversification and market expansion strategies

increase the number and diversity of interactions with its environment, thereby increasing the complexity.

An increase in the structural complexity of the environment in which the firm operates increases the need for strategic DC processes for sustaining competitive advantage and building meta-capability for resilience during disruption (Aragón-Correa & Sharma, 2003). Environmental complexity, therefore, acts as an amplifier of the effects of DC on OR. For example, firms, to counter increased complexity, can invest in developing and deploying stakeholder integration and collaboration platforms for improving information flow and collective decision-making. Timely, collaborative decision-making and change implementation results in creating DCs and resilience-capabilities, not just for the firm but across the value chain and helps prepare for reasonably stable and predictable conditions (levels 1 to 4) and sustain growth during disruption (level 5). Furthermore, a complex environment emphasizes the need for threat detection and resilience-response mechanisms. In other words, threat identification and diagnosis become more challenging in complex environments. Firms with more mature strategic DC processes can scan and sense the early warnings of potential threats and turn the threat quickly into a resilience-building and growth opportunity by seizing and transforming their internal and external resource configurations.

Thus, I posit that -

**Hypothesis 2c:** The effect of the organizations' strategic dynamic capability processes on their resilience-building meta-capability is amplified in business environments perceived to be complex.

### **2.2.3 The Moderating Role of Social Capital**

Social capital is the ability of the organization to extract value from its social structures, networks, and memberships (Nahapiet & Ghoshal, 1998; Sheng et al., 2011). It contains structural,

relational, and cognitive facets (Nahapiet & Ghoshal, 1998). The structural facet represents the type and configuration of socio-business connections or ties among the stakeholders in the network (Villena, Revilla, & Choi, 2011). The network connections or ties enhance market sensing DC capabilities by providing a mechanism for the participating stakeholders to access valuable tangible and intangible resources that benefit all environmental conditions, including relatively stable and predictable (levels 1 to 4) and disruptive and unpredictable (level 5) (Coleman, 1994). For example, a dense network with external partners, such as suppliers, customers, competitors, technologists, and regulatory bodies, promotes learning and allows them to share tacit knowledge related to exploration and exploitation opportunities. Therefore, the type and extent of the configuration of the business ties play a critical role in building reconfiguration capabilities essential for responding to rapidly changing environments and disruptions.

The relational facet encourages a sense of identification, mutual trust, and norms of reciprocity among the stakeholders in the network (Nahapiet & Ghoshal, 1998). It is a common platform for capturing and improving relationship quality through repeated interactions (Preston, Chen, Swink, & Meade, 2017). For example, (Blyler & Coff, 2003; Li, Zhang, & Zheng, 2016) found that high social capital contributed to creative problem-solving before, during, and following a crisis through open communication, mutual support, transparency in information, behavior, and resource sharing among partners. Therefore, the relational aspect of business ties positively influences strategic DC processes and OR.

The cognitive facet represents the degree to which the network participants share similar perspectives, narratives, ambitions, visions, and cultural values (Nahapiet & Ghoshal, 1998; Preston et al., 2017). Shared narratives and values create a common understanding among stakeholders to sense and assess information and develop plans for mutual goals (Blyler & Coff,

2003). For example, strong business ties help firms create DCs to achieve greater efficiency in operative tasks, explore innovative business models, and adapt and afford flexibility to grow from disruption (Helfat & Peteraf, 2003; Sirmon & Hitt, 2009). It allows firms to anticipate disruptive events, quickly absorb changes in external environments to ensure business continuity and advance from disruption to achieve a higher equilibrium level (Teece, 2007, 2012).

Social capital gained through business ties features interconnected networks, norms, and trust that facilitate coordination, cooperation, and innovation for a mutual benefit during repetitive, expanding, changing, discontinuous, and disruptive environmental conditions. It amplifies the effect of strategic DC processes on OR by influencing the firm's ability to balance exploration and exploitation simultaneously with itself and its entire value chain. Furthermore, the influence of organizational and inter-organizational relationships related to efficiency, redundancy, and flexibility are well documented in the literature (Adler & Kwon, 2002; Christopher & Rutherford, 2004). The strength of the firm's business ties is essential for delivering just-in-time operational excellence during fairly predictable environments (level 1 to 4). They are equally crucial for achieving agility during unpredictable crises to absorb, adapt, and grow from the disruption.

In sum, the social capital gained from business ties allows organizations to acquire, assimilate, transform, and exploit knowledge efficiently and effectively. These strategic DC processes enable firms to adapt existing resources, shift priorities, and create better resilience-building and resilience-response value for the business.

Hence, I posit that -

**Hypothesis 3:** The extent of the organization's social capital enhances the effect of strategic dynamic capability processes on their resilience-building meta-capability.

#### **2.2.4 The Moderating Role of Digital Maturity**

The concept of maturity refers to the level of completion of the desired state business and technology transformation. It thus can be applied to an organization's digital transformation (Hanelt, Bohnsack, Marz, & Marante, 2021). In the context of DC and OR, the organization's maturity in digital transformation relates to moving firms to a flexible organizational design of continuous adaptation and holistic co-evolution embedded within and driven by the business ecosystems. It denotes the organization's adaptability for competing effectively in a digital world (Kane et al., 2017). Strategic Management literature (Daniel & Wilson, 2003; Henfridsson & Bygstad, 2013) considers innovation and integration as the two critical organizational mechanisms to conceive and mature digital transformation. The mechanisms for innovation involve introducing the applications of new resources, processes, and capabilities to the organization. In contrast, the integration mechanism looks to align those to existing resources, processes, and capabilities (Ranganathan, Goode, & Ramaprasad, 2003).

Innovation focuses on ingenuity in both strategic and operational areas (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Sia, Soh, & Weill, 2016). For example, building a digital business, such as omnichannel or interconnected retail, is a strategic innovation that includes business (operating model innovation) and technology (Industry 4.0 utilization) aspects, transcends organizational boundaries (business model innovation), and leverages timely data insights from a unified source for decision-making. The firm's focus on attracting and mobilizing the digital workforce and creating digital-first culture is another example of strategic-level innovation activity related to digital maturity (Hansen, Kraemmergaard, & Mathiassen, 2011; Matzler, von den Eichen, Anschober, & Kohler, 2018). Furthermore, the operational focus is embedded in the strategic orientation to improve existing organizational processes and routines by

exploiting digital capabilities, such as Big Data analytics and Enterprise Resource Planning (ERP) platforms (Barua, Konana, Whinston, & Yin, 2004; Karimi & Walter, 2015).

Integration mechanisms are crucial to align and incorporate the new capabilities gained from innovation with existing ones. Developing a digital maturity strategy and transformation roadmap lays a systematic approach and course for coordinating, prioritizing, and integrating transformational change (Matt, Hess, & Benlian, 2015; Schallmo, Williams, & Boardman, 2020). On the business side, executing the strategy and roadmap involves deploying strategic DC processes and introducing technological flexibility toward achieving a collaborative and agile enterprise architecture (Schallmo et al., 2020). Integration also involves achieving harmonization of physical and digital worlds through promoting cross-functional cooperation and coordination of mechanisms to utilize and assimilate digital technologies within and across the business ecosystem (Chatterjee, Grewal, & Sambamurthy, 2002).

In addition to the mechanisms of digital maturity (Hess et al., 2016) emphasized the need for it to be a strategic priority for firms to avoid the risk of becoming obsolete by not continually assessing the options regarding technology adoption toward growth and resilience objectives. The concepts of digital maturity, digital transformation, DCs, and OR converge as digital technologies can fundamentally reshape and influence the traditional boundaries of businesses and enable firms to respond to new growth opportunities during relatively predictable environments and disruptions caused by a crisis. For example, digital maturity enables firms to invest methodically in introducing omnichannel capabilities for unlocking interconnected retail capabilities. However, in anticipation of disruption from a crisis, such as the COVID pandemic, they can adjust their business priorities to introduce innovations, such as the contactless shopping experience, to turn a challenging environment into an opportunity for resilience and growth.

In sum, a malleable organizational design conducive to continual adaptation to environmental opportunities and threats is unlocked at higher levels of digital maturity through data driven DCs, rapid transformations, and resilient responses.

Hence, I posit that -

**Hypothesis 4:** The level of the organization's digital maturity enhances the effect of strategic dynamic capability processes on their resilience-building meta-capability.

## CHAPTER 3: METHODOLOGY

The research design and methodology used to test the theoretical model proposed in Figure 1 are discussed in the subsequent sections.

### 3.1 Research Design

The study used quantitative research methodology (Creswell, 2009) to analyze data collected from a survey questionnaire adapted from previously validated scales from the literature. Further, the unit of analysis for the model to be tested is firm-level, and the research was performed as a cross-sectional study across established firms.

### 3.2 Sample Size

Research shows that studying the entire population is not practical and efficient. Therefore, selecting the appropriate sample size representing the entire population to answer the research questions is vital (Creswell, 2009). For this study, the baseline sample size, i.e., the minimum number of unique firm responses, was determined using the G\*Power software and the methodology proposed by (Faul, Erdfelder, Buchner, & Lang, 2009). A priori method of power analysis with 2-tailed linear multiple regression was used to compute the required sample size with effect size ( $f^2$ ) of .15, significance level ( $\alpha$ ) of .05, and power ( $1-\beta$ ) of .95. Additionally, the software requires the total number of predictors in the model as an input. The study includes one independent variable, five moderator variables, and eight control variables. Further, the eight control variables are classified into 15 elements, totaling 21 predictors. The 15 elements include two for the respondent's gender, three for the respondent's role, three for the functional area they are responsible for, and three for the industry they operate in. G\*Power calculated the minimum sample size, as shown in Figure 2, to be 90 firms based on these parameters. However, to improve

the appropriateness, the study targets a sample size of no less than 150 complete responses from unique firms (respondents with an appropriate level of decision-making authority).

```

Analysis:  A priori: Compute required sample size
Input:    Tail(s) = Two
              Effect size  $f^2$  = 0.15
               $\alpha$  err prob = 0.05
              Power (1- $\beta$  err prob) = 0.95
              Number of predictors = 21
Output:  Noncentrality parameter  $\delta$  = 3.6742346
              Critical t = 1.9954689
              Df = 68
              Total sample size = 90
              Actual power = 0.9517336

```

**Figure 11:** Results from Power Analysis using 2-tailed, Linear Multiple Regression Model

### 3.3 Data Collection

The survey consisting of 78 items (shown in Appendix A) was designed, implemented, and administered using the Qualtrics platform. Since the survey questionnaire was developed using adapted scales from the literature, pre-testing was not considered necessary. The research data was acquired by electronically distributing surveys to potential respondents through existing professional connections on LinkedIn, connections gained through networking in industry conferences, and referrals from the snowball technique. Personal connections were targeted in a management role with decision-making authority, typically with designations like or higher than ‘Senior Manager.’ The purpose of the survey was orally clarified, as needed. Key information from those oral discussions was noted to supplement the survey’s findings. Only one survey response was accepted from each participant for the study duration. The data was collected over four months from, June ’22 to September ’22. The constructs, dimensions, and measures are discussed in the next section.

### **3.4 Constructs, Dimensions, and Measures**

#### **3.4.1 Strategic Dynamic Capability Processes (Independent Variable)**

The seminal article (Teece et al., 1997) defines DC as organizational capabilities to “integrate, build, and reconfigure internal and external competencies to address rapidly changing environments.” However, for this study, DC is conceptualized as the firm’s strategic processes to methodically solve problems through its ability to sense opportunities, challenges, and threats, make timely decisions, and implement strategic decisions and changes efficiently to ensure sustained competitive advantage (Teece, 2007; Teece, 2014). Accordingly, drawing on existing scales from literature, DCs are measured along three dimensions, namely, strategic sense-making (Thomas et al., 1993), timely decision-making (Stalk, 1988), and change implementation capacity (Lavie, 2006).

Strategic sense-making is the process of developing cognitive maps to efficiently search for opportunities and threats and analyze information from internal and external environments (Thomas et al., 1993). Timely-decision making is the management process to quickly formulate, assess, and choose strategic orientations (Lavie, 2006). Change implementation is the ability to coordinate and execute integration and reconfiguration processes related to strategic decisions (Law et al., 1998). Research shows that the dimensions collectively summarize the construct. For example, in a rapidly changing environment where consumer needs and demands are shifting, and technology continually evolves, the three dimensions collectively contribute to the strategy that reshapes their DCs. Firms must deploy strategic sense-making capacity to seek opportunities, make timely decisions to seize those opportunities, and renew and transform resources bases with change implementation (Li & Liu, 2014). Thus, the aggregation proposed by (Law et al., 1998) is appropriate here, and the dimensions are considered in aggregation for this construct.

The items for the three dimensions were adapted from existing scales in literature. Accordingly, 15 items (Six items for strategic sense-making, Four times for timely decision-making, and five items for change implementation) were adapted from (Li & Liu, 2014). These items are listed in table 1. They are pertinent to the time leading up to the disruption caused by the COVID pandemic in 2020. The questionnaire provides this context to the respondent. The construct is measured using a seven-point Likert scale from 1, strongly disagree, to 7, strongly agree.

**Table 5. Construct Measurement Items – Strategic Dynamic Capability Processes**

<i>Strategic Dynamic Capability Processes - Dimensions and Items</i>
<i>Strategic Sense-making</i>
We can perceive environmental change before competitors
We often have meetings to discuss the market demand
We can fully understand the impact of the internal and external environment
We can feel the major potential opportunities and threats
We have a perfect information management system
We have good observation and judgment ability
<i>Timely Decision-making</i>
We can quickly deal with conflicts in the strategic decision-making process
Under many circumstances, we can make timely decisions to deal with strategic problems
We can remedy quickly to unsatisfactory customers
We can reconfigure resources in time to address environmental change.
<i>Change Implementation</i>
Our strategic changes can be efficiently carried out
Good cooperation exists among different functions
We help each other in strategic change implementation
We have a proper awarding and controlling system
We can efficiently improve strategic change implementation

### 3.4.2 Organizational Resilience (Dependent Variable)

OR is a multifaceted construct with capability-based (Ma et al., 2018), Process-based (McCarthy, Collard, & Johnson, 2017), Functional (Wicker et al., 2013), and Results-based (Kantur & İşeri-Say, 2012; Weick, 1996) perspectives. For this study, OR is conceptualized as the ability of an organization to anticipate disruption, resist, and adapt by rapidly changing course and reconfiguring organizational resources, optimizing organizational processes, reshaping organizational relationships, and recovering quickly from the disruption, and using the disruption to achieve counter-trend growth (Chen et al., 2021). In simple words, OR emphasizes the ability of the firms to survive a challenging circumstance and achieve growth. Accordingly, drawing on existing scales from (Pal et al., 2014), the construct is measured along four dimensions, namely, flexibility, redundancy, robustness, and networking. Flexibility is the “organization’s capacity to meet priorities and achieve goals in a timely manner to contain losses and avoid future disruptions” (Sheffi, 2007), redundancy is the “extent to which the systems and resources are substitutable in the event of disruption or loss of functionality” (Sheffi & Rice Jr, 2005), robustness is the “ability of the system to withstand a given level of stress or demand without suffering degradation or loss of function” (Tang, 2006), and networking is the extent of internal and external connectedness for reducing the risks from disruption and for developing long-term resilience (Coutu, 2002b).

Literature shows that OR is a higher-order multi-dimensional construct with several interrelated dimensions (Hillmann & Guenther, 2021). However, researchers are conflicted on the structure of the construct. While some (Mallak, 1998; Somers, 2009) consider it as a composite variable composed of independent, albeit formative, dimensions, others (Akgün & Keskin, 2014; McCann, Selsky, & Lee, 2009; Parker & Ameen, 2018; Richtnér & Löfsten, 2014) consider it as composed of independent, reflective dimensions. For thoroughness, the study considers the

dimensions in aggregation for hypothesis testing (Law et al., 1998) and individually for post hoc analysis.

The items for the four dimensions were adapted from existing scales in literature. Accordingly, five items for flexibility, three for redundancy, one for robustness, and five for networking were adapted from (Pal et al., 2014). These items are listed in table 2. They are stated in the context of the disruption caused by the COVID pandemic since 2020. The construct is measured using a seven-point Likert scale from 1, very poor, to 7, exceptional.

**Table 6. Construct Measurement Items – Organizational Resilience**

<i>Organizational Resilience - Dimensions and Items</i>	
<i>Flexibility</i>	<ul style="list-style-type: none"> <li>Quick reallocation of orders to alternate suppliers (when required)</li> <li>Flexible and fast logistics response</li> <li>Flexible internal processes and operations with regular monitoring</li> <li>Flexible decision-making and contingency plans</li> <li>Demand-drivenness (Market intelligence and customer-centricity)</li> </ul>
<i>Redundancy</i>	<ul style="list-style-type: none"> <li>Parallel processes for executing various organizational functions</li> <li>Multiple channels for satisfying customer needs</li> <li>Alternate strategies and decision-making ability</li> </ul>
<i>Robustness</i>	<ul style="list-style-type: none"> <li>Followed lean management principles (like Agile, Six Sigma, ISO 9000, Product/Process/Program Management)</li> </ul>
<i>Networking</i>	<ul style="list-style-type: none"> <li>Interaction with external stakeholders in the value-chain or network</li> <li>High transparency in information flow among the external stakeholders in the value-chain or network</li> <li>Interaction within the internal stakeholders (among departments) in the organization</li> <li>Investments in value-chain or network operations and risk-sharing</li> <li>Collaborative decision making with other stakeholders in the value-chain or network</li> </ul>

### **3.4.3 Perceived Business Environment (Moderator Variable)**

The organization's business environment is “the totality of physical and social factors that are taken directly into consideration in the decision-making behavior” (Duncan, 1972). This multidimensional construct is operationalized for this study as environmental munificence, dynamism, and complexity (Dess & Beard, 1984).

Munificence is defined as the capacity or the extent to which the environment can support the organization's stability and sustained growth. Dynamism is the uncertainty generated by the magnitude and frequency of change within the organization's environment. Complexity refers to the degree of heterogeneity in the environment related to customers, competition, product choices, resource interdependence among firms in the industry, and hostility introduced by concentration dispersion. Since these dimensions are theorized at the same level as the construct, the study uses the profile model proposed by (Law et al., 1998) to consider them separately instead of aggregating them.

The items for the three dimensions were adapted from existing scales in literature. Accordingly, three items were adapted from (Fainshmidt et al., 2019) for munificence, five items were adapted from (Schilke, 2014) for dynamism, and eight items were adapted from (Teo & King, 1997) for complexity. These items are listed in table 3. The construct is measured using a seven-point Likert scale from 1, strongly disagree, to 7, strongly agree.

**Table 7. Construct Measurement Items – Perceived Business Environment**

<i>Perceived Business Environment – Dimensions and Items</i>	
<i>Munificence</i>	<p>Demand for the products/services of our principal industry is growing and will continue to grow.</p> <p>The opportunities for firms in our principal industry to expand the scope of their existing products/services are extremely abundant.</p> <p>Resources for growth and expansions are easily accessible in our industry.</p>
<i>Dynamism</i>	<p>The modes of production/distribution/service change often and in a major way.</p> <p>The environmental demands on us are constantly changing.</p> <p>Marketing practices in our industry are constantly changing.</p> <p>Environmental changes in our industry are unpredictable.</p> <p>In our environment, new business models evolve frequently.</p>
<i>Complexity</i>	<p>In our industry, there is considerable diversity in customer buying habits</p> <p>In our industry, there is considerable diversity in nature of competition</p> <p>In our industry, there is considerable diversity in product lines</p> <p>The survival of our firm is currently threatened by scare supply of labor</p> <p>The survival of our firm is currently threatened by scare supply of materials</p> <p>The survival of our firm is currently threatened by tough price competition</p> <p>The survival of our firm is currently threatened by tough competition in product/service quality</p> <p>The survival of our firm is currently threatened by tough competition in product/service differentiation</p>

### **3.4.4 Social Capital with Business Ties (Moderator Variable)**

The core tenant of the social capacity research is the theory that the goodwill bestowed by other actors or stakeholders in the network is a valuable resource. While social scientists have offered various definitions for social capital, the focus on relationship primarily foregrounds the concept of “bridging and bonding” (Adler & Kwon, 2002). For this study, social capital is operationalized as the ability of the organization to extract valuable benefits from its social structures, networks, and memberships, namely, its business ties. Accordingly, five items shown in Table 4 were adapted from (Sheng et al., 2011). The construct is measured using a seven-point Likert scale from 1, strongly disagree, to 7, strongly agree.

**Table 8. Construct Measurement Items – Social Capital**


---

<i>Social Capital – Dimensions and Items</i>
Top Managers at our firm have built good connections with
Suppliers
Customers
Competitors
Market-based collaborators (for example, regulatory bodies, banks, government bureaus)
Technological collaborators

---

### 3.4.5 Digital Maturity (Moderator Variable)

The concept of maturity refers to the degree of completion of the desired state business and technology transformation. It thus can be applied to an organization's digital transformation (Hanelt et al., 2021). Research has viewed digital maturity as a level of the organization's digital transformation. Additionally, denotes the organization's adaptability for competing effectively in a digital world (Kane et al., 2017). For this study, the level of digital maturity is assessed across five dimensions, namely, Customer, Strategy, Technology, Operations, Organization, and Culture. The items related to this were adapted from (Herceg et al., 2020), as shown in Table 5. The construct is measured using a seven-point Likert scale from 1, very low, to 7, advanced.

**Table 9. Construct Measurement Items – Digital Maturity**


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<i>Digital Maturity – Dimensions and Items</i>
Regarding your <i>strategy</i> , how advanced(matured) is your company to embrace digital initiatives in order to gain a competitive advantage?
Regarding the <i>technology</i> in your company, does it enable the organization to create, process, store, secure, and exchange data to meet the needs of customers and organizational processes at a low cost?
Regarding the <i>operations</i> , do the processes and tasks utilize digital technologies to drive strategic management and enhance business efficiency and effectiveness?
Regarding <i>organization and culture</i> , is decision-making data-driven, and are your employees digitally skilled
Regarding <i>customer experience</i> , do your customers view your organization as their digital partner using their preferred channels of interaction online and offline?

---

### **3.4.6 Control Variables**

The study is controlled for the effects of three firm-specific and five respondent-oriented characteristics that might correlate with the strategic DC processes (independent variable) and impact the OR (dependent variable).

