The multi-faceted role of social capital for achieving organizational ambidexterity and supply chain resilience

Abstract

With the increasing frequency and impact of disruptions (i.e., in the wake of COVID 19, Suez Canal blockage), researchers and practitioners are faced with an ongoing challenge to enable supply chain resilience. Drawing on the theory of paradox and ambidexterity, this study highlights paradoxes in enabling supply chain resilience and proposes that firms manage such paradoxes by developing an ambidexterity capability. We build a research model hypothesizing the role of social capital that enables organizational ambidexterity to realise supply chain resilience. The model is tested using structural equation modelling comprising survey data of 204 Pakistani manufacturing firms. Based on the results of this study our overall model finds support with the exception that cognitive capital is not related to ambidexterity. This research contributes to the further conceptualization of paradoxes in supply chain resilience and advances the theory for a more comprehensive understanding of the impact of organizational social capital on ambidexterity.

Management relevance statement

Most firms are directly or indirectly affected by supply chain disruptions due to Covid-19 lockdowns or its aftermath. This even forces businesses in several cases into bankruptcy. Therefore, across industries across attention is on building resilience in their supply chain functions. Supply chain resilience allows firms to prepare and avoid disruptions and act accordingly in the face of disruptions. In this study, we help managers to understand that based on social capital firms can create supply chain resilience by making use of organizational ambidexterity. Lessons learned through the joint pursuit of alignment and adaptability (ambidexterity) also generate positive outcomes for supply chain resilience. Thus, balancing alignment and adaptability is a better strategy to generate supply chain resilience instead of solely focusing on alignment or adaptability. This provides counterintuitive advice as managers might be otherwise tempted to focus solely on adaptability versus alignment.

Keywords: Supply chain resilience, organizational ambidexterity, social capital, resilience paradoxes.
1. INTRODUCTION

Resilient firms are less vulnerable to disruptions and are more capable to manage the risk and recover from disruption [1, 2]. In today’s uncertain and turbulent environments, supply chain resilience (SCRes), defined as the ability of the firm to anticipate, deal with and recover from the changes brought by a supply chain disruption [3], represents one of the top priorities across industries to manage the disruption of the flow of goods or services [4, 5]. Supply chain disruption represents an unplanned or unintended stoppage in the normal flow of goods and materials within a supply chain [6]. The current trend of increasing frequency and impact of disruptions (e.g., in the wake of COVID 19, Suez Canal blockage) has further emphasized the significance of and interest in SCRes to ensure the firm’s sustenance and long-term survival [4, 7]. For instance, the Japanese ship that blocked the narrow Suez Canal roughly cost 12 percent of global trade and held up trade valued at over 54 billion USD, according to Lloyd’s list estimates [8]. Similarly, supply chain disruption caused by natural disasters, such as earthquakes and tsunami, has long-term repercussions on business and about 40-60 percent of small businesses never recover nor survive following such a disaster [9]. Consequently, firms are focusing on building resilience to mitigate the impact of disruptions [10, 11].

While resilience is generally seen as a desirable characteristic for an organization, the SCM literature defines resilience with differing or often competing terms such as response, adaptation, or flexibility along with the terms of reliability, continuity, or stability [3, 12-15]. The coexistence of differing demands in resilience challenges the effectiveness of resilience-building capabilities in managing underlying tensions, i.e., flexibility to cope and adapt with the sudden changes caused by disruption, at the same time, building stability to survive under distress [14, 16]. While the extant studies attempt to examine ways to foster SCRes, i.e., exploring the role of organizational resources [17, 18], structures, practices, or systems [16, 19], and capability factors such as manufacturing flexibility, visibility, or collaboration [20,
the research to identify specific capabilities to manage underlying tensions remain scant [13, 14]. In this regard, despite recent conceptual and theoretical advances in SCRes literature, two research gaps and shortcomings in prior literature are particularly noteworthy.

First, earlier research proposes contradictory propositions in resilience-building capabilities, i.e., some studies stress a need for experimentation, search, imagination, and variety [22] while others suggest focusing on reliability through consistency, control, low deviation, and routines [17], with limited research to respond to this controversy [13]. Notable exceptions are the studies of Linnenluecke [13], Iborra, et al. [14], and Williams, et al. [16] that direct research attention to exploring resilience-building capabilities that could manage the underlying paradoxical demands. In this study, we draw on the theory of paradox and ambidexterity[^1] to highlight paradoxes in building SCRes and argue that firms resolve such paradoxes by developing an ambidexterity capability. Differing demands require firms to pursue competing objectives simultaneously, associating ambidexterity capability to resolve paradoxical tensions [23].