**3.4.6.1 Firm Size:** Larger firms may have better access to scarce resources, such as capital, at lower cost and reduced risk, than smaller firms due to their scale of operations and influence (Chang & Thomas, 1989). Larger firms may also be able to dedicate more resources to change routines that help develop DC. The firm's size is controlled based on the number of full-time associates employed in the fiscal year 2021 (Akgun & Keskin, 2014; Li & Liu, 2014).

**3.4.6.2 Firm age:** A tenured firm may develop mature patterns that underpin DC processes over time than young and developing firms (Helfat & Peteraf, 2003; Zahra, Ireland, & Hitt, 2000). Tenure is controlled by the firm's age by using the years since the establishment as an indicator (Karna, Richter, & Riesenkampff, 2016; Mitchell et al., 2011).

**3.4.6.3 Industry effects:** The significance of the industry in which the firm competes is widely recognized in the literature as an indicator of firm-level variables (Dess et al., 1990). The industry-standard 2-digit SIC will be coded to three dummy variables to control for the industry effects (Schilke, 2014).

**3.4.6.4 Respondent's age:** The respondent's age may influence the perception and impact the variables considered in the study. Age will be controlled using the number of years as an indicator.

**3.4.6.5 Respondent's gender:** The gender of the respondent may also have an impact on the variables considered in the study. Gender will be controlled by coding the classifications, male and female, to two dummy variables.

**3.4.6.6 Respondent's role:** The level of authority or the influence of the respondent may impact the perception of variables considered. Role will be controlled by coding the designation classifications to three dummy variables.

**3.4.6.7 Respondent's functional area of responsibility:** The span of responsibility of the respondent will be controlled by coding the functional area of responsibility to three dummy variables.

**3.4.6.8 Respondent's tenure:** The respondent's total tenure in the organization, including current and prior roles, will be controlled using the number of years as an indicator.

The list of control variables is shown in Table 6.

**Table 10. Control Variables**

<i>Control Variables</i>
<i>Firm Size</i>
How large is your organization? Please specify the size of your organization in terms of the estimated number of full-time associates employed in fiscal year 2021.
<i>Firm Age</i>
How old is the organization you work for? Please specify the length of time (in number of years) your organization has been operational since its initial establishment.
<i>Industry Effects</i>
Please select the industry that best describes your organization.
<i>Respondent's Age</i>
Please specify your age in years.
<i>Respondent's Gender</i>
Please specify your gender identity.
<i>Respondent's Role</i>
Please specify your current designation or role in the organization.
<i>Respondent's Department or Functional Area of Responsibility</i>
Please select the functional area or department you are responsible for in the organization
<i>Respondent's Total Tenure in the Organization</i>

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How long have you worked for your organization? Please specify your total tenure (in years) in the organization, including the current and prior roles.

---

### **3.5 Measurement Model**

The proposed theoretical model in Figure 1 consists of one independent variable and five moderating variables, all measured at the firm level. The model is grounded on formal theories and targets a sufficiently large sample size (Hair, 2009). The hypotheses in this study were tested using multivariate ordinary least squares (OLS) regression, including tests for moderation. Several steps were performed to analyze and interpret the data. First, A preliminary analysis was performed to verify missing and incomplete data (Creswell, 2011; Forza, 2002). Second, data were evaluated for method bias (Creswell, 2011; Podsakoff, MacKenzie, & Podsakoff, 2012). Third, the reliability of the multiitem scales used in the study was assessed using measuring the coefficient alpha. Fourth, a descriptive analysis of all the variables, along with bivariate correlations between the variables, was performed. Fifth, the multicollinearity issue was considered and resolved. Sixth, the factor structure of the observed variables was verified using confirmatory factor analysis. Seventh, linearity, homoscedasticity, independence, and normality assumptions were verified before testing the research model and hypotheses using multiple regression. Finally, each hypothesis in the model was tested for statistical significance. These results are outlined in Chapter 4, along with supporting tables and figures. All tests and analyses were performed using version 28 of IBM SPSS Statistical software and the IBM SPSS Amos statistical package.

## CHAPTER 4: RESULTS

In this chapter, the survey and data analysis results are illustrated in detail. First, a preliminary analysis of the sample is provided. Then, the methodologies used to analyze the survey data are explained. A reliability test is conducted using coefficient Alpha (Cronbach's Alpha) to assess the internal consistency and reliability of the scales. Following that, a confirmatory factor analysis (CFA) is performed to evaluate the measurements used. With the validity and reliability of all measures established, multiple regression analysis is used to test the proposed hypotheses for the direct effect of dynamic capabilities on organizational resilience and the moderating effects of environmental munificence, dynamism, complexity, social capital, and digital maturity. In addition, post-hoc analysis is performed on the relationships between individual dimensions of dynamic capabilities and organizational resilience. This chapter also includes an explanation of the findings from the data analysis.

### 4.1 Preliminary Analysis

The potential respondents were identified through existing professional connections on LinkedIn and contacts gained through networking at industry conferences. Personal connections in a management role with decision-making authority, with designations like or higher than 'Senior Manager,' were targeted. In addition, the snowball technique gained more referrals from potential respondents. Furthermore, only one survey response was accepted from each participant for the study duration. The survey was distributed and administered using Qualtrics. A total of 269 respondents started the survey. Of those, 55 did not complete the survey, three declined to consent, and seven were not in a strategic role to qualify for the study. Qualtrics recorded 204 participants completing the survey, resulting in a completion rate of 75.8%, as summarized in Table 11. The

response rate, however, could not be determined as the snowball technique was utilized for referrals from targeted connections.

**Table 11: Summary of Survey Respondents**

<b>Surveys Started</b>	<b>Declined to Consent</b>	<b>Did Not Qualify</b>	<b>Incomplete Surveys</b>	<b>Completed Surveys</b>	<b>Completion Rate</b>
269	3	7	55	204	75.8%

Missing data could impact sample size and lead to biased or erroneous results ((Hair, 2009). While the survey was built in Qualtrics with item-level validations to check participant responses to all questions before submission, a missing value analysis was performed in SPSS to ensure completeness. Accordingly, this analysis confirmed all dependent, independent, moderating, and control variables with zero missing values.

In addition to confirming no missing data, the study was evaluated for common method bias. Common method bias refers to the variance attributable to the measurement method rather than to the constructs represented by the measures. This variance may cause measurement error and threaten the estimates of the true relationship among theoretical constructs. Scholars identify common method bias as a potential problem associated with studies involving self-reporting, for example, survey questionnaires (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Richardson, Simmering, & Sturman, 2009). Harman's one-factor test (Harman, 1976) was employed to test the presence of common method bias. Common method bias may be a significant problem when loading on one-factor accounts for more than 50% of the variance of all variables entered in exploratory factor analysis. To test this, all 12 variables (3 dimensions of DC, four dimensions of ORE, and five moderators) in the model were entered into an exploratory factor analysis. The results of an unrotated principal component factor analysis yielded 12 factors accounting for

65.6%. The first factor explained only 36.8% of the total variance and did not account for most of the variance. Furthermore, the study controls for common method bias by using scales previously accepted and validated in the literature (Podsakoff, 2003). Hence, common method bias is not a significant concern and thus is unlikely to confound the results' interpretation.

The demographic details are shown in Table 12. The responses show that 66% of the respondents were male, 33% were female, and 1% chose not to specify their identity. The mean age of the respondents was 46.9 years, and they had a mean tenure of 8.7 years in the firm. 77% of the respondents were at least in a director role or above, of which 17% held top management C-suite roles, and 25% held senior leadership titles, such as Vice President and Senior Vice President. The remaining 23% held other positions that had responsibility for strategic decision-making. Respondents from strategic development and technology management areas accounted for 64%, with an even split. The remaining 36% were from business operations and other functional areas, where responses from business operations were higher than functional areas by 2%. The highest represented firms were from the services industry (36%), followed by retail and wholesale (26%) and finance and banking (17%). The remaining 21% of respondents represented firms from other industries.

The descriptive statistics and bivariate correlations were generated for all independent, dependent, and control variables, as outlined in Table 13. The mean age of the firms represented in the study is 64.8 years, with an average of 83372 employees. The independent variable, DC, is strongly, positively, and significantly correlated ( $r = .870$ ,  $n = 204$ ,  $p < .001$ ) with the dependent variable, OR, indicating that higher levels of DC tend to contribute to better OR. Among the moderator variables, digital maturity ( $r = .815$ ,  $n = 204$ ,  $p < .001$ ) had the strongest correlation, followed by social capital ( $r = .706$ ,  $n = 204$ ,  $p < .001$ ), munificence ( $r = .539$ ,  $n = 204$ ,  $p < .001$ ),

dynamism ( $r = .375$ ,  $n = 204$ ,  $p < .001$ ), and complexity ( $r = .184$ ,  $n = 204$ ,  $p = .008$ ). Statistically significant and positive correlations can also be observed between all moderating variables. When analyzing the control variables (respondent age, respondent gender, respondent department, respondent role, respondent tenure, firm size, firm age, and industry), no statistically significant correlation is observed between the control variables and dynamic capabilities and organizational resilience.

As discussed, statistically significant correlations exist between variables in the study, indicating a multicollinearity problem. To address this, the double-mean-centering strategy proposed by (Lin, Wen, Marsh, & Lin, 2010) was executed. With this strategy, product indicators were built by mean-centering the product terms obtained by multiplying the mean-centered indicators of the associated latent variables. As a result, the highest observed variance inflation factor (VIF) equaled 6.9, and the highest value of the condition index equaled 7.379. The VIF and condition indices are a measure of multicollinearity. A value of 10 or higher indicates high degree of collinearity with the potential of undermining the statistical significance of the independent variable. Since the values in the study are below the threshold, the multicollinearity concern is alleviated.

**Table 12: Demographic Description**

<b>Variable</b>	<b>Category</b>	<b>N</b>	<b>%</b>	<b>Mean</b>
<b>Respondent's Demographic</b>				
Age		204	100%	46.9
Gender	Male	134	66%	
	Female	67	33%	
	Unspecified	3	1%	
Role	Top Management (CxO)	35	17%	
	Senior Vice President/VP	52	25%	
	Senior Director/Director	71	35%	
	Other Management	46	23%	
Department	Strategy Development	66	32%	
	Business Operations	38	19%	
	Functional Area	35	17%	
	Technology Management	65	32%	
Tenure			100%	8.7
<b>Firm's Demographic</b>				
Industry	Retail & Wholesale	54	26%	
	Financial & Banking	34	17%	
	Services	74	36%	
	Others	42	21%	
Age		204	100%	64.8
Size		204	100%	83372

**Table 13: Descriptive Statistics and Bivariate Correlations**

	Mean	Std. Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1 Organizational Resilience	4.47	1.21																										
2 Dynamic Capabilities	5.16	1.03	.870**																									
3 Munificence	5.52	1.01	.539**	.521**																								
4 Environmental Dynamism	5.13	1.14	.375**	.458**	.583**																							
5 Complexity	4.54	1.23	.184**	.328**	.452**	.675**																						
6 Social Capital	5.36	1.10	.706**	.738**	.512**	.376**	.284**																					
7 Digital Maturity	4.63	1.49	.815**	.787**	.451**	.459**	.539**																					
8 Respondents Age	46.94	8.93	-0.131	-0.061	-0.106	-0.091	-0.064	-0.021	-.163*																			
9 Respondents Tenure	8.69	7.41	0.055	0.103	0.044	0.019	0.102	0.054	0.031	0.136																		
10 Firm Size	83372.12	138799.89	0.123	0.064	.165**	0.052	0.041	.139**	.182**	0.110	.356**																	
11 Firm Age	64.77	50.68	0.004	-0.013	0.013	0.022	-0.021	-0.040	0.046	0.025	0.028	0.048																
12 Department: Strategy Development	0.32	0.47	0.130	.175**	-0.102	-0.075	-0.015	0.070	0.094	0.096	-0.005	-0.071	-0.120															
13 Department: Business Operations	0.19	0.39	-0.002	-0.026	0.013	-0.016	-0.067	-0.041	0.022	0.001	-0.060	-0.114	.222**	-.331**														
14 Department: Functional Area	0.17	0.38	-0.113	-.185**	-0.038	-0.050	-0.111	-0.092	-.166**	-.169**	0.054	0.064	0.048	-.315**	-.218**													
15 Department: Technology Management	0.32	0.47	-0.037	-0.004	0.123	.162**	.160**	0.038	0.038	0.040	0.011	0.114	-0.104	-.473**	-.327**	-.311**												
16 Role: Other Management	0.23	0.42	0.053	0.091	0.048	0.133	0.090	-0.065	.162**	-.274**	-0.104	-0.095	0.071	-0.097	0.103	0.066	-0.042											
17 Role: Senior Director/Director	0.35	0.48	-0.079	-0.108	0.074	-0.038	-0.026	0.033	-0.091	0.130	0.008	0.128	-0.018	-0.087	-0.032	0.050	0.075	-.394**										
18 Role: Senior Vice President/VP	0.25	0.44	0.092	0.029	-0.026	-0.048	-0.062	0.070	0.055	-0.032	0.043	0.051	-0.059	0.004	-0.078	-0.027	0.083	-.316**	-.427**									
19 Role: Top Management (CxO)	0.17	0.38	-0.065	0.002	-0.117	-0.044	0.028	-0.051	-0.127	.177**	0.056	-0.115	0.012	.215**	0.016	-0.104	-.144**	-.246**	-.333**	-.266**								
20 Gender: Male	0.66	0.48	0.120	0.116	-0.051	-0.084	-0.092	.147**	0.131	.287**	0.052	.205**	-0.054	-0.008	-0.105	-0.027	0.118	-0.129	0.030	0.067	0.028							
21 Gender: Female	0.33	0.47	-0.109	-0.095	0.053	0.063	0.113	-0.065	-.147**	-.285**	-0.047	-.219**	-0.012	0.007	0.068	0.042	-0.097	0.072	-0.007	-0.050	-0.014	-.968**						
22 Gender: Nonspecified	0.14	0.12	-0.047	-0.084	-0.004	0.086	-0.081	-.328**	0.059	-0.022	-0.022	0.046	.261**	0.003	.151**	-0.056	-0.084	.226**	-0.089	-0.071	-0.056	-.169**	-0.085					
23 Industry: Retail and Wholesale	0.26	0.44	-0.039	-0.032	0.033	0.005	0.112	0.032	-0.110	0.118	0.061	.198**	-0.093	-0.082	-.144**	0.081	.138**	-.191**	0.028	0.082	0.081	0.083	-0.065	-0.073				
24 Industry: Finance and Banking	0.17	0.37	0.022	-0.006	0.072	-0.022	0.093	-0.009	-.235**	-0.045	-0.103	0.031	-0.056	0.090	.145**	-0.136	-.168**	-.189**	0.070	-0.029	-.175**	.191**	-0.055	-.266**				
25 Industry: Services	0.36	0.48	0.104	0.131	0.033	0.035	-0.059	0.012	.213**	0.104	0.091	0.092	-0.047	.154**	-0.021	-.181**	0.009	-0.041	0.069	0.073	-0.127	0.084	-0.115	0.077	-.453**	-.337**		
26 Industry: Others	0.21	0.41	-0.101	-0.115	-.142**	-0.027	-0.053	-0.135	-0.125	-0.036	-0.133	-.231**	0.128	-0.041	0.099	-0.007	-0.036	0.102	0.061	-.242**	0.090	-0.041	0.031	0.039	-.306**	-.228**	-.384**	

n=204 Listwise

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

## 4.2 Reliability Analysis

The reliability of the measurement model must first be established before the model's validity can be assessed (Hair, 2009). The internal consistency of a set of items provided by coefficient or Cronbach's Alpha should be measured to examine the quality of the instrument (Churchill Jr, 1979). In general, the lower limit for Cronbach's Alpha ( $\alpha$ ) is 0.70 (Hair, 2009). Table 14 presents the reliability of each construct and the number of items. Overall, the Cronbach's Alpha of DC, ORE, ED, CX, SC, and DM constructs are above 0.70 (.938, .962, .829, .853, .852, and .933), indicating a good degree of reliability. However, the Alpha ( $\alpha$ ) value of the Munificence construct is lower than .70 at .608. While the Alpha value increased to .662 if one item is deleted, it still does not sufficiently improve reliability. However, the corrected item-total correlations for all the items in the construct are above 0.30 (.428, .535, .378), which is encouraging.

**Table 14: Reliability Analysis**

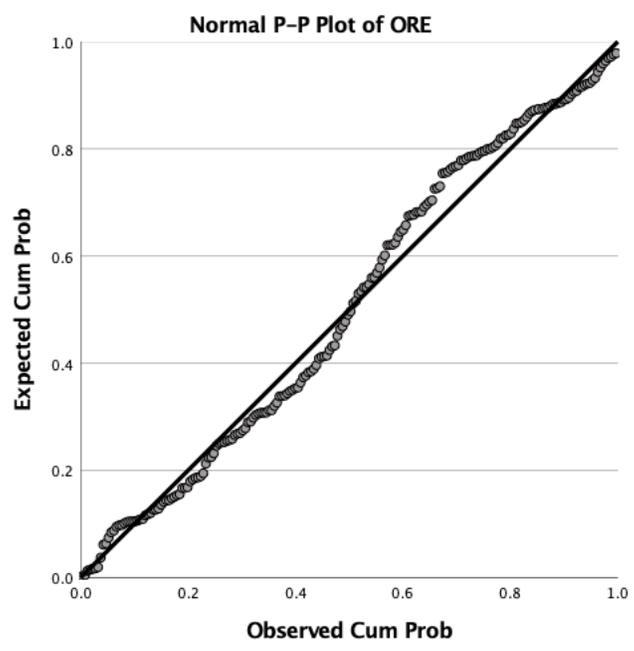
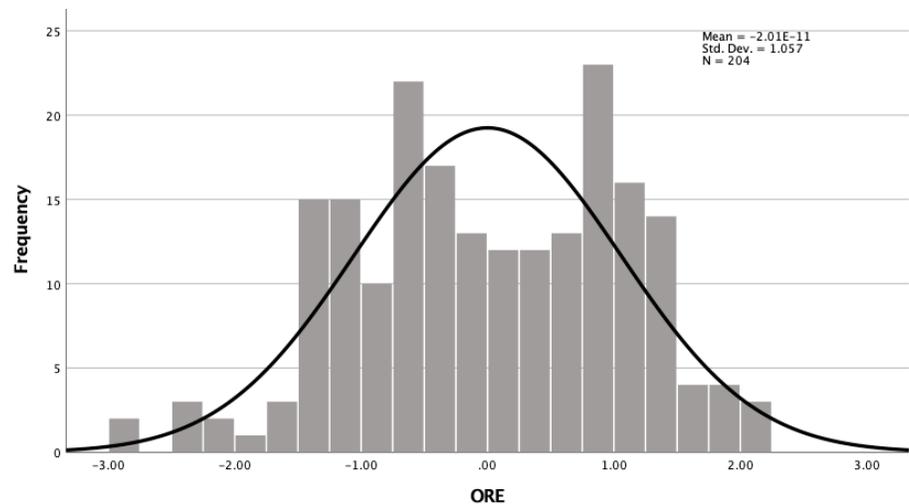
Construct	Items	$\alpha$	$\alpha$ if item eliminated
<b>Independent Variable</b>			
Dynamic Capabilities (DC)	15	.938	
<b>Dependent Variable</b>			
Organizational Resilience (ORE)	14	.962	
<b>Moderating Variables</b>			
Munificence (M)	3	.608	.662 (1 item)
Environmental Dynamism (ED)	5	.829	
Complexity (CX)	8	.853	
Social Capital (SC)	5	.852	
Digital Maturity (DM)	5	.933	

### 4.3 Model Fit Analysis

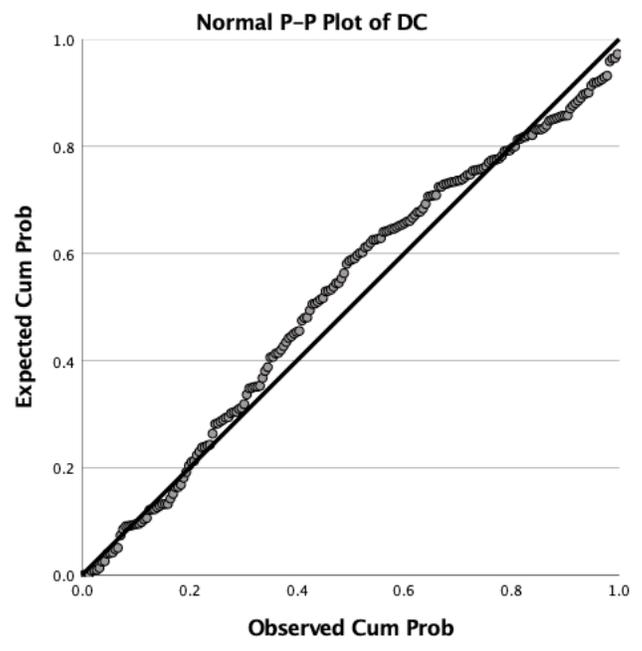
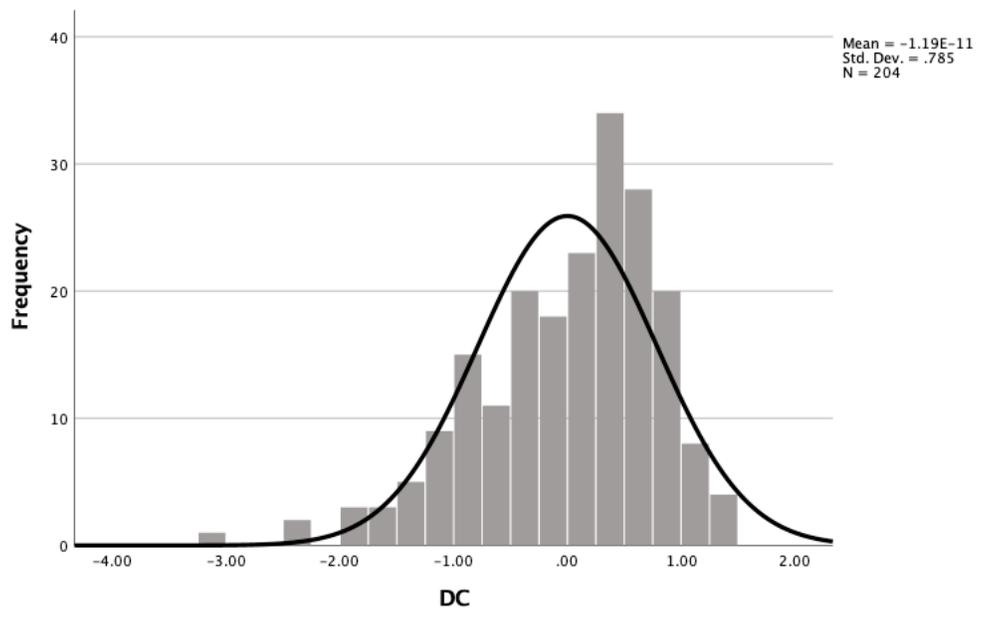
Once reliability has been established, construct validity should be assessed (Hair, 2009; Hair, Anderson, Babin, & Black, 2010). As a first step, Confirmatory factor analysis (CFA) is used to test the measurement model further to determine the factor structure of a set of variables. The CFA technique allows "... the researcher to assess the contribution of each scale item as well as incorporate how well the scale measures the underlying latent construct" (Hair, 2009; Hair et al., 2010).

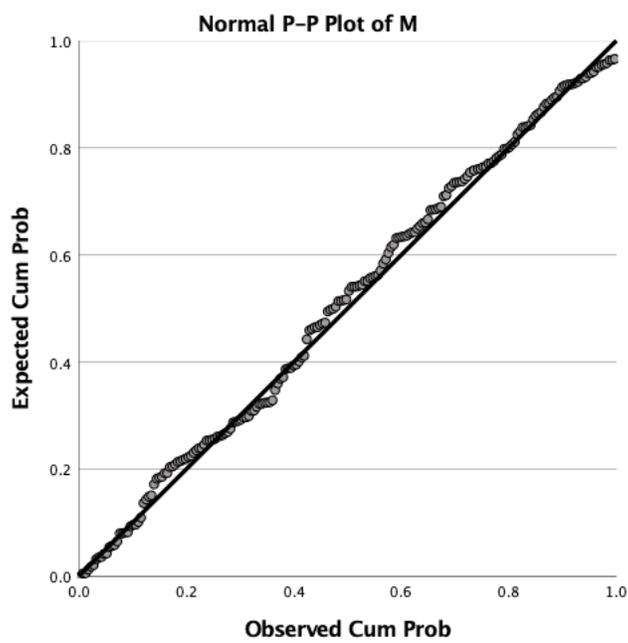
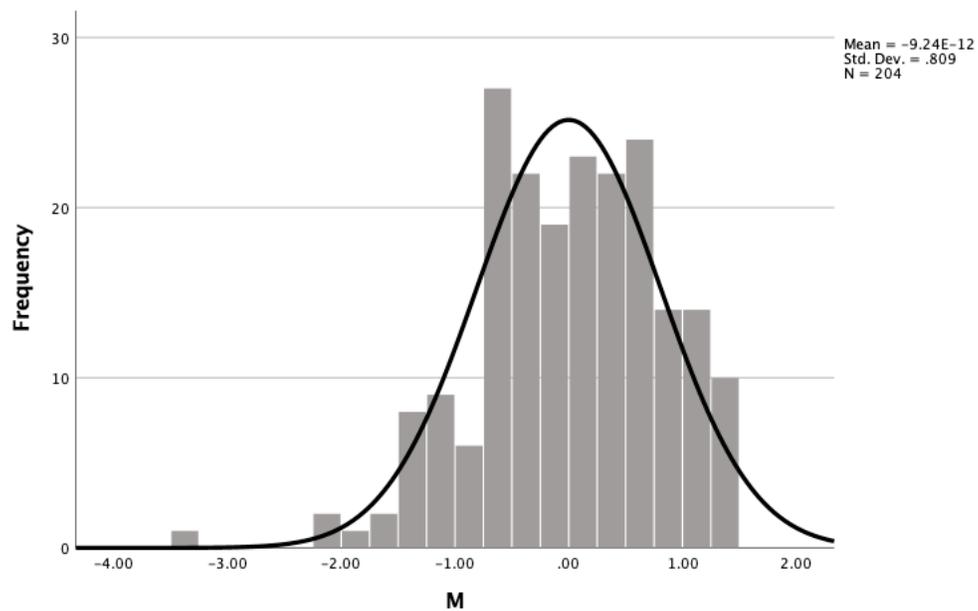
Before conducting CFA, the assumptions of sample size, normality, linearity, and multicollinearity must be satisfied (Tabachnick, Fidell, & Ullman, 2007). First, the sample size (204) of this study exceeds the minimum (100) proposed by scholars (Ibid, 2010). Second, normality - the likelihood that a random variable underlying the data set is normally distribution - and linearity - the ability of the correlation coefficient to adequately represent the relationship between each pair of variables - can be assessed visually by examining the histogram and a normal probability plot. The histogram compares the observed data with a distribution that approximates the normal distribution. Further, "the normal probability plot compares the cumulative distribution of a normal distribution where if the distribution is normal, the line representing the actual data follows the diagonal" (Hair, 2009; Hair et al., 2010). The histogram and normal probability plots of the dependent, independent, and moderating variables are presented in figures 12 to 18. A visual examination confirms the normality and linearity assumptions. Finally, as discussed in section 4.1, the multicollinearity concern was alleviated by verifying the VIF and condition index values below the widely accepted threshold.

Figure 12: Normality Plot: Dependent Variable – Organizational Resilience

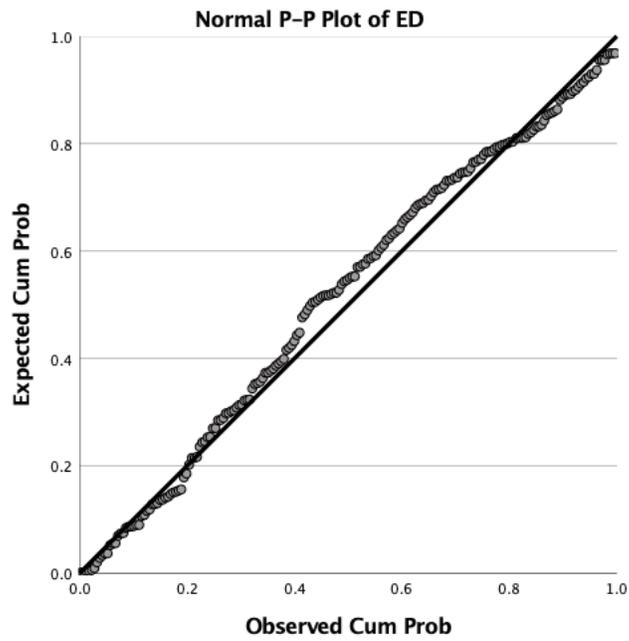
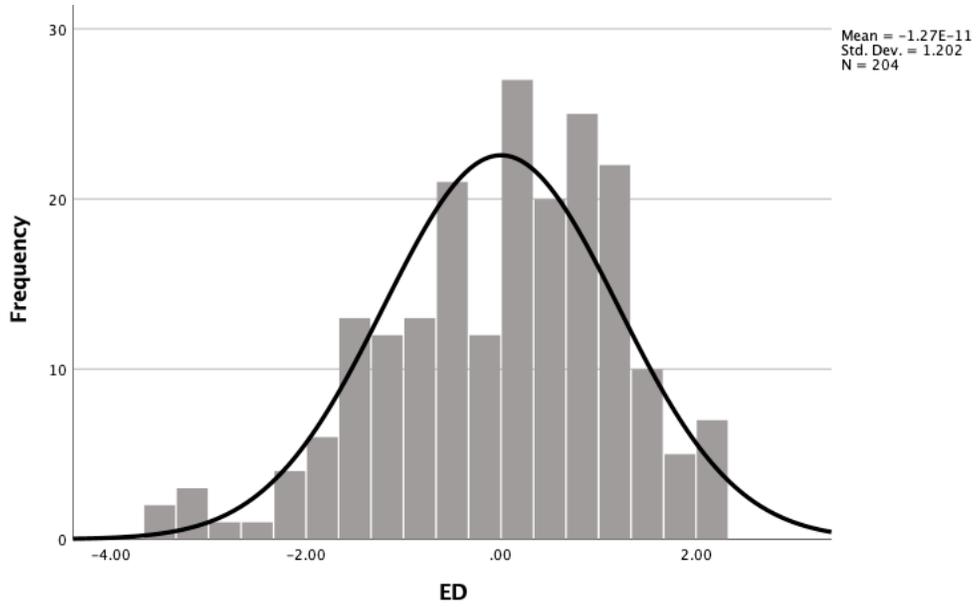


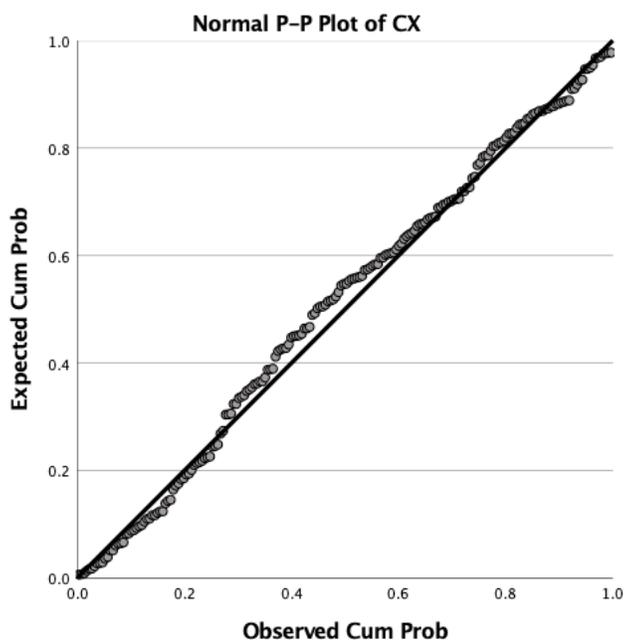
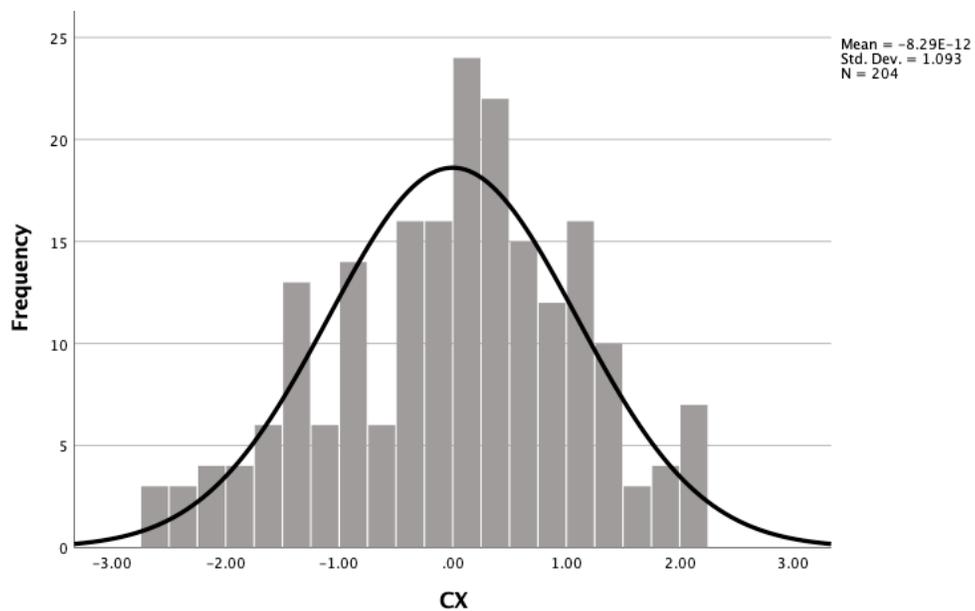
**Figure 13: Normality Plot: Independent Variable – Dynamic Capability**

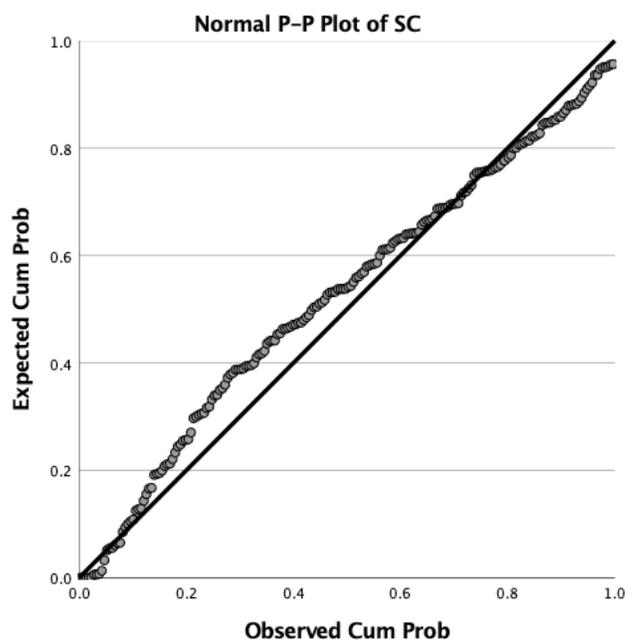
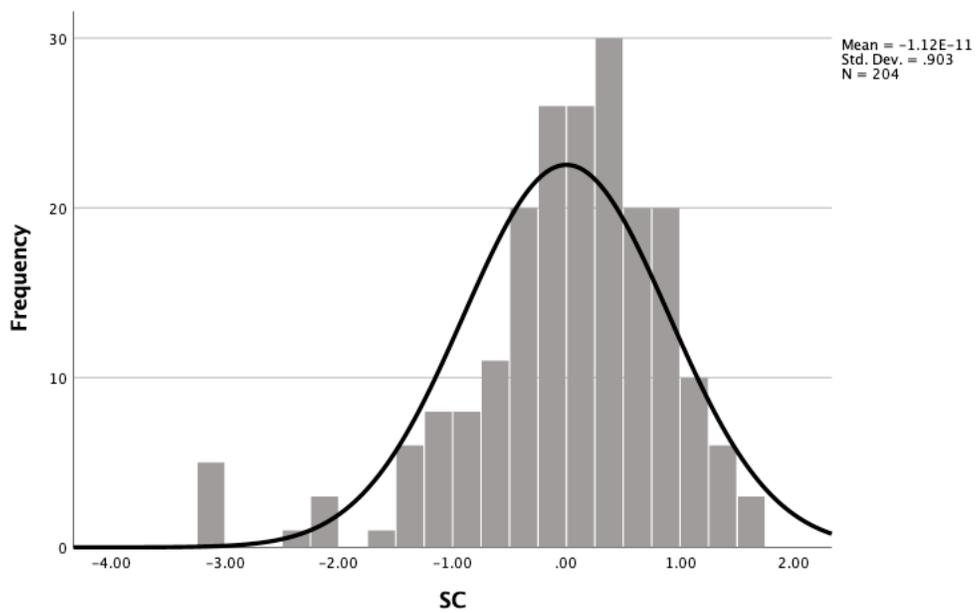


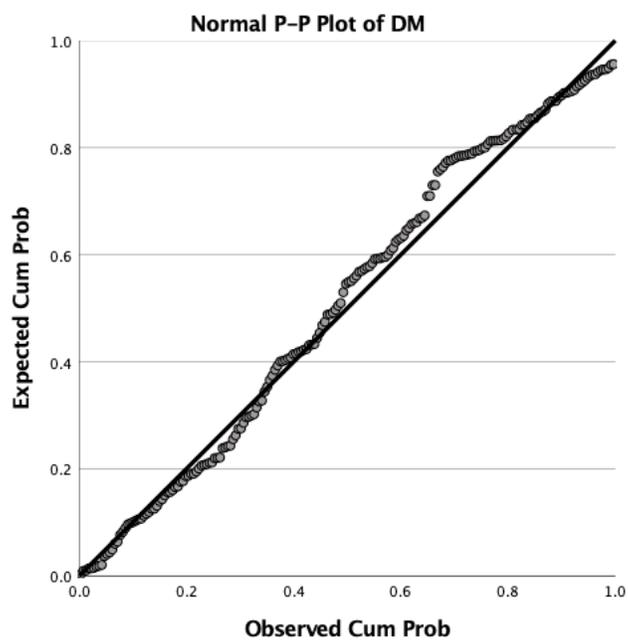
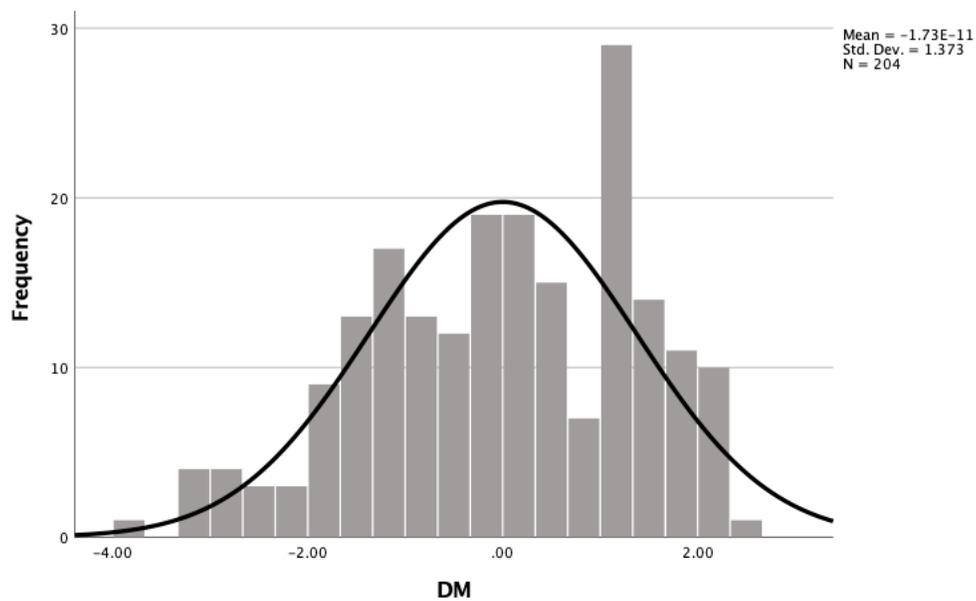
**Figure 14: Normality Plot: Moderating Variable – Munificence**

**Figure 15: Normality Plot: Moderating Variable – Environmental Dynamism**



**Figure 16: Normality Plot: Moderating Variable – Complexity**

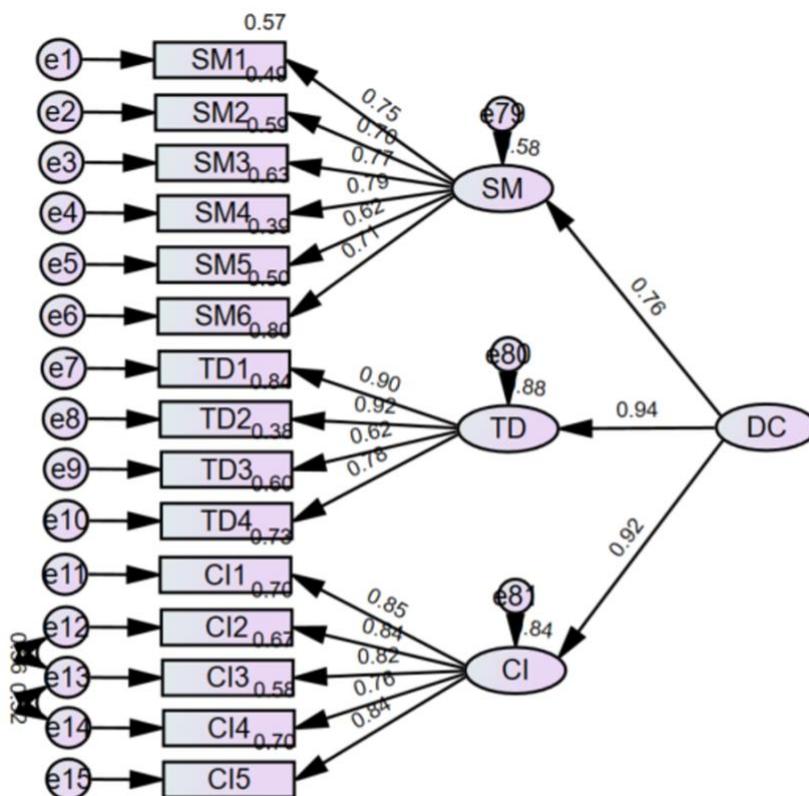
**Figure 17: Normality Plot: Moderating Variable – Social Capital**

**Figure 18: Normality Plot: Moderating Variable – Digital Maturity**

While performing CFA, the overall model fit, as suggested by (Hair, 2009; Hair et al., 2010; Jaccard & Wan, 1996), was assessed using four indices, namely, chi-square/degree of freedom ( $\chi^2/df$ ) ratio, the comparative fit (CFI) index, the root mean square error of approximation (RMSEA) value, and the standardized root mean square residual (SRMR) value. First, the relative/normed chi-square ( $\chi^2/df$ ) is used instead of the traditional chi-square value ( $\chi^2$ ) as the chi-square statistic is sensitive to large sample size ( $> 200$ ) and may reject a model that fits (Bentler & Bonett, 1980). For a sample size over 200, (Kline, 1998) recommends a ratio less than 3.0 as acceptable. Second, CFI compares a target model's fit to an independent or null model. A value above .90 is usually associated with a model that fits well (Fan, Thompson, & Wang, 1999). Third, RMSEA is a parsimony-adjusted index. Values closer to 0 represent a good fit. Generally, values less than .08 indicate a reasonable error of appropriation and a good fit (Hair, 2009; Hair et al., 2010). Finally, SRMR is the square root of the difference between the residuals of the sample covariance matrix and the hypothesized model. Generally, values of about .08 or less are considered acceptable.

The factor loadings and covariances from the fit tests for the DC dimensions, OR dimensions, two-factor DC and OR constructs, and moderators are shown in figures 19, 20, 21, and 22.