Second and relatedly, the empirical research predominantly identifies high-order resilience-building capabilities (i.e., strategic consistency, organizational ambidexterity [14], disruption orientation [3], (also see Appendix Table A), while neglecting organizational resources that integrate, reconfigure, and build to translate into higher-order capabilities [21]. In other words, while studies identify organizational capabilities as antecedents to SCRes, they stop short of explaining how such capabilities are put into practice. Moreover, the SCM literature primarily identifies resilience-building capabilities rooted in a firm’s supply chain operations, such as production, visibility, sourcing, collaboration, and logistics, thereby lacking considerable understanding of what engenders resilience beyond common supply chain

[^1]: Ambidexterity is defined as the ability to manage two distinct things at the same time [34] and is associated with resolving paradoxes, i.e., competing elements that exist simultaneously. The theory of paradox and ambidexterity refers to the ability of a firm in resolving paradoxical tensions by developing an ambidexterity capability [23]
strategies [11]. In this study, we theorize and test organizational knowledge-based resources rooted in its human resources (i.e., social capital) to create an organizational level resilience-building capability, i.e., organizational ambidexterity capability. This assumption is rooted in the theoretical arguments of Kang and Snell [24] and Turner, et al. [25], suggesting that organizational knowledge accumulates and manifests itself in the social capital (namely, cognitive, relational, and structural capital), and configuration of these knowledge resources enable ambidexterity.

 Altogether, we address two research questions: (1) Does organizational ambidexterity capability impact supply chain resilience? (2) Does social capital impact organizational ambidexterity capability? We answer the proposed research questions using data from 204 Pakistani firms and make several contributions to SCM and resilience literature. By shedding light on underlying tensions in building SCRes, our study contributes to a better understanding of research and practice for instilling effective resilience strategies, thereby facilitating continued theory testing in the research area. Our study empirically showcases and extends the consequences of developing an ambidexterity capability as an antecedent to SCRes. As opposed to the dominantly proposed resilience-enhancing capabilities rooted in a firm’s supply chain operations (i.e., visibility, production, and logistics), our finding identifies it as an organizational-level capability. In a more nuanced understanding of the link between organizational resources and SCRes, our study validates the role of social capital in facilitating ambidexterity capability and contributes to delineating a comprehensive understanding of resilience-building mechanisms. Our research seeks to open up a discussion and advance theory for a more holistic and comprehensive understanding of building SCRes.
2. THEORETICAL BACKGROUND AND HYPOTHESIS

2.1. SCRes and paradoxical demands

SCRes is defined as the ability of a firm to “resist disruption and recover operational capability after disruptions occur” [26, p. 36]. Which highlights two key components of resistance to disruption and recovery from disruptions in a firm’s resilience. The resistance to disruption component is referred to firms showing perseverance through maintaining control and consistency when encountering adversity [22, 27, 28]; while the recovery from disruption component is referred to organizational attempts to experiment with robust solutions to recover the sudden changes caused by a disruption [17, 28, 29].

The component of resistance to disruption through established habits, routines, consistency, control, and low deviation may require an internal focus of a firm’s efforts and resources on managing existing resources to align with the unusual changes in the face of disruption [22, 28]. Whereas the component of recovery from disruption through variety, imagination, and experimentation may require firms to create more novel, robust, and flexible solutions to adapt to disruptions [17, 27]. The multifaceted nature of resilience components presents a paradox for managers, where differing demands may compete for similar organizational resources, and the excessive focus on one may adversely affect the other. Therefore, achieving resilience may require specific capabilities to manage the underlying tensions.

The recent review studies (e.g., [13, 16, 30]) highlight these tensions in fostering resilience and call for further research. For instance, Linnenluecke [13] note that “tensions between the need for organizational stability on the one hand […] and organizational change on the other hand […] have not yet been resolved and require future work” (p.19). Although resilience is an increasingly common theme in academic research, business practice, public policy, and the popular press, the studies to conceptualize, explore, empirical test resilience-
enabling capabilities that manage underlying tensions of competing components is scant with an exception of [14]. Iborra, et al. [14] identify organizational ambidexterity and strategic consistency to facilitate resilience building in Spanish small and medium firms. We extend their conceptual grounding and explore the role of organizational knowledge resources to provide an understanding of developing an ambidextrous capability.