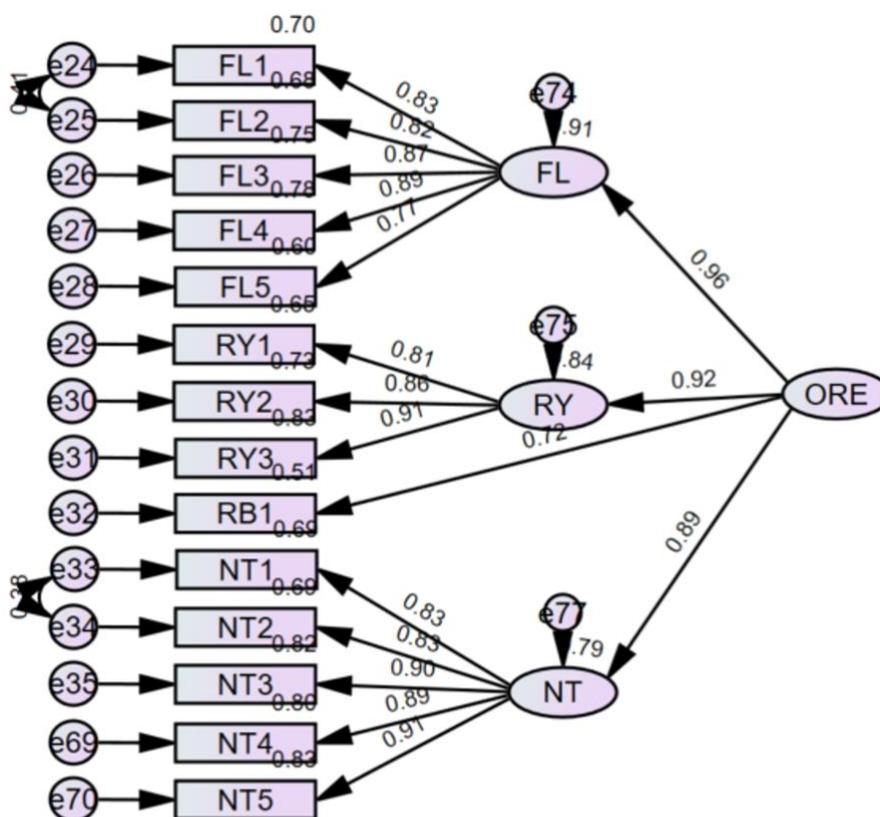
Figure 19: The second-order factor of DC dimensions



- PCMIN/DF            2.0310 (< 3 )
- CFI                    0.9580 (>.90)
- RMSEA                0.0710 (<.08)
- SRMR                 0.0523 (<.08)

The DC scale yielded a  $\chi^2/df$  ratio of 2.0310, below the suggested 3.0 threshold, indicating a good fit. Next, the CFI measured at .9580, higher than the suggested .90 value, indicating a good fit. Following that, the RMSEA for the model was .0710, less than the suggested .080 value, indicating a good fit. Finally, SRMR measured at .0523, lower than the .08 threshold, indicating a good fit. Overall, the measurement model for DC indicated a good fit.

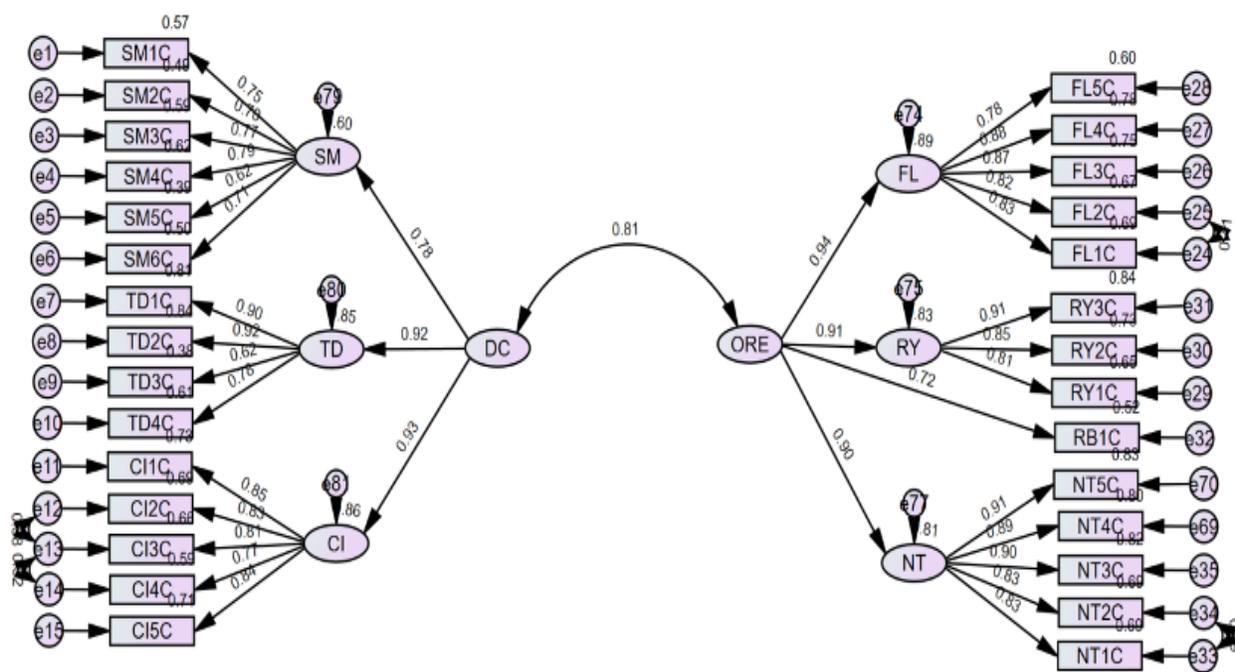
Figure 20: The second-order factor of the four OR dimensions



- PCMIN/DF 1.7660 (< 3 )
- CFI 0.9790 (>.90)
- RMSEA 0.0610 (<.08)
- SRMR 0.0317 (<.08)

The ORE scale yielded a  $\chi^2/df$  ratio of 1.7660, below the suggested 3.0 threshold, indicating a good fit. Next, the CFI measured at .9790, higher than the suggested .90 value, indicating a good fit. Following that, the RMSEA for the model was .0610, less than the suggested .80 value, indicating a good fit. Finally, SRMR measured at .0317, lower than the .08 threshold, indicating a good fit. Overall, the measurement model for OR indicated a good fit.

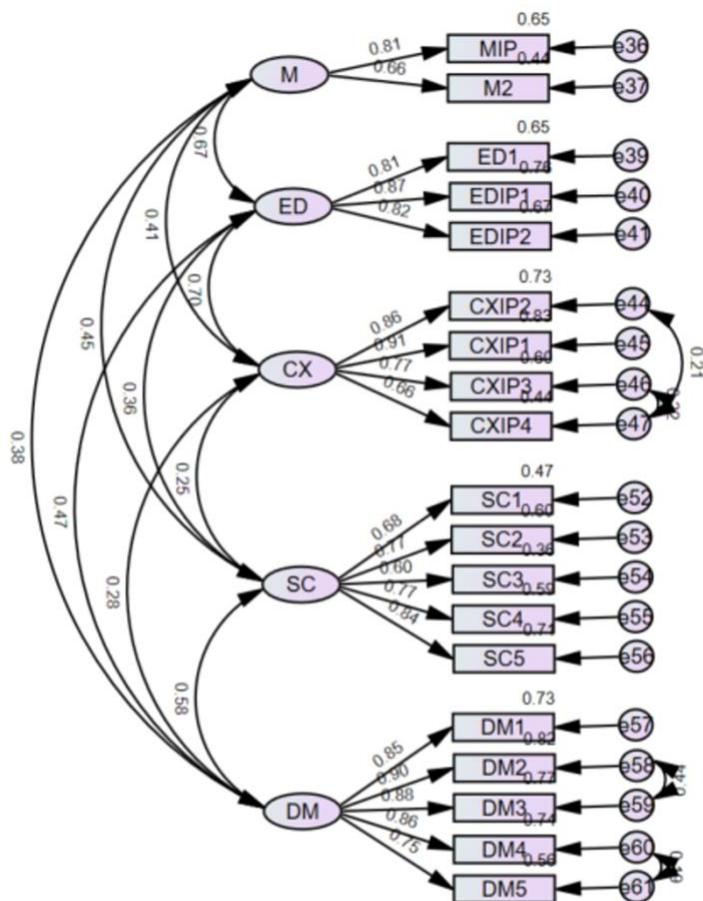
**Figure 21: The Two-factor Analysis of the DC and OR constructs**



- PCMIN/DF            1.8710 (< 3 )
- CFI                    0.9380 (>.90)
- RMSEA                0.0650 (<.08)
- SRMR                 0.0542 (<.08)

The DC and OR scales yielded a  $\chi^2/df$  ratio of 1.8710, below the suggested 3.0 threshold, indicating a good fit. Next, the CFI measured at .9380, higher than the suggested .90 value, indicating a good fit. Following that, the RMSEA for the model was .0650, less than the suggested .80 value, indicating a good fit. Finally, SRMR measured at .0542, lower than the .08 threshold, indicating a good fit. Overall, the measurement model for DC and OR indicated a good fit. In addition, this alleviates the discriminant validity concern due to the high correlation between the DC and OR constructs.

**Figure 22: Five dimensions of the Moderators**



- PCMIN/DF 1.8590 (< 3 )
- CFI 0.9530 (>.90)
- RMSEA 0.0650 (<.08)
- SRMR 0.0539 (<.08)

The scale for moderator variables yielded a  $\chi^2/df$  ratio of 1.8590, below the suggested 3.0 threshold, indicating a good fit. Next, the CFI measured at .9530, higher than the suggested .90 value, indicating a good fit. Following that, the RMSEA for the model was .0650, less than the suggested .80 value, indicating a good fit. Finally, SRMR measured at .0539, lower than the .08

threshold, indicating a good fit. Overall, the measurement model for the moderators indicated a good fit.

#### **4.4 Construct Validity (Convergent Validity, Construct Reliability, and Discriminant Validity)**

Convergent validity, construct reliability, and discriminant validity were used to test the constructs, Dynamic Capabilities (DC), Munificence (M), Environmental Dynamism (ED), Complexity (CX), Social Capital (SC), Digital Maturity (DM), and Organizational Resilience (ORE).

Factor loadings and average variance extracted (AVE) are used as indicators to determine convergent validity (Hair et al., 2010). As a rule of thumb, factor loadings and AVE values higher than 0.50 indicate a high level of convergent validity. The factor loadings ranged between 0.60 and 0.91 regarding DC, OR, and Moderators, demonstrating that they converge on a common point, the latent constructs. Further, an AVE of more than .50 was found for all constructs. Thus, convergent validity is satisfied for the measurement model.

Construct reliability (CR) is the last indicator of convergent validity. A reliability score of 0.70 is generally considered to demonstrate good internal consistency (Hair et al., 2010). The results illustrated a high degree of consistency of the measures, with CR values ranging from 0.708 to 0.929. Table 15 displays the AVE and the CR of all constructs.

Comparing the AVE values for any two constructs with the square of the correlation estimate between these two constructs provides evidence of discriminant validity (Hair et al., 2010). The AVE values should be greater than the square correlation estimate. Table 15 displays the AVE and the CR for all constructs. Table 15 shows that all the constructs passed this test.

**Table 15: Construct Reliability and Validity Measures**

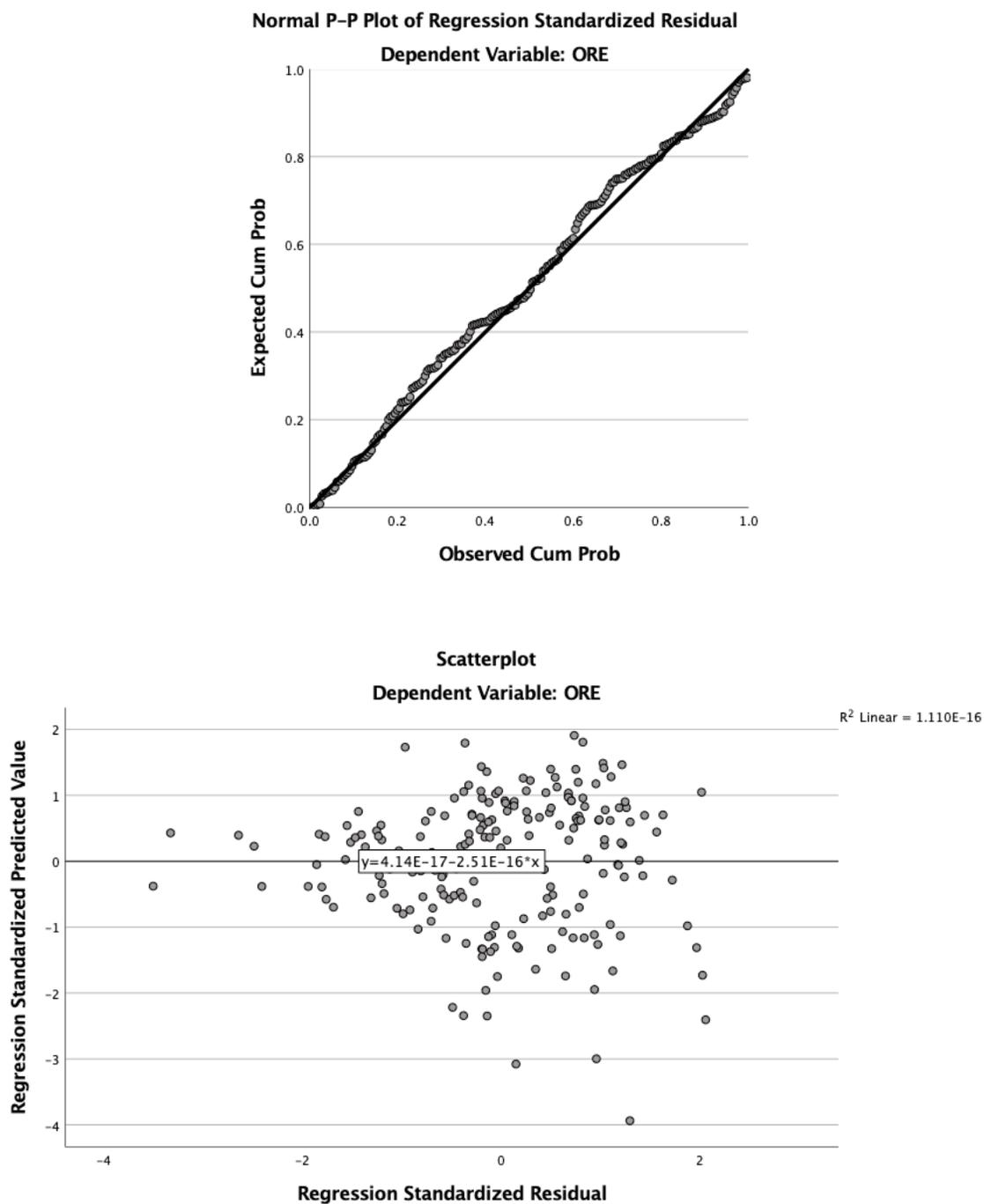
	CR	AVE	MSV	ASV	DM	M	ED	CX	SC	DC	ORE
DM	0.929	0.724	0.587	0.318	0.851						
M	0.708	0.552	0.430	0.224	0.385	0.743					
ED	0.872	0.695	0.489	0.274	0.475	0.656	0.834				
CX	0.880	0.651	0.489	0.153	0.277	0.405	0.699	0.807			
SC	0.856	0.546	0.460	0.269	0.586	0.443	0.365	0.249	0.739		
DC	0.911	0.774	0.659	0.356	0.726	0.425	0.462	0.307	0.678	0.880	
ORE	0.928	0.765	0.659	0.347	0.766	0.474	0.392	0.186	0.649	0.812	0.875

#### 4.5 Regression Results

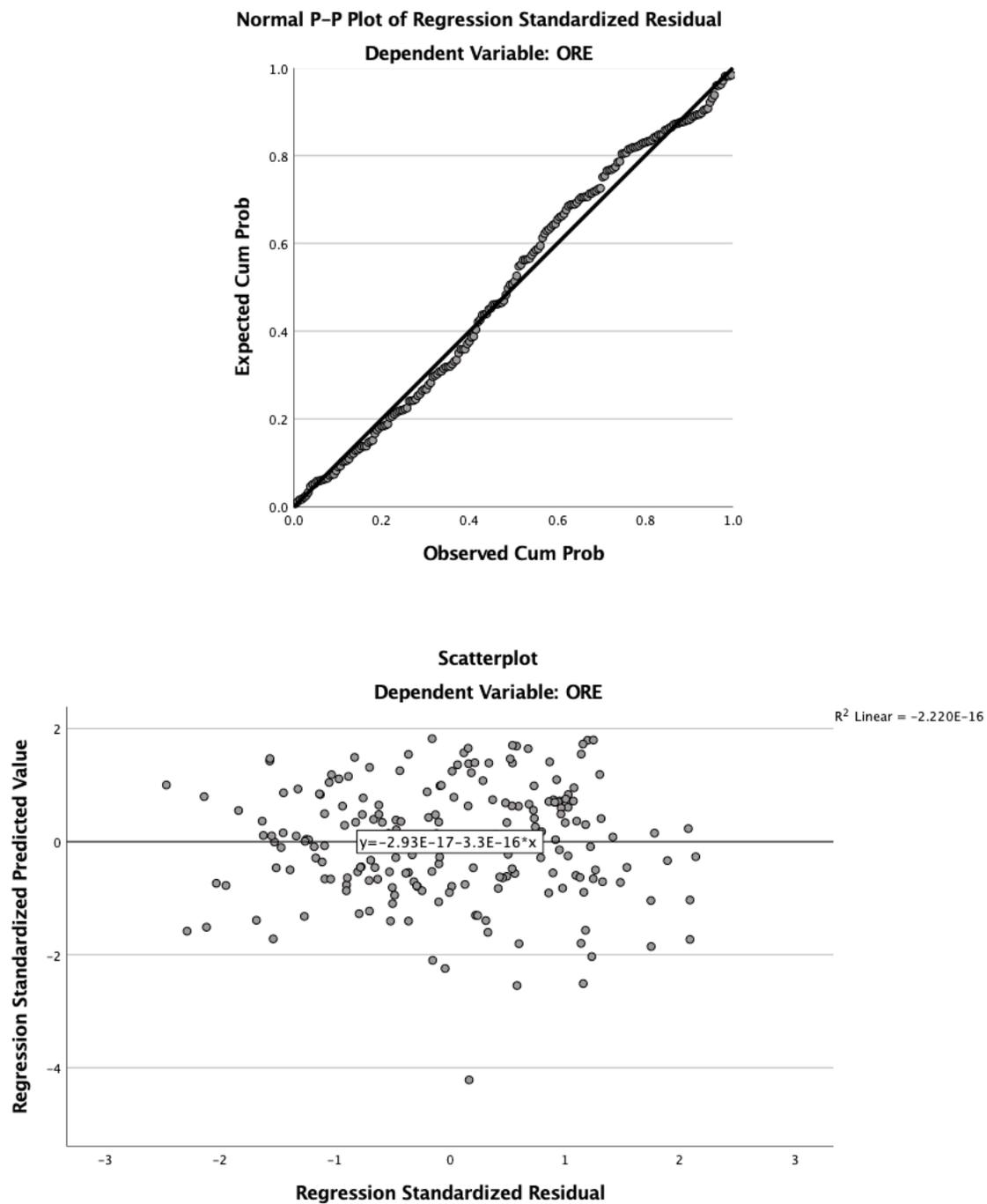
Before considering the research model and hypotheses for testing, the data were examined for violations of statistical assumptions regarding normality, homoscedasticity, and linearity. (Hair et al., 2010).

Normality and linearity assumptions were verified as part of CFA testing and discussed in Section 4.3. Homoscedasticity assumes that the dependent variable displays equal levels of variance across all levels of the predictor variables (Hair et al., 2010). This was assessed by examining the scatterplots. Figures 22 through 29 show that the independent and moderator variables were regressed individually against the dependent variable. In each case, equal variance dispersion was observed in the scatter plots, and the residuals are normal in the residuals plot showing that the assumption of homoscedasticity was not violated.

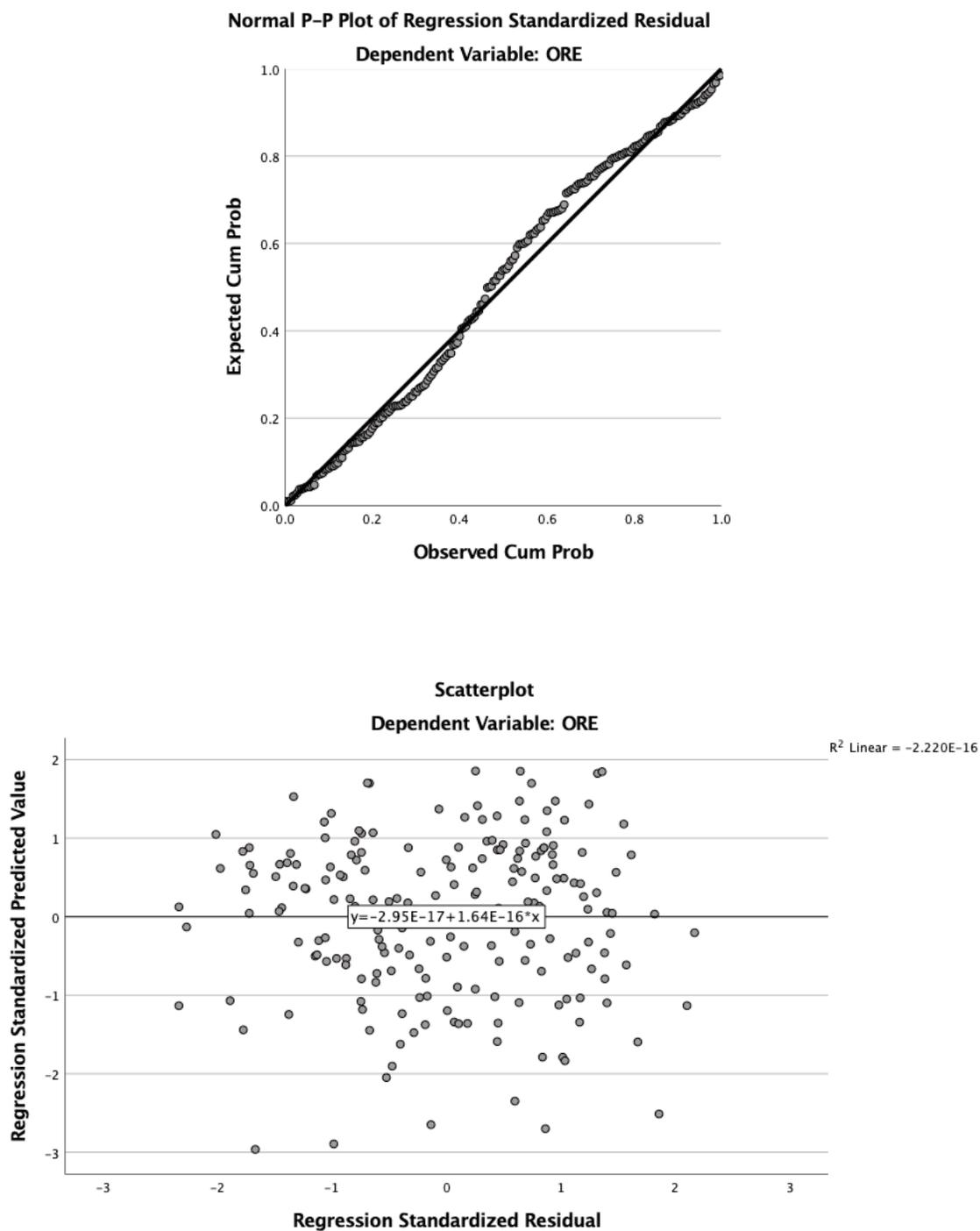
**Figure 23: Linearity and Homoscedasticity Test: Dynamic Capability and Organizational Resilience**

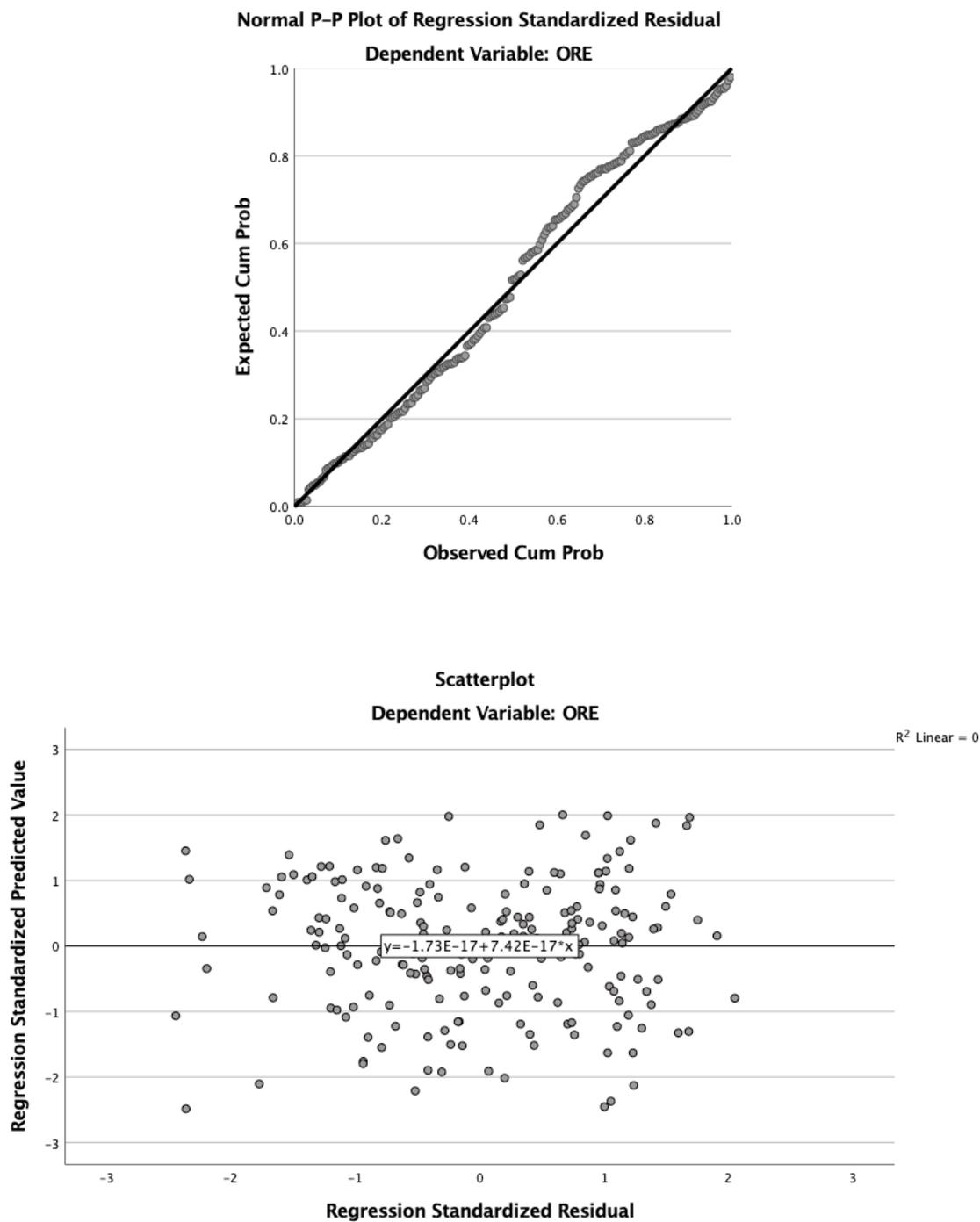


**Figure 24: Linearity and Homoscedasticity Test: Munificence and Organizational Resilience**

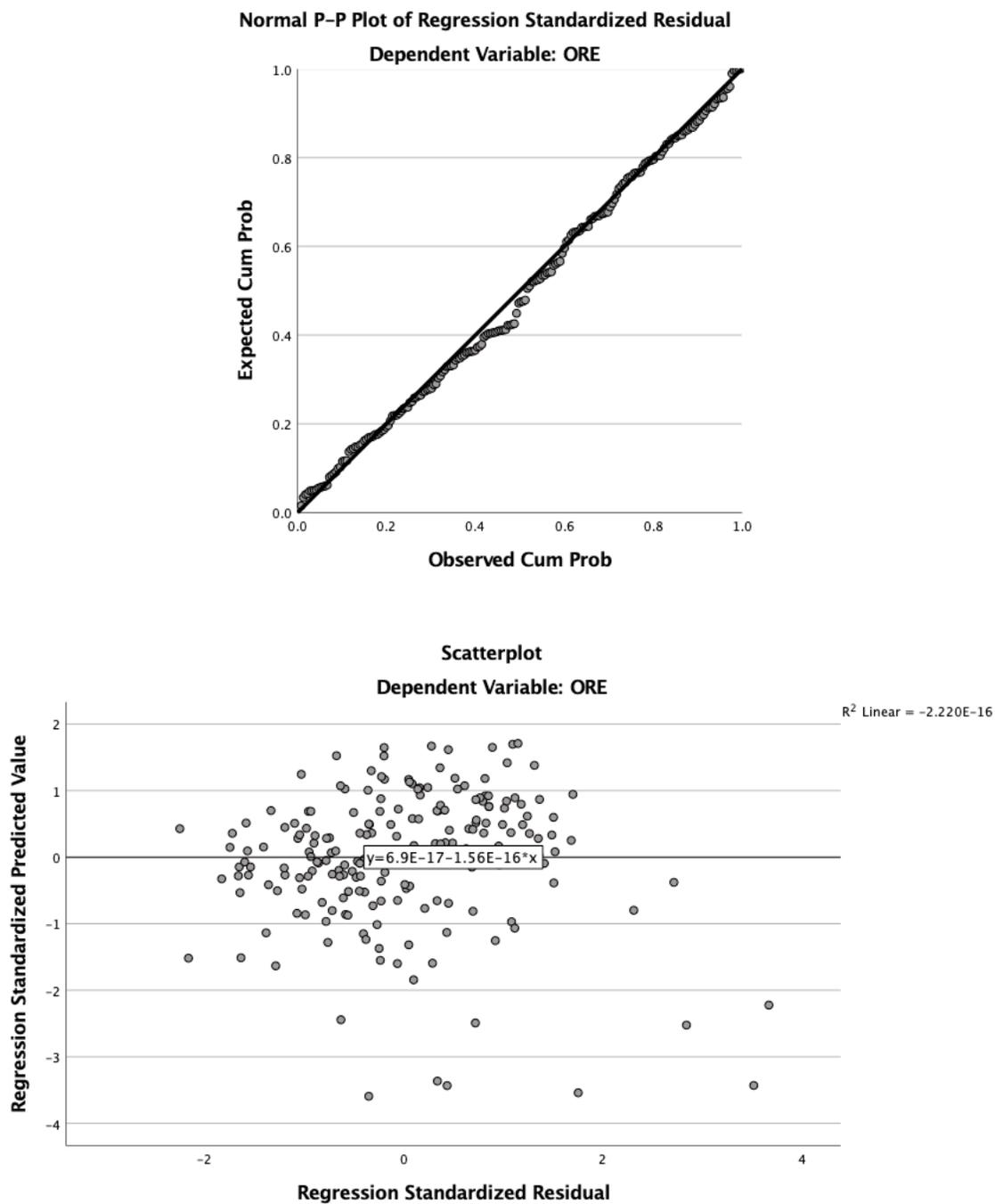


**Figure 25: Linearity and Homoscedasticity Test: Environmental Dynamism and Organizational Resilience**

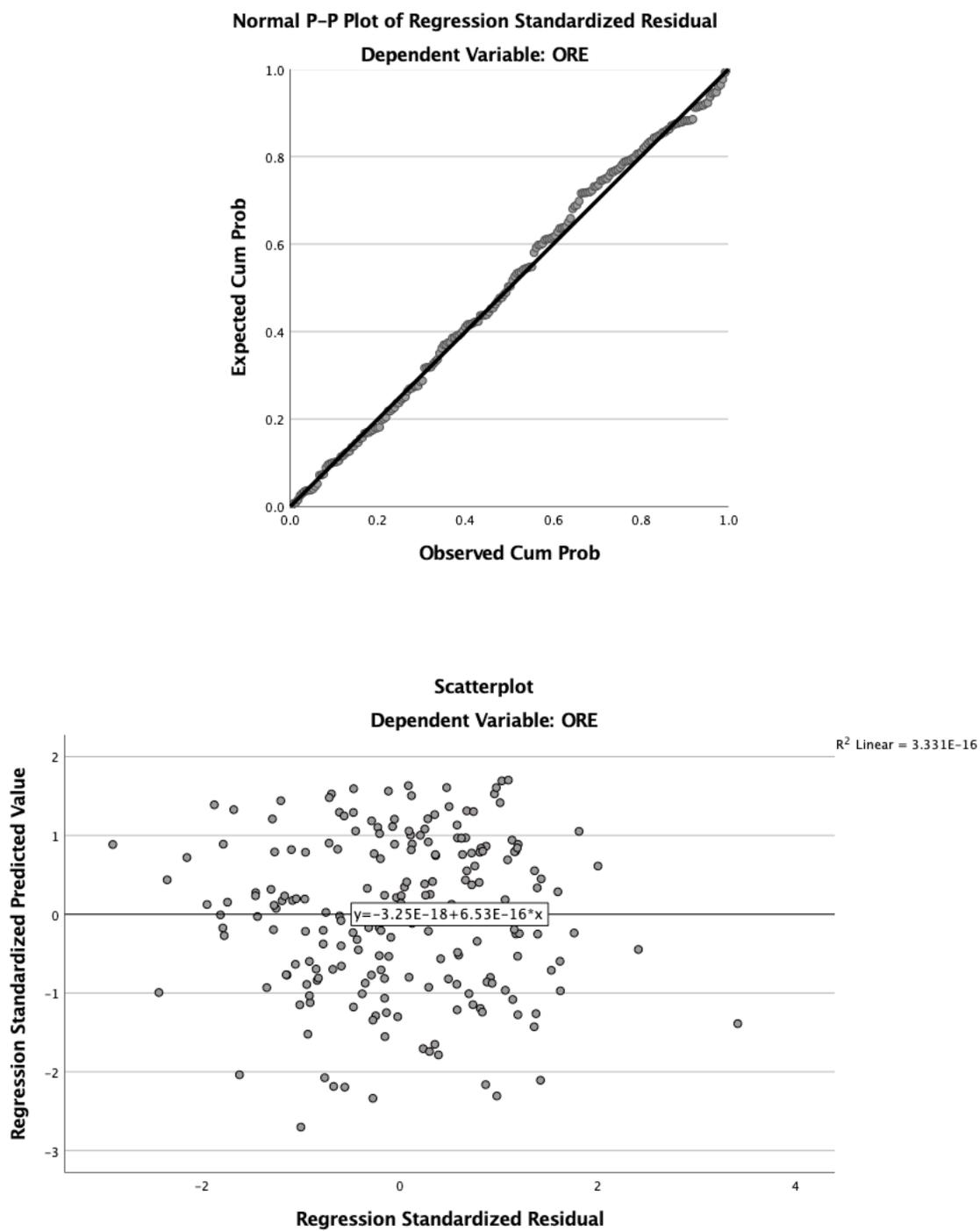


**Figure 26: Linearity and Homoscedasticity Test: Complexity and Organizational Resilience**

**Figure 27: Linearity and Homoscedasticity Test: Social Capital and Organizational Resilience**



**Figure 28: Linearity and Homoscedasticity Test: Digital Maturity and Organizational Resilience**



After testing the underlying regression assumptions, the hypotheses were tested using multiple regression analysis yielding four models as outlined in the results provided in Table 16. First, the control variables were entered in model 1 to examine their effects on the criterion variables. The adjusted  $R^2$  (0.047) of the model was not significant even at the 0.10 level ( $F = 1.662, p > .10$ ), indicating that the control variables did not significantly affect OR. Next, to test hypothesis 1, the independent variable, DC, was entered in model 2. Hypothesis 1 proposed that higher levels of strategic DC processes were positively associated with OR. In support of hypothesis 1, DC was positively and significantly related to OR ( $\beta = 0.878, p < .001$ ). Furthermore, the adjusted  $R^2$  of the model increased to 0.765 and was significant at the .001 level ( $F = 42.252, p < .001$ ), indicating that the model explained 78.3% of the variance in OR.

To test the moderation effects of munificence, environmental dynamism, complexity, social capital, and digital maturity, the five moderating variables were entered in model 3, and the interaction terms were entered in model 4. In model 3, the adjusted  $R^2$  value from the main effects of the moderators increased to 0.831 and was significant at the .001 level ( $F = 48.631, p < .001$ ). Digital maturity ( $\beta = 0.369, p < .001$ ) and munificence ( $\beta = 0.205, p < .001$ ) were significantly and positively related to OR at the .001 level. Complexity ( $\beta = -0.128, p < .01$ ) was significantly and positively associated with OR at the .01 level, and environmental dynamism ( $\beta = -0.097, p < .10$ ) marginally significantly and negatively related to OR at the .10 level.

The adjusted  $R^2$  value further increased to 0.844 in model 4 with the interaction terms of the moderators and continued to be significant at the .001 level ( $F = 43.102, p < .001$ ). Hypothesis 2a argued that munificence would moderate the relationship between DC and OR; however, while the main effects of munificence ( $\beta = 0.195, p < .001$ ) and DC ( $\beta = 0.624, p < .001$ ) were significantly and positively related to OR, the interaction effect was not significant thus not

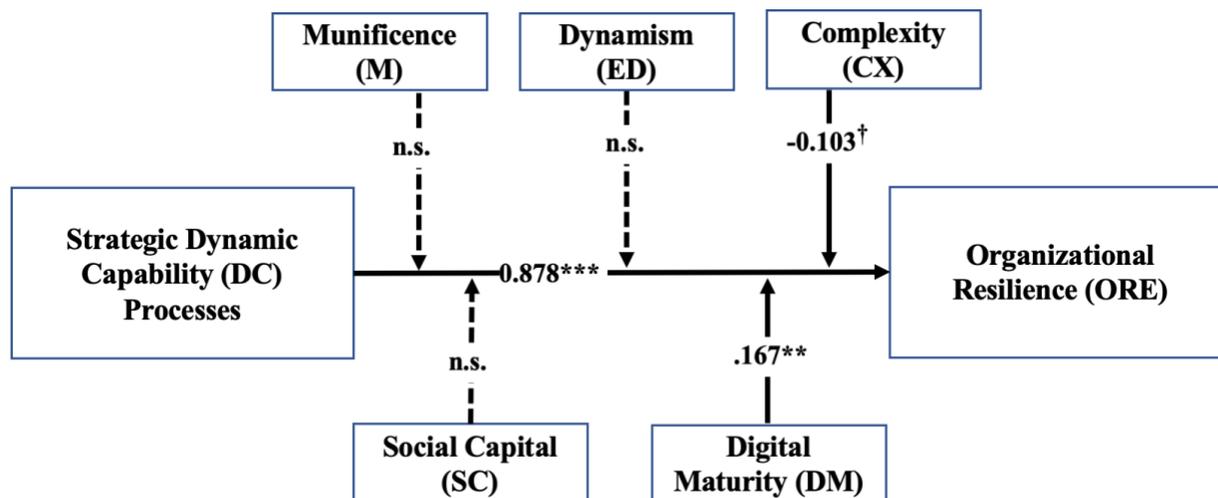
supporting the hypothesis. Hypothesis 2b argued that environmental dynamism would moderate the relationship between DC and OR; however, neither the main effect nor the interaction effect was significant, thus not supporting the hypothesis. Hypothesis 2c argued that complexity would moderate the relationship between DC and OR. However, the model showed that the main effects of complexity ( $\beta = -0.139, p < .01$ ) and DC ( $\beta = 0.624, p < .001$ ) were significantly and negatively related to OR, the interaction effect ( $\beta = -0.103, p < .10$ ) was only marginally, negatively significant at the .10 level. Therefore, only partially supports hypothesis 2c. Hypothesis 3 argued that social capital would moderate the relationship between DC and OR; however, neither the main effect nor the interaction effect was significant, thus not supporting the hypothesis. Finally, hypothesis 4 argues that digital maturity moderates the relationship between DC and OR. The results show that the main effects of digital maturity ( $\beta = 0.333, p < .001$ ) and DC ( $\beta = 0.624, p < .001$ ) were significantly and positively related to OR, the interaction effect ( $\beta = 0.167, p < .10$ ) was also positively significant at the .01 level. A summary of the regression results for all four models is shown in table 16, and the hypothesized relationships are portrayed and detailed in figure 28 and table 17.

Table 16: Regression Results

Variables	Model 1	Model 2	Model 3	Model 4
<b>Controls</b>	$\beta$	$\beta$	$\beta$	$\beta$
Respondent Age	<b>-0.200*</b>	<b>-0.083*</b>	-0.033	-0.034
Respondent Tenure	0.038	-0.057	-0.005	-0.016
Gender: Male	<b>0.150*</b>	0.036	0.003	0.024
Gender: Non specified	-0.073	0.036	0.005	0.056
Department: Strategy Development	<b>0.160<sup>†</sup></b>	0.030	0.040	0.027
Department: Business Operations	0.064	0.052	0.025	0.012
Department: Functional Area	-0.093	0.054	0.056	<b>0.062<sup>†</sup></b>
Role: Other Management	0.013	<b>-0.103*</b>	<b>-0.081*</b>	<b>-0.093*</b>
Role: Senior Director/Director	-0.079	-0.045	-0.049	-0.046
Role: Top Management (CxO)	-0.085	<b>-0.081<sup>†</sup></b>	-0.035	-0.023
Firm Age	0.045	0.000	-0.010	-0.002
Firm Size	0.116	<b>0.089*</b>	0.002	-0.007
Industry: Retail and Warehouse	-0.045	-0.007	0.046	0.047
Industry: Finance and Banking	-0.023	0.024	0.024	0.026
Industry: Others	-0.082	0.031	<b>0.066<sup>†</sup></b>	0.054
<b>Independent Variables</b>				
Dynamic Capabilities (DC)		<b>0.878***</b>	<b>0.542***</b>	<b>0.624***</b>
<b>Moderating Variables</b>				
Munificence (M)			<b>0.205***</b>	<b>0.195***</b>
Environmental Dynamism (ED)			<b>-0.097<sup>†</sup></b>	-0.084
Complexity (CX)			<b>-0.128**</b>	<b>-0.139**</b>
Social Capital (SC)			0.040	0.056
Digital Maturity (DM)			<b>0.369***</b>	<b>0.333***</b>
<b>Interaction Effects</b>				
M * DC				0.056
ED * DC				0.033
CX * DC				<b>-0.103<sup>†</sup></b>
SC * DC				-0.047
DM * DC				<b>0.167**</b>
R	0.342	0.885	0.921	0.929
R <sup>2</sup>	0.117	0.783	0.849	0.864
Adjusted R <sup>2</sup>	0.047	0.765	0.831	0.844
$\Delta R^2$	0.117	0.666***	0.065***	0.015***
F	1.662	<b>42.252***</b>	<b>48.631***</b>	<b>43.102***</b>

Significant at: <sup>†</sup>  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

Figure 29: Results of the Hypothesized Model



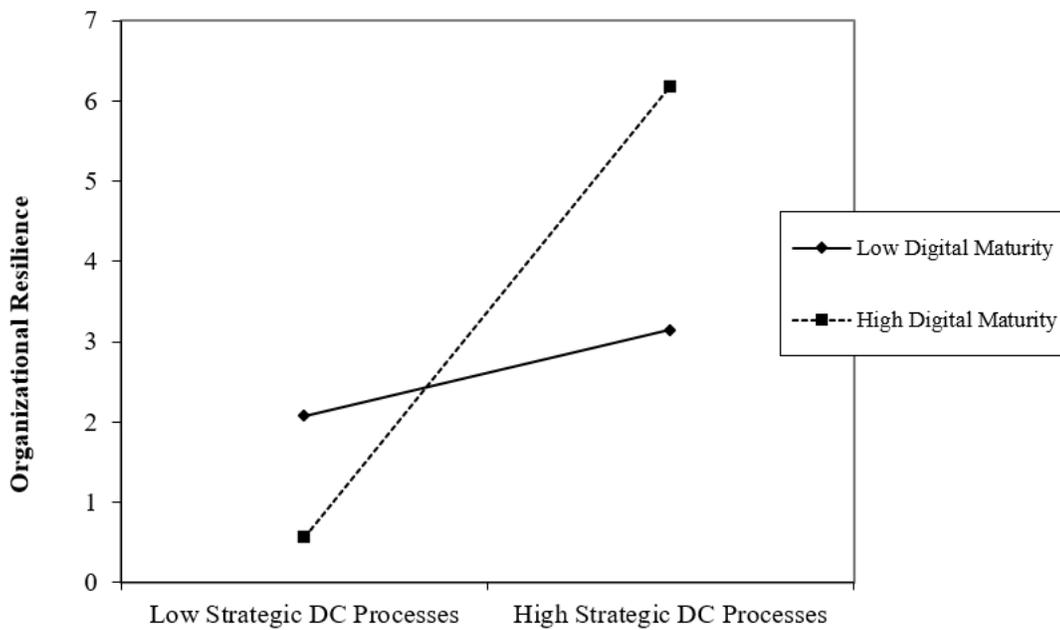
Significant at: †  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