2.2. Theory of paradox and ambidexterity

Paradoxes represent contradictory yet interrelated elements that exist simultaneously posing competing demands [21]. The contradictory elements trigger managerial responses to confront competing demands simultaneously to seek accommodation. For instance, at IBM network technologies, a highly entrepreneurial general manager articulated a strategic intent to exploit the existing chip line. Yet her zeal for exploration led her to build a business unit only focused on exploration, causing extant product lines to suffer. The pressure from corporate staff and client dissatisfaction drove the general manager to rebuild the business unit and focus attention on both current and new product lines simultaneously [31]. The capability to manage competing demands, i.e., short-term performance from existing product lines and long-term success through experimenting with new products, at the same time is termed ambidexterity [30, 31]. [23]. Drawing on the theory of paradox and ambidexterity, which refers to the ability of a firm to resolve competing demands by managing them simultaneously [23, 32], we argue that firms with an ambidexterity capability are better equipped to manage paradoxical demands in enabling SCRes.

Ambidexterity refers to the ability of a firm to manage and pursue trade-off activities at the same time—such as the joint pursuit of incremental and discontinuous innovation [33], exploration and exploitation [34], or efficiency and flexibility [35]. More specifically, the ambidextrous organization achieves alignment in its current operations while also adapting effectively to changing environmental demands [36]. For instance, O'Reilly and Tushman [37]
note that ambidexterity within an organization “is achieved when individuals agree that their unit is aligned and adaptable” (p. 329). Therefore, consistent with prior research [36, 38] and the competing demands of SCRes, this study defines ambidexterity as a dynamic capability of a firm to pursue alignment and adaptability simultaneously. Alignment refers to “coherence among all the patterns of activities in the business unit”, i.e., a common vision or working together toward the same goals. Adaptability is the “capacity to reconfigure activities in the business unit quickly to meet changing demands in the task environment” [36]. Alignment is achieved when firm’s associates have consistent objectives, work coherently to achieve overall objectives while reducing resources wastage. Adaptability is achieved when firm’s develop systems that respond to changes quickly and evolve rapidly according to market changes and its associates challenge outmoded norms [36].

Birkinshaw and Gibson [39] emphasized the fact that for organizations to sustain success over longer periods, simultaneous balance is required between adaptability and alignment i.e. contextual ambidexterity. They narrate the example of Ericson that was a pioneer in developing analog systems towards the end of the 20th century. However, the organization emphasized adaptability over alignment when it did massive hiring with considerable duplicity of effort, leading to layoffs in excess of 60,000 and widespread shutdowns of its facilities. On the other hand, Teece et al [40] narrate the example of the Toyota Production System where the system-wide goal of waste reduction is widely practiced, yet the design of its U-shaped work cells allows for flexibility. The overall system is based on a coherent set of activities that combine the elements of adaptability while keeping the alignment of the whole system.

We argue that ambidexterity is a dynamic capability based on the insight that it involves sensing external threats, seizing opportunities, and dynamically reconfiguring resources accordingly [38]. Contributing to research on organizational ambidexterity, numerous literature streams—including technology and innovation management, strategy, and
organizational theory—suggest that organizations succeeding in reconciling and harnessing a combined and simultaneous pursuit on alignment and adaptability are more effective than firms keeping a unilateral focus on either one of the components in sustaining long term business growth [37]. Prior literature conceptualizes organizational ambidexterity in three ways: structural ambidexterity, temporal/sequential ambidexterity, and contextual ambidexterity [37]. We conceptualize the ambidexterity capability in terms of contextual ambidexterity at the supply chain level following the focus of our research objectives. Please refer to Table 1 for a brief overview and relevance of the three ambidexterity concepts.