Table 17: Hypothesized Relationships and Results

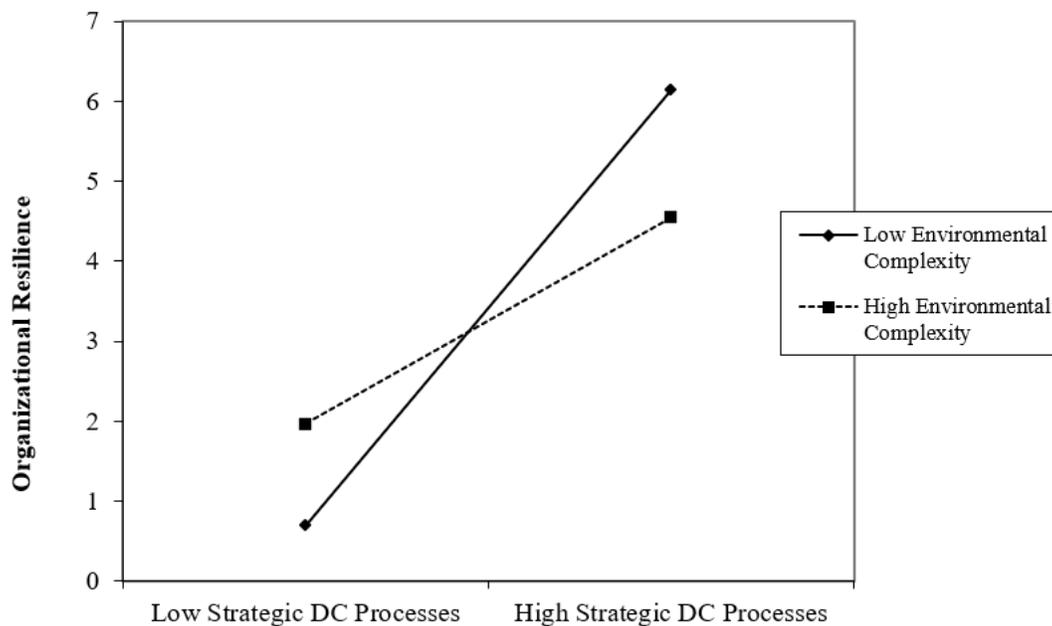
Hypothesized Relationship		Result
<b>Direct Effect</b>		
H1	Organizations with more robust strategic dynamic capability processes have a greater resilience-building meta-capability to grow from disruptions.	<b>Supported</b>
<b>Moderating Effect</b>		
H2a	The effect of the organizations' strategic dynamic capability processes on their resilience-building meta-capability is amplified in business environments perceived to be munificent.	Not Supported
H2b	The effect of the organizations' strategic dynamic capability processes on their resilience-building meta-capability is amplified in business environments perceived to be dynamic.	Not Supported
H2c	The effect of the organizations' strategic dynamic capability processes on their resilience-building meta-capability is amplified in business environments perceived to be complex.	<b>Marginally Supported</b>
H3	The extent of the organization's social capital enhances the effect of strategic dynamic capability processes on their resilience-building meta-capability.	Not Supported
H4	The level of the organization's digital maturity enhances the effect of strategic dynamic capability processes on their resilience-building meta-capability.	<b>Supported</b>

A two-way interaction was plotted to further explain the moderation effects of digital maturity and environmental complexity on the relationship between DC and OR. As shown in figure 29, slope differences reveal that the relationship between DC and OR is stronger with higher digital maturity than with lower digital maturity. In other words, digital maturity strengthens the positive relationship between DC and OR. On the contrary, the slope differences, as shown in figure 30, reveal that the relationship between DC and OR is stronger in lower environmental complexity than in higher environmental complexity. In other words, environmental complexity dampens the positive relationship between DC and OR.

**Figure 30: Two-way Interaction of Digital Maturity on Dynamic Capability and Organizational Resilience Relationships**



**Figure 31: Two-way Interaction of Environmental Complexity on Dynamic Capability and Organizational Resilience Relationships**



#### 4.6 Post Hoc Tests and Results

Post hoc tests were conducted to further evaluate the effects of the individual dimensions of DC and OR. First, an analysis of the effects of DC on the four dimensions of OR, namely, flexibility, redundancy, robustness, and networking, and the moderating effects of munificence, environmental dynamism, complexity, social capital, and digital maturity on those relationships was conducted. Following that, an analysis of the effects of the three dimensions of DC, namely, sense-making, timely decision-making, and change implementation, on OR and its four dimensions and the interaction effects of the five moderators was conducted.

The post-hoc results of models testing the OR dimensions are shown in table 18. In model 5, flexibility was regressed on the control variables, DC, and interaction terms. DC ( $\beta = 0.636, p < .001$ ) was significantly and positively related to flexibility. While the main effects of the

moderating variables, munificence ( $\beta = 0.211, p < .001$ ), complexity ( $\beta = -0.148, p < .01$ ), and digital maturity ( $\beta = 0.223, p < .001$ ) also showed significance, only the interaction term of digital maturity ( $\beta = 0.235, p < .01$ ) was found significant. Overall, model 5 was significant ( $F = 20.748, p < .001$ ), with an adjusted  $R^2$  of 0.717.

In model 6, redundancy was regressed on the control variables, DC, and interaction terms. DC ( $\beta = 0.647, p < .001$ ) was significantly and positively related to redundancy. While the main effects of the moderating variables, munificence ( $\beta = 0.130, p < .05$ ), complexity ( $\beta = -0.137, p < .05$ ), and digital maturity ( $\beta = 0.300, p < .001$ ) also showed significance, only the interaction term of complexity ( $\beta = -0.137, p < .05$ ) and digital maturity ( $\beta = 0.205, p < .05$ ) were found significant. Overall, model 6 was significant ( $F = 19.528, p < .001$ ), with an adjusted  $R^2$  of 0.704.

In model 7, robustness was regressed on the control variables, DC, and interaction terms. DC ( $\beta = 0.442, p < .001$ ) was significantly and positively related to robustness. Further, the main effect and the interaction term of the moderating variable digital maturity ( $\beta = 0.279, p < .05$ ) were significant. In addition, the main effect and the interaction term of the moderating variable munificence ( $\beta = 0.173, p < .10$ ) were marginally significant. Overall, model 7 was significant ( $F = 9.080, p < .001$ ), with an adjusted  $R^2$  of 0.509.

Finally, in model 8, networking was regressed on the control variables, DC, and interaction terms. DC ( $\beta = 0.534, p < .001$ ) was significantly and positively related to networking. While the main effects of the moderating variables, munificence ( $\beta = 0.214, p < .001$ ), complexity ( $\beta = -0.125, p < .05$ ), and digital maturity ( $\beta = 0.349, p < .001$ ) also showed significance, only the interaction term of complexity ( $\beta = -0.148, p < .05$ ) was found significant. Overall, model 5 was significant ( $F = 23.131, p < .001$ ), with an adjusted  $R^2$  of 0.739.

Table 18: Post-Hoc Results: Organizational Resilience Dimensions

Variables	Model 5	Model 6	Model 7	Model 8
	$\beta$ Flexibility	$\beta$ Redundancy	$\beta$ Robustness	$\beta$ Networking
<b>Dependent Variable</b>				
<b>Controls</b>				
Respondent Age	-0.052	<b>-0.076<sup>†</sup></b>	-0.061	0.023
Respondent Tenure	-0.024	-0.02	0.001	-0.014
Gender: Male	0.056	0.008	-0.052	0.027
Gender: Non specified	<b>0.088<sup>†</sup></b>	0.065	0.02	0.038
Department: Strategy Development	0.033	-0.007	-0.031	<b>0.081<sup>†</sup></b>
Department: Business Operations	-0.006	0.015	-0.024	0.05
Department: Functional Area	0.049	0.063	0.066	0.104
Role: Other Management	<b>-0.094<sup>†</sup></b>	<b>-0.12*</b>	-0.064	<b>-0.112*</b>
Role: Senior Director/Director	-0.067	-0.063	0.046	-0.05
Role: Top Management (CxO)	-0.038	-0.017	-0.009	-0.021
Firm Age	0.028	-0.022	-0.029	-0.015
Firm Size	-0.023	0.051	0.085	-0.071
Industry: Retail and Warehouse	0.051	0.072	0.021	0.047
Industry: Finance and Banking	0.029	0.025	0.051	0.025
Industry: Others	0.038	<b>0.095<sup>†</sup></b>	0.061	0.057
<b>Independent Variables</b>				
Dynamic Capabilities (DC)	<b>0.636***</b>	<b>0.647***</b>	<b>0.442***</b>	<b>0.534***</b>
<b>Moderating Variables</b>				
Munificence (M)	<b>0.211***</b>	<b>0.130*</b>	<b>0.144<sup>†</sup></b>	<b>0.214***</b>
Environmental Dynamism (ED)	-0.092	-0.083	-0.016	-0.083
Complexity (CX)	<b>-0.148**</b>	<b>-0.137*</b>	-0.025	<b>-0.125*</b>
Social Capital (SC)	0.074	0.019	-0.142	0.072
Digital Maturity (DM)	<b>0.223***</b>	<b>0.300***</b>	<b>0.428***</b>	<b>0.349***</b>
<b>Interaction Effects</b>				
M * DC	0.052	0.046	<b>0.173<sup>†</sup></b>	0.058
ED * DC	-0.022	0.037	-0.092	0.155
CX * DC	-0.073	<b>-0.158*</b>	-0.065	<b>-0.148*</b>
SC * DC	-0.057	-0.052	-0.134	-0.025
DM * DC	<b>0.235**</b>	<b>0.205*</b>	<b>0.279*</b>	0.075
R	0.868	0.861	0.756	0.879
R <sup>2</sup>	0.753	0.742	0.571	0.773
Adjusted R <sup>2</sup>	0.717***	0.704***	0.509***	0.739***
F	<b>20.748***</b>	<b>19.528***</b>	<b>9.080***</b>	<b>23.131***</b>

Significant at: <sup>†</sup>  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

The post-hoc results of models testing the effects of the three dimensions of DC, namely, sense-making, timely decision-making, and change implementation, on OR and its four dimensions, namely flexibility, redundancy, robustness, and networking, and the interaction effects of the five moderators are shown in table 19.

In model 9, OR was regressed on the control variables, sense-making, time decision-making, change implementation, and interaction terms of munificence, environmental dynamism, complexity, social capital, and digital maturity. Change implementation ( $\beta = 0.425, p < .001$ ) and timely decision-making ( $\beta = 0.301, p < .01$ ) were significantly and positively related to OR, while sense-making was only marginally, positively significant ( $\beta = 0.143, p < .10$ ). While analyzing the main and interaction effect of moderating variables, first, the main effects of the moderating variable, munificence ( $\beta = 0.239, p < .001$ ), was significant. Its interaction with sense-making ( $\beta = 0.283, p < .05$ ) was significant and positive; change implementation ( $\beta = -0.526, p < .01$ ) was significant and negative; and timely decision-making ( $\beta = 0.326, p < .10$ ) was only marginally significant and positive. Second, while the main effect of environmental dynamism was not significant, its interaction with sense-making ( $\beta = -0.165, p < .05$ ) was significant and negative, and change implementation ( $\beta = 0.326, p < .10$ ) was marginally significant and positive. Third, while the main effect of complexity ( $\beta = -0.150, p < .05$ ) was significant, the interaction effects with sense-making, timely decision-making, and change implementation were not significant. Fourth, while the main effect of social capital ( $\beta = 0.098, p < .10$ ) was marginally significant, the interaction effects with sense-making, timely decision-making, and change implementation were not significant. Finally, while the main effect of digital maturity ( $\beta = 0.411, p < .001$ ) was significant, only the interaction with timely decision-making ( $\beta = 0.301, p < .05$ ) was significant. Overall, model 9 was significant ( $F = 26.957, p < .001$ ), with an adjusted  $R^2$  of 0.829.

In model 10, flexibility was regressed on the control variables, sense-making, time decision-making, change implementation, and interaction terms of munificence, environmental dynamism, complexity, social capital, and digital maturity. Timely decision-making ( $\beta = 0.377, p < .01$ ) and Change implementation ( $\beta = 0.299, p < .05$ ) were significantly and positively related to flexibility; however, the effect of sense-making was not significant. While analyzing the main and interaction effect of moderating variables, first, the main effect of the moderating variable, munificence ( $\beta = 0.261, p < .001$ ), was significant. Its interaction with sense-making ( $\beta = 0.374, p < .05$ ) was significant and positive; change implementation ( $\beta = -0.628, p < .01$ ) was significant and negative; and timely decision-making was not significant. Second, while the main effects of complexity ( $\beta = -0.155, p < .05$ ) and digital maturity ( $\beta = 0.345, p < .001$ ) were significant, their interaction effects were not significant. Finally, the main and interaction effects of environmental dynamism and social capital were not significant. Overall, model 10 was significant ( $F = 13.379, p < .001$ ), with an adjusted  $R^2$  of 0.699.

In model 11, redundancy was regressed on the control variables, sense-making, time decision-making, change implementation, and interaction terms of munificence, environmental dynamism, complexity, social capital, and digital maturity. Timely decision-making ( $\beta = 0.292, p < .05$ ) and Change implementation ( $\beta = 0.405, p < .001$ ) were significantly and positively related to redundancy; however, the effect of sense-making was not significant. While analyzing the main and interaction effect of moderating variables, first, the main effect of the moderating variable, munificence ( $\beta = 0.171, p < .05$ ), was significant. Its interaction with sense-making ( $\beta = 0.418, p < .05$ ) was significant and positive; change implementation ( $\beta = -0.431, p < .10$ ) was marginally significant and negative; and timely decision-making was not significant. Second, while environmental dynamism's main effect was not significant, its interaction effect with sense-

making ( $\beta = -0.364, p < .10$ ) was significant and negative. Third, while the main effect of complexity ( $\beta = -0.136, p < .05$ ) was significant, its interaction effects with sense-making, timely decision-making and change implementation were not significant. Fourth, the main and interaction effects of social capital were not significant. Finally, while the main effect of digital maturity ( $\beta = 0.349, p < .001$ ) was significant, only the interaction effect with timely decision-making ( $\beta = 0.460, p < .05$ ) was significant. Overall, model 11 was significant ( $F = 12.590, p < .001$ ), with an adjusted  $R^2$  of 0.684.

In model 12, robustness was regressed on the control variables, sense-making, time decision-making, change implementation, and interaction terms of munificence, environmental dynamism, complexity, social capital, and digital maturity. Change implementation ( $\beta = 0.321, p < .05$ ) was significantly and positively related to robustness; however, the effects of sense-making and timely decision-making were not significant. While analyzing the main and interaction effect of moderating variables, first, the main effect of the moderating variable, munificence ( $\beta = 0.197, p < .05$ ), was significant. However, its interaction effects with sense-making, timely decision-making, and change implementation were not significant. Second, while environmental dynamism's main effect was not significant, its interaction with sense-making ( $\beta = -0.488, p < .05$ ) was significant. Third, while the main effect of complexity was not significant, its interaction with timely decision-making ( $\beta = -0.483, p < .05$ ) was significant. Fourth, the main and interaction effects of social capital were not significant. Finally, while the main effect of digital maturity ( $\beta = 0.435, p < .001$ ) was significant, only its interaction with timely decision-making was significant. Overall, model 12 was significant ( $F = 6.695, p < .001$ ), with an adjusted  $R^2$  of 0.516.

Finally, in model 13, networking was regressed on the control variables, sense-making, time decision-making, change implementation, and interaction terms of munificence,

environmental dynamism, complexity, social capital, and digital maturity. Change implementation ( $\beta = 0.484, p < .001$ ) was significantly and positively related to networking, while sense-making was only marginally significant and positive, and the effect of timely decision-making was not significant. While analyzing the main and interaction effect of moderating variables, first, the main effect of the moderating variable, munificence ( $\beta = 0.261, p < .001$ ), was significant. Its interaction with timely decision-making ( $\beta = 0.625, p < .01$ ) was significant and positive; change implementation ( $\beta = -0.697, p < .001$ ) was significant and negative; and sense-making was not significant. Second, while environmental dynamism's main effect was not significant, its interaction with change implementation ( $\beta = 0.432, p < .01$ ) was significant and timely decision-making ( $\beta = -0.366, p < .10$ ) was marginally significant. Third, while the main effect of complexity ( $\beta = -0.169, p < .01$ ) was significant, its interaction with sense-making, timely decision-making, and change implementation were not significant. Fourth, the main and interaction effects of social capital were not significant. Finally, while the main effect of digital maturity ( $\beta = 0.422, p < .001$ ) was significant, only its interactions with timely decision-making ( $\beta = 0.279, p < .10$ ) and change implementation ( $\beta = -0.282, p < .10$ ) were marginally significant. Overall, model 13 was significant ( $F = 15.727, p < .001$ ), with an adjusted  $R^2$  of 0.734.

The research findings, contributions, limitations, and future research opportunities are discussed in the next chapter.

**Table 19: Post-Hoc Results: Dynamic Capability and Organizational Resilience Dimensions**

Variables	Model 9	Model 10	Model 11	Model 12	Model 13
	$\beta$ Org Resilience	$\beta$ Flexibility	$\beta$ Redundancy	$\beta$ Robustness	$\beta$ Networking
<b>Dependent Variable</b>					
<b>Controls</b>					
Respondent Age	-0.034	-0.04	<b>-0.081<sup>†</sup></b>	-0.069	0.016
Respondent Tenure	-0.035	-0.044	-0.045	-0.038	-0.026
Gender: Male	0.02	0.04	0.009	0.077	0.025
Gender: Non specified	0.03	0.06	0.048	-0.018	-0.001
Department: Strategy Development	0.048	0.059	0.012	-0.001	<b>0.100*</b>
Department: Business Operations	0.033	0.024	0.023	0	0.076
Department: Functional Area	<b>0.067<sup>†</sup></b>	0.058	0.062	0.076	<b>0.105*</b>
Role: Other Management	<b>-0.079<sup>†</sup></b>	-0.07	<b>-0.111*</b>	-0.044	<b>-0.101*</b>
Role: Senior Director/Director	-0.046	-0.056	-0.071	0.053	-0.057
Role: Top Management (CxO)	-0.03	-0.037	-0.032	-0.029	-0.029
Firm Age	-0.012	0.014	-0.027	-0.028	-0.037
Firm Size	-0.014	-0.036	0.047	-0.026	-0.074
Industry: Retail and Warehouse	0.055	0.071	0.066	0.022	0.052
Industry: Finance and Banking	0.035	0.053	0.016	0.048	0.039
Industry: Others	0.052	0.042	0.076	0.065	0.055
<b>Independent Variables</b>					
Sense-making (SM)	<b>0.143<sup>†</sup></b>	0.117	0.097	0.104	<b>0.171<sup>†</sup></b>
Timely Decision-making (TD)	<b>0.301**</b>	<b>0.377**</b>	<b>0.292*</b>	0.207	0.165
Change Implementation (CI)	<b>0.425***</b>	<b>0.299*</b>	<b>0.405***</b>	<b>0.321*</b>	<b>0.484***</b>
<b>Moderating Variables</b>					
Munificence (M)	<b>0.239***</b>	<b>0.261***</b>	<b>0.171*</b>	<b>0.197*</b>	<b>0.261***</b>
Environmental Dynamism (ED)	-0.074	-0.097	-0.069	-0.021	-0.050
Complexity (CX)	<b>-0.150**</b>	<b>-0.155*</b>	<b>-0.136*</b>	-0.003	<b>-0.169**</b>
Social Capital (SC)	<b>0.098<sup>†</sup></b>	0.125	0.081	-0.160	0.097
Digital Maturity (DM)	<b>0.411***</b>	<b>0.345***</b>	<b>0.349***</b>	<b>0.435***</b>	<b>0.422***</b>
R	0.928	0.869	0.862	0.779	0.885
R <sup>2</sup>	0.861	0.755	0.744	0.607	0.784
Adjusted R <sup>2</sup>	0.829***	0.699***	0.684***	0.516***	0.734***
F	<b>26.957***</b>	<b>13.379***</b>	<b>12.590***</b>	<b>6.695***</b>	<b>15.727***</b>

Significant at: <sup>†</sup>  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

**Table 19: Post-Hoc Results: Dynamic Capability and Organizational Resilience Dimensions**

Variables	Model 9	Model 10	Model 11	Model 12	Model 13
	$\beta$ Org Resilience	$\beta$ Flexibility	$\beta$ Redundancy	$\beta$ Robustness	$\beta$ Networking
<b>Dependent Variable</b>					
<b>Interaction Effects</b>					
M * SM	<b>0.283*</b>	<b>0.374*</b>	<b>0.418*</b>	0.310	0.130
ED * SM	<b>-0.165*</b>	-0.112	<b>-0.364<sup>†</sup></b>	<b>-0.488*</b>	-0.013
CX * SM	-0.055	-0.148	-0.003	0.207	-0.080
SC * SM	-0.086	-0.095	-0.012	0.236	-0.275
DM * SM	-0.065	-0.089	-0.097	-0.261	0.032
M * TD	<b>0.326<sup>†</sup></b>	0.338	0.112	0.357	<b>0.625**</b>
ED * TD	-0.133	-0.104	0.002	-0.080	<b>-0.366<sup>†</sup></b>
CX * TD	-0.125	-0.153	-0.080	<b>-0.483*</b>	-0.071
SC * TD	-0.020	-0.019	-0.054	0.052	-0.014
DM * TD	<b>0.301*</b>	0.232	<b>0.460*</b>	<b>0.565*</b>	<b>0.279<sup>†</sup></b>
M * CI	<b>-0.526**</b>	<b>-0.628**</b>	<b>-0.431<sup>†</sup></b>	-0.456	<b>-0.697***</b>
ED * CI	<b>0.255<sup>†</sup></b>	0.146	0.287	0.371	<b>0.432**</b>
CX * CI	0.110	0.232	-0.042	0.228	0.095
SC * CI	0.129	0.147	0.088	-0.349	0.334
DM * CI	-0.110	0.031	-0.193	-0.050	<b>-0.282<sup>†</sup></b>
R	0.928	0.869	0.862	0.779	0.885
R <sup>2</sup>	0.861	0.755	0.744	0.607	0.784
Adjusted R <sup>2</sup>	0.829	0.699	0.684	0.516	0.734
F	<b>26.957***</b>	<b>13.379***</b>	<b>12.590***</b>	<b>6.695***</b>	<b>15.727***</b>

Significant at: <sup>†</sup>  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

## CHAPTER 5: DISCUSSION AND CONCLUSION

This chapter discusses the research findings in five sections. It starts with an overview of the study in the first section, followed by a discussion of the results of the hypothesized research model in the second section. The third section describes the literature, theoretical, and managerial contributions, and the final two sections address the study's limitations, offer future research opportunities, and end with conclusions.

### 5.1 Overview

Firms must navigate through various manifestations of uncertainty to adequately prepare for, react to, and successfully capitalize on environments that may threaten their survival (Lengnick-Hall et al., 2011). Since the dot com crash in the late 1990s, many companies have shifted their business goals beyond the traditional profit motives and shareholder wealth creation objectives to achieve resilience. Strategic resilience is the firm's meta-capability to anticipate disruption and use the disruptive environment as an opportunity for achieving counter-trend growth by rapidly adjusting business priorities, resources, processes, and relationships (Hamel & Valikangas, 2003; Limnios et al., 2014). While DC and OR scholars have studied various firm-level outcomes and capabilities, such as business performance (Wilden & Gudergan, 2015), innovation (Wang et al., 2020), agility (Amit Kumar & Narain, 2019), and flexibility (Felipe, Roldán, & Leal-Rodríguez, 2016), the relationship between DC and OR is yet to be understood.

First, this study addressed the aforementioned literature gap by empirically evaluating the extent to which strategic DCs during typical business environments (level 1 to level 4) contribute to gaining OR during disruption (level 5). Drawing on the strategic processes typology by Teece and colleagues (2007;2014), this study defined DC as “the firm's propensity to sense opportunities and threats, make timely decisions, and implement strategic decisions and changes effectively”.

The study theorized OR as the firm's meta-capability enablers for growth during a disruption by extending the process-based and capability-based approaches of resilience perspectives (Gittell et al., 2006; Lengnick-Hall et al., 2011; Ma et al., 2018; Wicker et al., 2013) and proposing an integrated resilience framework adapted from (Duchek, 2020). Further, the study clarified the boundary conditions of DC and OR in terms of environmental conditions, including change visibility, rapidity, familiarity, and scope.

Second, the study investigated the impact of DC processes on OR in terms of perceived business environments - munificence, dynamism, and complexity. The literature considers these conditions key influencers of strategic firm decisions regarding resource-allocation and capability-building processes. Significant changes in their levels can increase the organization's vulnerability and change impact.

Finally, the study also investigated the influence of the firm's social capital and digital maturity on the effects of DC and OR. Social capital through business ties, networks, and memberships allows firms to acquire, assimilate, transform, and exploit knowledge efficiently and effectively. Similarly, a malleable organizational design, along with digital technologies, can rapidly reshape the traditional boundaries of businesses during typical and disruptive environments.

This study is vital from both research and managerial perspectives. The findings should guide researchers and practitioners in effectively understanding and building resilience capabilities for creating and sustaining competitive advantage during disruption. Moreover, the proposed integrated resilience framework should act as a structured management tool and provide several avenues for further research. This chapter discusses the key research findings from the survey and research conversations with participating executives.

## **5.2 Discussion of Key Research Findings**

This study primarily employed quantitative survey methodology to achieve the research objectives. In addition, discussions with the participating executives during the survey process were used to refine the key constructs' understanding further and complement the research data analysis. As a caveat, these discussions themselves are not suggestive of a qualitative research method and, as such, inadequate in providing more specific answers to the research questions. Key findings from the discussions and quantitative examination of the research constructs are discussed below, followed by a discussion of post-hoc analyses. Post-hoc analyses were performed to gain a deeper understanding of the associations between the dimensions of the constructs (Hollenbeck & Wright, 2017).

### **5.2.1 The Main Effect of DC on OR**

DC and OR theories have attracted scholarly research over the last two decades. Many studies have examined the impact of DC and OR on various firm outcomes, such as business performance and competitive advantage (Fainshmidt, Pezeshkan, Frazier, Nair, & Markowski, 2016; Wilden & Gudergan, 2015). However, the impact of DC on OR is yet to be empirically tested and understood. The analytical results of this study address this gap, providing strong empirical evidence supporting hypothesis 1. The results show that firms with robust strategic DCs in typical business environments have a greater resilience-building meta-capability to achieve counter-trend growth during disruptions.

The insights from the discussions with the senior executives show that they generally expect and prepare for uncertainties and volatility in business environments, including global socioeconomic and political disruptions. They also expect changes in consumer needs, preferences, and behaviors over time as technology and product choices evolve. Most executives

considered these environmental factors 'typical' in their strategic decision-making process for achieving growth objectives. However, the difference of opinion and approach among the executives was stark when considering operating in crisis or adversity. While some opined the conditions as an exercise of business continuity to withstand and survive the disruption, others considered it an opportunity to differentiate and accelerate growth. Similarly, some stay steadfast to their business goals, while others rearrange their priorities.

Regardless of the approach, the executives concurred on the significance of the resilience stages and the need for making proactive albeit paradoxical decisions in typical environments to build meta-capability for resilience during disruption. For example, some of the strategies employed include deliberately carrying excess inventory to meet supply shortages, having redundant suppliers with varying prices in different geographical locations for the same product, building redundant business processes as a fail-safe measure, and investing in modular business and technology capabilities to induce agility than monolithic designs and solutions that provide efficiency. Furthermore, the executives recognized that these strategies might result in lower firm profits and business performance in the short term. These lowered gains make strategic decision-making challenging, especially for firms with shareholder value maximization goals. As one of the Chief Financial Officer that participated in the survey explained, 'it takes constant reminders to the board of the impact of past disruptions to incorporate resilience strategies as part of the normal course of business. Once incorporated, it takes extraordinary effort to continue to explain the need to accept the short-term business consequences of those strategic decisions.'

These practitioners' perspectives are consistent with DC literature. For example, Hamel and Valikangas (2003) noted that dynamically adapting to the changing business environments requires making counter-intuitive decisions between many competing choices and incompatible

strategic forces with unknown consequences. It involves making paradoxical decisions between exploration and exploitation and short-term profits and long-term growth (Walker & Salt, 2012). The insights from the executives were also consistent with the OR literature while considering the firm's response during and as the firm emerged from the disruption based on factors directly related to the environment, such as change visibility (lack thereof), rapidity (speed of disruption), familiarity (unexpected), and scope (global or expansive) (Eisenhardt & Martin, 2000; Peteraf et al., 2013). Furthermore, consistent with the DC and OR literature, most executives concurred that the response, even in highly dynamic and uncertain environments, was still based on adaptations of high-level business routines committed to memory during typical environments and guided by the firm's culture and core values (Danneels, 2012; Helfat & Martin, 2015).

In sum, the study provides strong empirical evidence supporting the hypothesis that links firm DCs in typical business environments to OR during disruption. In addition to the main effect, this study also considered the moderating role of the perceived business environment - namely, munificence, dynamism, and complexity - social capital, and digital maturity. The following three sections discuss the results of these moderation effects.

### **5.2.2 The Moderation Effects of Perceived Business Environment**

Studies have shown that firms' business environment influences and shapes the resource, asset, and path configurations and plays a critical role in strategic decision-making regarding resource allocation and capability-building among firms (Keats & Hitt, 1988; Sirmon et al., 2007; Subramaniam & Youndt, 2005; Weerawardena et al., 2006). However, the results of the current study found only marginal support for hypothesis 2c regarding complexity and no support for hypothesis 2a regarding munificence and hypothesis 2b regarding dynamism. The results also deviate from the extant literature's support for the influence of the three environmental conditions

on firm outcomes, such as business performance and competitive advantage (Dale Stoel & Muhanna, 2009; Fainshmidt et al., 2019; Goll & Rasheed, 1997; McArthur & Nystrom, 1991).

Central to this study's business environments hypotheses, grounded on DC theory, is that the strategic fit between organizational and environmental factors allows more rigorous resource, asset, and path reconfigurations essential for OR during disruption. There may be several reasons for the current study's results to deviate from this perspective.

First, the firms represented in the study were primarily mid-to-large-sized and well-established. Such firms, due to their scale and longevity of operation, may garner better networks and access to resources and assets during all environmental conditions and tend to carry slack that buffers them from disruptions. For example, resource reconfigurations can meet changing demand patterns during unpredictable events by improving long-term relationships with customers and business partners (Harrison & St. John, 1996; Jawahar & McLaughlin, 2001). Similarly, the scale and size of the firm afford them greater managerial discretion to invest in exploration and exploitation simultaneously (Sharma, 2000). In addition, better access to resources allows them to shift their business priorities between exploration and exploitation as needed (Russo, 2003).

Second, well-diversified firms with varying products and services, business models, marketing practices, and supply chain networks can absorb and adapt to environmental uncertainties better than their non-diversified competition (García-Morales et al., 2012). For example, they can reduce the impact of uncertainty by engaging their broader stakeholders proactively to foresee future events, gain access to vital information, and implement preventative actions (Aragón-Correa & Sharma, 2003). The insights derived from the executives confirmed this theoretical argument. For example, a senior executive responsible for business transformation noted their firm's ability to adjust capacity and resources between brick-and-mortar and online

channels as an immediate response to the disruption caused by the COVID pandemic. The agility and flexibility were afforded by the firm's diversification and innovation strategies in prior years.

Third, while increased scale, size, and level of diversification can provide a buffer for well-established firms, a higher degree of heterogeneity imposes constraints as many exogenous influences in the decision environment, such as hostility introduced by concentration-dispersion (Dess & Beard, 1984) and resource interdependence among industry firms, require greater managerial cognition and action (Tung, 1979). For example, an increase in the structural network complexity of the firm's environment requires the firm to increase the need for DC processes to build OR capabilities (Aragón-Correa & Sharma, 2003). A critical inference regarding this can be drawn from the insights gained from the executives, who broadly differentiated gaining access to information from the ability to improve information flow for collective decision-making. While most well-endowed firms can gain access to information, not all firms counter complexity by investing in developing collaboration platforms to integrate stakeholders in the value chain (Dess et al., 1990; Sharfman & Dean Jr, 1997). Hence, this study's partial support for the moderation effect of complexity is justified.

Finally, while theoretical and practical arguments help understand the mixed results better for this cross-sectional study, a longitudinal design may provide deeper insights. The next section discusses the moderation effect of social capital.

### **5.2.3 The Moderation Effect of Social Capital**

Social capital relates to the firm's ability to extract tangible and intangible value from all the stakeholders in their value chain (Nahapiet & Ghoshal, 1998). It provides the knowledge base for initiating strategic change to improve collaboration across the value chain, create transparency for information sharing, explore innovation, create mutual trust, and sustain competitive advantage

by collectively adapting to any environmental condition (Blyler & Coff, 2003; Li et al., 2016). The study, therefore, hypothesized that social capital moderates the effect of DC on OR by acquiring, assimilating, transforming, and exploiting knowledge efficiently and effectively. The results of hypothesis 3, however, did not support this. There may be several reasons for this.

First, a dense network with business partners across the firm's value chain during typical environments may inherently promote learning and knowledge-sharing DC capabilities essential for resilience (Coleman, 1994). with limited, non-significant need for reconfiguration during disruption. Further, the larger scale and size of the participating firms in the study may also be a contributing factor to the lack of support, as the type and extent determine the density of the network (Villena et al., 2011). rendering the influence of social capital during the disruption non-significant. In other words, for mid-to-large, established firms, social capital may be an antecedent to DC than a moderator of DC and OR. Many executives corroborated this perspective. For example, a supply chain executive of a large retail firm spoke about the annual conference to the business partners for sharing information, listening to feedback, and collective problem-solving. In this case, the annual conference was a common platform for repeated interaction (Preston et al., 2017). This resilience-building forum and mechanism remained the same, except for the mode (virtualized during the COVID pandemic), before and during the disruption.

Second, no significant change to the relational facet may be necessary during the disruption, as the sense of identity (Nahapiet & Ghoshal, 1998; Preston et al., 2017) , reciprocity, and mutual trust created during a typical business environment may be driving open communication, mutual support, transparent behaviors, and resource sharing needed during a disruption (Helfat & Peteraf, 2003; Sirmon & Hitt, 2009). For example, a senior operations executive of a large wholesale firm spoke about the various privileges and programs they offer

their suppliers in the normal course of business. The programs were tailored to help the suppliers thrive in good times and survive during difficult times. Therefore, firms with intentionally built tighter networks may benefit from the social capital advantages without significant changes during disruption.

Finally, while theoretical and practical arguments help understand the nonsignificant result better, a longitudinal study inclusive of smaller firms as a comparison group may yield deeper insights. The next section discusses the moderation effect of digital maturity.

#### **5.2.4 The Moderation Effect of Digital Maturity**

Firms' digital maturity relates to embracing digital technology and business transformation initiatives to gain a competitive advantage (Hanelt et al., 2021). In the context of this study, it also relates to achieving a flexible organizational design conducive to rapid adaptation across the business's ecosystem during disruption (Kane et al., 2017). Accordingly, and in line with the literature, the results from this study found strong support for hypothesis 4 regarding the influence of digital maturity on the effects of DC on OR.

Innovation, the mechanism to introduce new applications, processes, technologies, and customer experiences, and integration, the mechanism to align those new capabilities to existing resources, are the two critical strategic and operational aspects of maturing digital technologies (Daniel & Wilson, 2003; Henfridsson & Bygstad, 2013). Furthermore, the strategic-level activity of creating new capabilities by leveraging emerging technologies such as Blockchain, the Internet of Things, and Artificial Intelligence, attracts new digitally oriented talent and helps build a digital-first culture (Barua et al., 2004; Karimi & Walter, 2015). In addition, embedding a tactical, operational focus within the strategic orientation improves organizational processes' and business routines' effectiveness and efficiency. This integration of existing with new also furthers the

digital-first culture by continually upgrading the internal talent, which results in better talent retention (Hansen et al., 2011; Matzler et al., 2018). Hence, innovation and integration deliver a malleable organizational design conducive to rapid adaptation during environmental disruptions.

The insights from the executives offer additional context here. For example, A Chief Information Officer of a global retailer noted the significance of developing and orchestrating a digital strategy linked to achieving long-term business objectives. A digital technology roadmap misaligned or not aligned with transforming the business would only create rigidity, not the agility and flexibility needed for resilience. Other technologists expressed similar views, such as the need to focus holistically on innovation and include process, product, people, and organizational culture. Some executives also opined the need for end-to-end trust-based, two-way integration with all stakeholders in the value chain.

In sum, the study's results align with the literature and practitioner perspectives on the influence of digital maturity on the effects of DC on OR. Orchestrating a purposeful digital maturity strategy and technology transformation roadmap aligned with business objectives lays the foundation for deploying strategic DCs toward building a flexible and agile organizational design for resilience. The post-hoc results are discussed next.

### **5.2.5 Post-Hoc Analyses**

The results of this study show strong support for the effects of DC processes on OR capabilities. Post-hoc analyses were performed to understand further the relationships between the individual dimensions of the DC and OR constructs (Hollenbeck & Wright, 2017). First, the effects of the DC processes on individual OR dimensions, namely, flexibility, redundancy, robustness, and networking, were tested. Next, tests to analyze the effects of individual DC dimensions, namely, sense-making, timely decision-making, and change implementation, on OR were

performed, followed by analyses of the effects of individual DC dimensions, namely, sense-making, timely decision-making, and change implementation, on the individual OR dimensions of flexibility, redundancy, robustness, and networking. A discussion of the results follows.

#### **5.2.5.1 Effects of aggregated DC on individual OR dimensions**

The results showed that the main effects of the DC processes on individual OR dimensions, namely, flexibility, redundancy, robustness, and networking, were consistent with the main effect hypothesized in the primary research model between the DC and OR constructs. However, the post-hoc provided several additional insights.

First, the effects of DC on OR were stronger on redundancy - the ability to build collateral pathways and deploy alternate strategies to anticipate and absorb (Marion, 1999), followed by flexibility - the ability to develop the adaptive capacity for executing contingency and growth plans (Sheffi, 2007), networking - the level of interconnectedness across the value chain (Pal et al., 2014), and robustness - the ability of the system to withstand and absorb stress introduced by the disruption (Duchek, 2020). While this study considered the OR meta-capability in aggregation, post-hoc confirms that individual-level contributions vary and are most likely related to the resilience stages. The insights gained from senior executives offer additional context. Most concurred-on strategies such as multiple sourcing, creating parallel processes, and carrying excess capacity as foundational for absorbing a disruption's initial impact. These views were consistent with the literature (Lengnick-Hall et al., 2011; Sheffi & Rice Jr, 2005). However, they acknowledged that they often contend with balancing the cost of carrying additional reserves beyond normal levels with the loss of short-/mid-term profits and the long-term economic benefits of resilience (Linnenluecke et al., 2012). A senior vice president of operations noted redundancy as the foundation of resilience, without which adaptation and advancement may not be plausible.

Regarding flexibility, most executives associated the capability with adaptation and advancement stages and the firm's strategic decision-making ability to adjust business priorities and reconfigure resources rapidly. This practitioner's perspective is consistent with the literature (Vargo & Seville, 2011; Vossen, 1998). A senior executive of a large retail firm explained flexibility in terms of resilience stages, noting adaptation, for example, extending technology capabilities rapidly to enable curb-side pick-up, as a mechanism of short-term differentiation and advancement, for example, building a new business model for exploiting an opportunity that did not exist before the disruption, as a longer-term growth strategy. Most leaders considered networking another foundational element of resilience applicable in all stages. However, they noted that the effectiveness relies on factors such as the type, extent, and robustness of information and knowledge-sharing mechanisms and the active incorporation of feedback into the value-creation process. Studies have emphasized this as the bonding and bridging strategies for improving resilience outcomes (Andrew et al., 2016; McEntire, 2012). Finally, consistent with the literature (Hillmann & Guenther, 2021), the executives primarily associated robustness with anticipation and absorption stages, such as carrying continuous improvement measures, implementing a robust internal control focus, and being a quality-aware organization in typical environments.

Second, the post-hoc results show that the firm's digital maturity strongly influenced the effects of DC processes on flexibility, redundancy, and robustness resilience capabilities, but not networking. While the practitioners concurred widely on the value of utilizing digital technologies to drive collaboration and information flow across the network, they equally emphasized the relationship aspects that drive success for all participants as foundational. In the literature, Andrew and colleagues (2016) found building mutual trust and shared commitment essential for collective

action. Additionally, while Ibarra (1993) emphasized the positive effects of the network centrality of an organization, Provan & Milward (2001) found that the individual participants' success does not result in the effectiveness of the network. Therefore, the relationship aspect of interconnectedness that drives the common vision, commitment, shared values, and legitimacy of the network is foundational for digital interconnectedness.

Third, while the study found marginal support for the moderation effects of complexity, post-hoc results found that the degree of heterogeneity in the environment dampened the effects of DC on redundancy and networking but not flexibility and robustness. The increase in the extraneous actors and factors in the business environment imposes more significant constraints on the firms requiring a greater level of cognition of the exogenous influence on the one hand (Tung, 1979). On the other hand, it increases the risk of disruption due to the extent of internal and external stakeholder connectedness (Coutu, 2002b). Furthermore, flexibility and robustness may be more internally focused, while redundancy and network may be more externally focused.

Finally, post-hoc results showed marginal support for the influence of munificence on robustness, even though the study did not find any significant support for munificence's influence on the effects of DC on OR. Better accessibility to infrastructure and resources and the existence of economically viable alternatives may be conducive to desensitizing and derisking the performance degradation of the system during disruption, thereby improving robustness (Zhou et al., 2017).

In sum, the results of the post-hoc analysis of the effects of the DC processes on individual OR dimensions, namely, flexibility, redundancy, robustness, and networking, provide a deeper-level understanding of the main effects of this study. The following section discusses the effect of individual DC dimensions on OR.

### 5.2.5.2 Effects of individual DC dimensions on OR

First, the effect of timely decision-making and change implementation on OR was more significant than sense-making; in fact, only marginal support was found for sense-making. Second, the strength of change implementation was stronger than timely decision-making within the two dimensions of significance. Turning to practitioners provide further insights. They generally concurred on associating, though overlapping, specific DC dimensions with resilience stages on the integrated OR framework. Sense-making, the creative and cognitive managerial process of scanning the environment to understand the threats and opportunities in the environment (Thomas et al., 1993), was associated with the anticipation stage. Whereas timely decision-making regarding whether to change and what and when to change (Moliterno & Wiersema, 2007) and change implementation for simultaneously pursuing exploration and exploitation activities (Judge & Blocker, 2008; Soparnot, 2011) spanned absorption, adaptation, and advancement stages. Further, due to its action orientation, change implementation was more closely associated with achieving growth than timely decision-making associated with initiating growth.

Third, post-hoc considering the moderation effect of the individual DC dimensions on OR found only the interaction with timely decision-making significant. Beyond the availability and accessibility of data, timely analytics, leveraging digital technologies for enriching and extending data, slicing and dicing, and visualizing data are critical for agile management decision-making (Araz, Choi, Olson, & Salman, 2020; O'donovan, Leahy, Bruton, & O'Sullivan, 2015; Phillips-Wren, Iyer, Kulkarni, & Ariyachandra, 2015).

Finally, post-hoc revealed support for significant influences of munificent and dynamic environments on the effects of specific individual DC dimensions on OR that were not apparent in the current research model. Further, the marginal support for the influence of complexity was no

longer evident. These results provide avenues for future research. We discuss the post-hoc results of the individual dimensions of DC on the individual dimensions of OR next.

### **5.2.5.3 Effects of individual DC dimensions on the individual OR dimensions**

First, the results from the post-hoc analysis of the effects on individual dimensions of OR reconfirmed the strength of the effect of change implementation DC dimension on aggregate OR construct. In addition, the individual-dimension-level analysis revealed that the effect of change implementation is highest with networking, followed by redundancy, robustness, and flexibility.

Second, the timely decision-making DC dimension only significantly affected the flexibility and redundancy OR dimensions. The literature and practitioners share the exploration versus exploitation conundrum (Ferreira et al., 2020; Tushman. & O'Reilly., 1996). Decisions related to flexibility, related to growth (exploration), and redundancy, related to (exploitation) may be paradoxical, thereby supporting this finding.

Third, the marginal support for the sense-making DC dimension's effect on aggregated OR construct was clarified on the networking OR dimension. This insight is valuable when considering the effects of other individual DCs on individual ORs. For example, an inference may be drawn that implementing changes based on the learning from listening and understanding the needs of the various stakeholders in the business ecosystem, supplemented by timely decisions related to exploration and exploitation activities, will enhance the resilience meta-capability of an organization.

Fourth, individual-dimension-level post-hoc results of the influence of digital maturity clarified the marginal support with time decision-making DC dimension and its effect on networking. Further, the post-hoc results provide interesting insights into the influence of business environments that warrant future research.

In sum, the post-hoc analyses of the effects of individual DC dimensions on individual OR dimensions attempt to answer the common question among practitioners and theorists of how to approach building resilience and, more specifically, where to start. This result may help find the answer while providing further avenues for research.

### **5.3 Contributions**

One of the significant contributions of this study is that it fills the existing literature gap of empirically understanding the relationship between strategic dynamic capability processes and organizational resilience in the context of disruption. Although several previous studies have investigated the role of dynamic capabilities and organizational resilience independently on firm-level outcomes, such as competitive advantage (Li & Liu, 2014), business performance (Wilden & Gudergan, 2015), innovation (Wang et al., 2020), and agility (Amit Kumar & Narain, 2019; Felipe et al., 2016), only a conceptual understanding exists of the relationship between the two constructs (Corrales-Estrada et al., 2021; Ma et al., 2018; Revilla et al., 2017). Further, research is yet to consider the influence of business environments, social capital, and digital maturity in understanding the effects of DC on OR. This research provides empirical evidence regarding the linkages between DC and OR and the influence of business environments, social capital, and digital maturity on those effects. The research results have theoretical and practical applications contributing to both DC and OR literature, which are discussed next.

First, the prescriptive and normative perspectives of OR literature focusing primarily on the attributes, behaviors, and resources of the focal organization with its less resilient peers are not conducive to understanding how resilience can be designed and achieved agnostic of an event in practice (Boin & Van Eeten, 2013; Sutcliffe, 2003). This study extended OR literature by

proposing a framework, adapted from the model suggested by Duchek (2020), that promotes a holistic understanding of the resilience phenomenon by integrating the dynamism of resilience stages from the process-based approach and the inner workings of resilience that constitute the meta-capability of OR from capability-based approaches. In other words, the framework theorized that the resilience stages: anticipate, absorb, adapt, and advance, rely on the meta-capability of OR: flexibility, redundancy, robustness, and networking for turning disruption into an opportunity for growth. Further, in line with the research premise that resilience is an “interaction between the organization and the environment,” (Linnenluecke et al., 2012; Williams et al., 2017) the study conceptualized the interrelationships of the resilience stages with timing, actions, antecedents, and drivers.

Second, the study used the meta-capability of OR proposed in the framework as the dimensions of the OR construct in the research model, thus linking theoretical contribution to the research model for testing. Further, consistent with survey research approaches (Groves et al., 2011), the dimension definitions, and items for the survey were adapted from existing scales in the literature (Pal et al., 2014).

Third, managers often contend with the need to assess and act quickly on information gathered on an imminent event and show the ecology of thought to take incremental and iterative steps to mitigate risks (Whiteman & Cooper, 2011). This study provides critical knowledge to practitioners about the interactions between resilience stages and the meta-capability contributing factors for developing a high resilience potential (Lengnick-Hall et al., 2011) as well as the ability to realize it (Madni & Jackson, 2009).

Fourth, the study contributed to the literature by clarifying the boundary conditions of DC and OR by adapting the levels of the environmental activity model (Igor & J, 1990). The study

theorized that distinguishing the typical, predictable economic activity in levels 1 to 4 from the economic activity triggered by a surprising, unanticipated event, such as a crisis, in level 5 is essential for understanding the foundational relationship between DC and OR. Further, the study used four real-life examples to clarify the complex interaction of the socioeconomic and political factors (García-Morales et al., 2007) that makes it theoretically and practically challenging to imply that DC may result in OR. Thus, emphasizing further the significance of the purpose and results of this study.

Fifth, as aforementioned, the observation that firms often operate under challenging environments that generate and shape their resources, asset positions, and path configurations are central to the resilience phenomenon. Beyond providing empirical evidence for the effect of DC on OR, this study investigated the influence of three environmental conditions that the literature considers the key influencers of strategic resource allocation decisions and capability-building processes among firms (Keats & Hitt, 1988; Sirmon et al., 2007; Subramaniam & Youndt, 2005; Weerawardena et al., 2006). Though the results were mixed and found only partial support for environmental complexity, the post-hoc analysis provided some deeper insights into the influence of munificence, dynamism, and complexity on the effects of the individual dimensions of DC on individual dimensions of OR. These findings provide future avenues for researchers.

Sixth, the literature suggests that digital maturity, digital transformation, DCs, and OR converge to fundamentally reshape and reimagine the boundaries of businesses and enable firms to react and respond to growth opportunities during disruption (Hess et al., 2016). The results from the study evaluating the moderation effects of digital maturity provide empirical evidence for this. Further, the post-hoc provides deeper insights for practitioners to consider and provides researchers with new research avenues.

Finally, while the study did not include a qualitative methodology per se, the perspectives gained from discussions with the practitioners during the survey distribution and administration process were used to bridge the gap between theory and practice where possible. This approach of using managerial perspectives enhances the value of the theoretical contribution. It avoids the classic notion that 'when considering multifaceted disciplines, everything works in theory but not necessarily in practice' (Baker, Singleton, & Veit, 2011).

#### **5.4 Limitations and Future Research**

The study's contributions must be considered in conjunction with the limitations. First, a cross-sectional research design was used. Hence, an evaluation of the phenomenon over time and an inference of the causal relationships could not be determined. Furthermore, the study was operationalized using a survey method where the variables are captured and measured simultaneously by the same response method from a common source. While it is one of the most commonly used methods in strategy and management research, surveys pose a threat of common method variance and common method bias (Podsakoff et al., 2003; Richardson et al., 2009). If present, the consequences can be detrimental to the validity and reliability of the study's results (Baumgartner & Steenkamp, 2001). The risk was controlled and addressed by adapting scales previously accepted and validated in the literature and performing statistical tests to confirm that it is not a significant concern and is unlikely to confound the results' interpretation. However, future research can consider using a longitudinal study to examine the effects of DC more accurately on OR at different points in time on the onset, during, and after a disruption while also solving for the common method bias.

Second, the study used the disruption caused by the COVID pandemic as the context for responses in the survey. The COVID pandemic impacted the business environment differentially

among industries across the globe. While the scope of the survey was not restricted, responses were primarily from services, retail/wholesale, and finance/banking industries. Further, the scope of the study was limited to firms in the United States. Therefore, the study's results are not generalizable (Hubbard, Vetter, & Little, 1998) to all industries and nations beyond the United States. However, future research could investigate cross-industry variances with match pairs research design.

Third, the scope of the study was limited to the currently operational firms and did not include those that went out of business during and immediately after the COVID pandemic. There may be an inherent sample selection bias as a result (Fink, 2003). However, this exclusion was deliberate in assessing the resilience of the firms that have survived the COVID pandemic. Resilience, for this study, was defined as using disruption as an opportunity to achieve counter-trend growth. Hence, survival was used as the minimum qualification for a firm. Nonetheless, future research can extend the definition of resilience to include firms that went out of business and set up a longitudinal study with comparison groups to understand the relationship between DC and OR better.

Fourth, the study used a combination of personal connections and the snowball technique to operationalize the study. While some scholars note that such a sample may be biased, and the results may not be generalizable, some consider the techniques appropriate for gaining responses from hard-to-reach populations (Atkinson & Flint, 2001; Vanderstoep & Johnson, 2008). The study targeted senior executives of mid-to-large-sized established firms. This target population seldom participates in academic surveys voluntarily. Personal connection increases the probability of the initial contact for sharing the survey information. The snowball technique effectively gains access to other qualified executives in various firms not in the network, thus enhancing the survey

quality. An alternative approach for future research could be to work with the institutions such as National Retail Federation (NRF) that organize global summits for the C-suite executives to potentially survey their members. NRF currently has over 16000 members across the country.

Fifth, there may be a reverse causality phenomenon (Hamilton & Nickerson, 2003; Semadeni, Withers, & Trevis Certo, 2014) between DC and OR. For example, DC may also be an outcome of OR, or DC and OR may have a two-way causal relationship. The study did not use instrumental variables to test for endogeneity, which can be an avenue for future research. In addition, future research using longitudinal studies can investigate DC and OR for reciprocal causality where DC causes OR during disruption and returns to DC after disruption during typical environments (Dess, Newport, & Rasheed, 1993).

Sixth, DC and OR are highly correlated. A high correlation between the dependent and independent variables introduces discriminant validity concerns, as the measures may be reflective indicators of a singular latent variable. Insufficient discriminant validity may result in an overestimation of the strength of the relationship between the predictor and the outcome; or may confirm that a relationship may not exist. A two-factor confirmatory factor analysis was performed to alleviate the concern (Farrell & Rudd, 2009), and all indices showed a good fit.

Seventh, insights gained from the executives during the survey distribution and administration process were used to complement the study's findings. While they are helpful, they do not adequately answer the research questions. A qualitative study can extract better information and uncover details that a survey method cannot provide (Gummesson, 2000). Furthermore, a triangulation research approach (Flick, 2004; Turner, Cardinal, & Burton, 2017), for example, conducting a qualitative study in conjunction with a longitudinal quantitative study, in the future will yield robust theoretical and managerial contributions.

Eighth, scholars have long held that including post-hoc analysis promotes both scientific inquiry and cumulative knowledge creation (Kerr, 1998). As such, the study's post-hoc results regarding the effects of individual DC dimensions on individual OR dimensions and the moderating effects of the business environments aid in generating several interesting hypotheses that can be the topic of empirical research in the future.

Ninth, resilience research in strategic management has revolved around crisis management and business continuity, primarily focusing on coping, absorption and adaptation needed for survival (Conz & Magnani, 2020; Parker & Ameen, 2018). Much of the scales developed for empirical research support this purpose. Future research can focus on developing a new scale that measures growth beyond survival during a disruption.

Finally, in addition to future research opportunities to address the limitations, a mediation model can be set up to understand better the DC and OR constructs in relationship with firm-level outcomes such as sustained competitive advantage or business performance. For example, research questions such as - Does OR mediate the effects of DC on competitive advantage? Or Does DC mediate the effects of OR on business performance? - will contribute tremendously to the DC and OR literature. In addition to mediation, the relationship between constructs, such as slack, tolerance for failure, and willingness to cannibalize, (Danneels, 2008; Katkalo, Pitelis, & Teece, 2010) can be investigated with DC and OR to better define and clarify the boundary conditions between DC and OR. Furthermore, building on the findings of this study regarding the influence of a firm's digital maturity, future research can examine the specific moderation effects of the maturity and utilization of emerging technologies (Harreld, O'Reilly III, & Tushman, 2007; Slater et al., 2014; Zahra & George, 2002), such as cloud computing, big data analytics, blockchain, internet of things, artificial intelligence, and machine learning.

## 5.5 Conclusions

This study is one of the first to empirically investigate the resilience phenomenon, grounded on DC and OR theories, in the context of a disruption using primary data gathered from executives of mid-to-large size firms. The extant DC and OR literature traditionally focus on firm outcomes, with only a conceptual understanding of the relationship between the two distinct constructs. Beyond filling that gap and finding significant support for the effects of DC on OR, this study also contributed to OR literature by proposing a conceptual framework that integrates the dynamism of resilience stages and the inner workings of resilience that constitute the OR meta-capability, thus fostering a comprehensive understanding of the resilience phenomenon. The influence of the business environment conditions, social capital, and digital maturity were also examined, and partial support was found. This study also discussed further research opportunities to expand knowledge from this contribution.

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## APPENDIX A



## ACADEMIC SURVEY TO EXAMINE THE ROLE OF DYNAMIC CAPABILITIES, SOCIAL CAPITAL, AND DIGITAL MATURITY ON ORGANIZATION RESILIENCE

The questionnaire is part of a doctoral research study by the University of North Carolina at Charlotte on understanding the effect of strategic organizational capabilities and digital maturity on resilience during environmental dynamism. We anticipate significant theoretical and managerial contributions from this study. There are no right or wrong answers to the questions - we are interested in your professional opinion. The responses are anonymous and confidential. The data collected will be secured and used purely for academic purposes. Your timely completion of the questionnaire in its entirety provides valuable input for this contextually significant research work. Managers with decision-making authority should complete this survey.

**Section 1:** This section includes statements about your organization's strategic sense-making, timely decision-making, and change implementation capabilities **prior to the COVID pandemic**. Please indicate the extent to which you agree or disagree with the following statements. (1 = Strongly disagree; 7= Strongly agree).

**1. Statements regarding your organization's strategy development prior to the COVID pandemic:**

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
We can perceive environmental change before competitors	1	2	3	4	5	6	7
We often have meetings to discuss the market demand	1	2	3	4	5	6	7
We can fully understand the impact of the internal and external environment	1	2	3	4	5	6	7
We can feel the major potential opportunities and threats	1	2	3	4	5	6	7
We have a perfect information management system	1	2	3	4	5	6	7
We have good ability to judge observations	1	2	3	4	5	6	7

**2. Statements regarding your organization's decision-making process prior to the COVID pandemic:**

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
We can quickly deal with conflicts in the strategic decision-making process	1	2	3	4	5	6	7
Under many circumstances, we can make timely decisions to deal with strategic problems	1	2	3	4	5	6	7
We can remedy quickly to unsatisfactory customers	1	2	3	4	5	6	7
We can reconfigure resources in time to address environmental change	1	2	3	4	5	6	7

**3. Statement regarding your organization's change implementation process prior to the COVID pandemic:**

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
Our strategic changes can be efficiently carried out	1	2	3	4	5	6	7
Good cooperation exists among different functions	1	2	3	4	5	6	7
We help each other in strategic change implementation	1	2	3	4	5	6	7
We have a proper awarding and controlling system	1	2	3	4	5	6	7
We can efficiently improve strategic change implementation	1	2	3	4	5	6	7

4. Statement regarding your organization's tolerance for failure **prior to the COVID pandemic:**

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
It is understood that failure is a necessary part of success	1	2	3	4	5	6	7
Management understands that when you try something new, you sometimes fail	1	2	3	4	5	6	7
Failure is accepted as an inevitable byproduct of taking a lot of initiatives	1	2	3	4	5	6	7
A mistake is seen as an opportunity to learn	1	2	3	4	5	6	7

5. Statements regarding your organization's resource availability **prior to the COVID pandemic:**

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
All available resources are locked up in current projects	1	2	3	4	5	6	7
My firm has a reasonable amount of resources in reserve.	1	2	3	4	5	6	7
We have ample discretionary financial resources.	1	2	3	4	5	6	7
We can always find the 'manpower' to work on special projects.	1	2	3	4	5	6	7

**Section 2:** This section includes statements regarding your organization's strategic response since the **COVID pandemic**. Please indicate the extent to which the response has provided the organization with a competitive advantage (1 = very poor, 7= exceptional).

1. Strategic organizational response for introducing flexibility **since the COVID Pandemic:** The capacity to meet priorities and goals in a timely manner to contain losses and avoid future disruptions.

	Poor						Exceptional
	1	2	3	4	5	6	7
Quick reallocation of orders to alternate suppliers (when required)	1	2	3	4	5	6	7
Flexible and quick logistics response	1	2	3	4	5	6	7
Flexible internal processes and operations with regular monitoring	1	2	3	4	5	6	7
Flexible decision-making and contingency plans	1	2	3	4	5	6	7
Demand-drivenness (Market intelligence and customer-centricity)	1	2	3	4	5	6	7

2. Strategic organizational response for creating redundancy **since the COVID Pandemic:** The extent to the system is substitutable, i.e., capable of satisfying functional requirements in the event of disruption, degradation, or loss of functionality.

	Poor						Exceptional
	1	2	3	4	5	6	7
Parallel processes for executing various organizational functions	1	2	3	4	5	6	7
Multiple channels for satisfying customer needs	1	2	3	4	5	6	7
Alternate strategies and decision-making ability	1	2	3	4	5	6	7

3. Strategic organizational response for developing robustness **since the COVID Pandemic:** The ability of system to withstand a given level of stress or demand without suffering degradation or loss of function.

	Poor						Exceptional
	1	2	3	4	5	6	7
Followed lean management principles (like Agile, Six Sigma, ISO 9000 etc.,)	1	2	3	4	5	6	7

4. Strategic organizational response for increase networking **since the COVID Pandemic**: Internal and external connectedness needed for reducing risks during disruption and developing long-term resilience.

	Poor					Exceptional	
	1	2	3	4	5	6	7
Interaction with external stakeholders in the value-chain or network	1	2	3	4	5	6	7
High transparency in information flow among the external stakeholders in the value-chain or network	1	2	3	4	5	6	7
Interaction within the internal stakeholders (among departments) of the organization	1	2	3	4	5	6	7
Investments in value-chain or network operations and risk-sharing	1	2	3	4	5	6	7
Collaborative decision making with other stakeholders in the value-chain or network	1	2	3	4	5	6	7

**Section 3:** This section seeks to understand how your **typical** business environment impacts your firm's key decision-making processes. Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Disagree						Strongly Agree	
	1	2	3	4	5	6	7	
Demand for the products/services of our principal industry is growing and will continue to grow	1	2	3	4	5	6	7	
The opportunities for firms in our principal industry to expand the scope of their existing products/services are extremely abundant	1	2	3	4	5	6	7	
Resources for growth and expansions are easily accessible in our industry	1	2	3	4	5	6	7	
The modes of production/distribution/service change often and in a major way	1	2	3	4	5	6	7	
The environmental demands on us are constantly changing.	1	2	3	4	5	6	7	
Marketing practices in our industry are constantly changing.	1	2	3	4	5	6	7	
Environmental changes in our industry are unpredictable.	1	2	3	4	5	6	7	
In our environment, new business models evolve frequently.	1	2	3	4	5	6	7	
In our industry, there is considerable diversity in customer buying habits	1	2	3	4	5	6	7	
In our industry, there is considerable diversity in nature of competition	1	2	3	4	5	6	7	
In our industry, there is considerable diversity in product lines	1	2	3	4	5	6	7	
The survival of our firm is currently threatened by scare supply of labor	1	2	3	4	5	6	7	
The survival of our firm is currently threatened by scare supply of materials	1	2	3	4	5	6	7	
The survival of our firm is currently threatened by tough price competition	1	2	3	4	5	6	7	
The survival of our firm is currently threatened by tough competition in product/service quality	1	2	3	4	5	6	7	
The survival of our firm is currently threatened by tough competition in product/service differentiation	1	2	3	4	5	6	7	

**Section 4:** This section relates to understanding your organization's **typical** level of engagement with various business stakeholders. Please indicate the extent to which you agree or disagree with the following statements. (1 = Strongly disagree; 7= Strongly agree).

**1. Top managers at our firm have built good connections with**

	Strongly Disagree					Strongly Agree	
	1	2	3	4	5	6	7
Suppliers	1	2	3	4	5	6	7
Customers	1	2	3	4	5	6	7
Competitors	1	2	3	4	5	6	7
Market-based collaborators (for example, regulatory bodies, banks, government bureaus)	1	2	3	4	5	6	7
Technological collaborators	1	2	3	4	5	6	7

**Section 5: Digital Maturity:** This section relates to understanding the level of digital maturity. Please read the statement below and rate your organization's **current** digital maturity level. (1 = Very low, 7 = Advanced).

	Very Low					Advanced	
	1	2	3	4	5	6	7
Regarding your <i>strategy</i> , how advanced(matured) is your company to embrace digital initiatives in order to gain a competitive advantage?	1	2	3	4	5	6	7
Regarding the <i>technology</i> in your company, does it enable the organization to create, process, store, secure, and exchange data to meet the needs of customers and organizational processes at a low cost?	1	2	3	4	5	6	7
Regarding the <i>operations</i> , do the processes and tasks utilize digital technologies to drive strategic management and enhance business efficiency and effectiveness?	1	2	3	4	5	6	7
Regarding <i>organization and culture</i> , is decision-making data-driven, and are your employees digitally skilled	1	2	3	4	5	6	7
Regarding <i>customer experience</i> , do your customers view your organization as their digital partner using their preferred channels of interaction online and offline?	1	2	3	4	5	6	7

**Section 6: Technology Utilization:** This section relates to understanding the **current** level of implementation of emerging digital technologies in your organization (1 = None, 7 = Advanced).

**1. Please indicate your organization's level of maturity in utilizing the following emerging digital technologies.**

	None					Advanced	
	1	2	3	4	5	6	7
Cloud Computing	1	2	3	4	5	6	7
Big Data	1	2	3	4	5	6	7
Analytics	1	2	3	4	5	6	7
Blockchain	1	2	3	4	5	6	7
Internet of Things (IoT)	1	2	3	4	5	6	7
Artificial Intelligence	1	2	3	4	5	6	7
Augmented Reality	1	2	3	4	5	6	7

**Section 7: Demographics**

**Please provide information about your organization and your role within the organization. As a reminder, your identity will remain entirely anonymous throughout the research.**

- Please specify your age in years.
- Please specify your gender identity.
  - Male
  - Female
  - Non-binary
  - Prefer not to disclose

3. Please specify your current designation or role in the organization.
  - Chief Officer (designations such as CEO, CFO, CIO, COO, CMO, CAO, CDO, CSO, etc.,)
  - Senior Vice President / Vice President
  - Senior Director / Director
  - Senior Manager / Manager
  - Enterprise / Business Architect
  - Other (Please specify)
  
4. Please select the functional area or department you are responsible for in the organization
  - Strategy and Business Development
  - Business Operations
  - Finance, Accounting
  - Technology Management
  - Other (Please specify)
  
5. How long have you worked for your organization? Please specify your total tenure (in years) in the organization, including the current and prior roles.
  
6. How large is your organization? Please specify the size of your organization in terms of the estimated total number of full-time associates employed in fiscal year 2021.
  
7. Please select the industry that best describes your organization.
  - Agriculture, Forestry, Fishing (SIC Code 01-09)
  - Mining (SIC Code 10 - 14)
  - Construction (SIC Code 15 - 17)
  - Manufacturing (SIC Code 20 - 39)
  - Transportation & Public Utilities (SIC Code 40 - 49)
  - Wholesale Trade (SIC Code 50 - 51)
  - Retail Trade (SIC Code 52 - 59)
  - Finance, Insurance, Real Estate (SIC Code 60 - 67)
  - Services (SIC Code 70 - 89)
  - Public Administration (SIC Code 90 - 00)
  - Other (Please specify)
  
8. How old is the organization you work for? Please specify the length of time (in number of years) your organization has been operational since its initial establishment

Thank you very much for your participation. We appreciate your time and response. Upon completing the research, the results and findings will be shared with you. If you have any questions, please feel free to reach out to Anand Kangala via email at [akangala@uncc.edu](mailto:akangala@uncc.edu).