Table 1. Overview of ambidexterity concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
<th>Relevance to our study</th>
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<tbody>
<tr>
<td><strong>Structural ambidexterity</strong></td>
<td>Simultaneous use of contrasting activities using different structures, organizational units, projects, etc. [41]</td>
<td>Given our study’s focus on managing tensions in building resilience within an organizational supply chain, the concept of structural ambidexterity is less relevant.</td>
</tr>
<tr>
<td><strong>Temporal/sequential ambidexterity</strong></td>
<td>Managing the contrasting activities at different points in time, i.e., one after another in tandem [42]</td>
<td>Temporal ambidexterity is beneficial when the contradictory elements can be separated in time and synergistic effects may not be a priority [43]. Shifting momentum and resources between activities for SCRes following disruption can be more disruptive [12] as such this concept is less relevant to our study as well.</td>
</tr>
<tr>
<td><strong>Contextual ambidexterity</strong></td>
<td>Simultaneous use of contrasting activities across an entire business unit, i.e., within the context of a firm [36]</td>
<td>Given our study’s focus on managing tensions in building resilience within an organizational supply chain, the concept of contextual ambidexterity seems to be the most appropriate.</td>
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While contextual ambidexterity seems a better fit in managing paradoxical demands in building-resilience, developing an ambidexterity capability requires a supportive “set of systems and processes that collectively define a context that allows the meta-capabilities of alignment and adaptability to simultaneously flourish” [36]. Drawing on the social capital
theory, we further explore the organizational knowledge resources embedded in social networks that may enable an ambidexterity capability to build SCRes. In doing so, we go beyond the dominant practice of simply identifying higher-order resilience-building capabilities, without exploring the organizational resources that translate into such capabilities. A representative overview of the SCRes literature on antecedents of SCRes is presented in Appendix (Table A) to highlight this shortcoming.

2.3. Social capital theory

Social capital refers to “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit […] comprises both the network and the assets that may be mobilized through that network [44, p. 243]. The social capital theory draws on the interaction and exchanges within social units as a valuable resource. Nahapiet and Ghoshal [44] identify and delineate three dimensions of social capital, namely cognitive, structural, and relational capital that constitute and facilitate the creation of new intellectual capital in firms. Cognitive capital represents the shared representations, interpretations, and systems of meaning among the actors of a network [4, 44]. Cognitive capital is created through interaction over time, developing a common understanding of goals, norms, ways of acting collectively, and may appear as shared codes, language, goals, vision, or practices [4, 44, 45]. Structural capital describes the impersonal configuration of linkages between people or units, which represent the presence/absence of ties among networks based on size, density, connectivity, and hierarchy [4, 44]. Relational capital relates to interpersonal relationships and can be characterized by trust, friendship, respect, reciprocity, and identification with and commitment to the collective [4, 44, 45].

While social capital is widely recognized as a valuable resource for firms [4, 46-48], the emerging research positions social capital to be a critical relational resource to face, adapt and survive adverse change [44]. Existing research exploring the link between social capital
and resilience has been limited with a lacking application of social capital conceptualization [49, 50]. For instance, studies often apply one or two of the three conceptual dimensions of social capital in the SCM literature i.e., [51, 52], and/or show inconsistent results (cf. Gölgeci and Kuivalainen [49]). Thus, the depth of the link between social capital and resilience is yet to be fully explored [49, 53]. Following the call to develop a further understanding of the link between social capital and SCRes, we propose that social capital enables firms to be ambidextrous in managing the tensions of SCRes.

2.4. Social capital and organizational ambidexterity

The dimensions of social capital as relationship ties provide unique capabilities and social cohesion (i.e., sense of belonging and deep connectedness) to achieve coherence among activities (i.e., alignment) and share novel and diverse practices to adapt to changes (adaptability) [36]. We propose that each dimension of social capital (cognitive, structural, and relational) draws on the patterns of interactions and exchanges within the social units and can enact an ambidexterity capability.

Cognitive capital provokes the development of shared meaning and values among employees that creates an important link to facilitate communication and collaboration [44, 54]. A shared set of values and goals helps to ameliorate conflicting interests and disagreement, thereby setting a common strategic direction [55]. It can alleviate the adverse effects of opportunistic behavior, divergent goals, and conflicting perspectives among organizational employees responsible for alignment and adaptability, and prevent organizations from devolving into fragmented structures [56, 57]. Consequently, cognitive capital encourages collective behavior that creates team efficiency valuable in translating diverse ideas into focused actions required for the simultaneous pursuit of organizational ambidexterity [55]. For instance, Ciba Vision, a contact lenses producer, aligned their resources to compete in their mature business of conventional contact lenses and adopted new technologies for extended
wear and fashion lenses [41]. While the new technologies might threaten their conventional business, Ciba Vision promoted a cognitive capital by enunciating a new vision statement, ‘healthy eyes for life’, that inspired cross-company teamwork by underscoring connections between the conventional and emerging business initiatives. In this sense, shared vision by propounding a cognitive capital contributes to resolving conflicts in resource use and combination, and to achieve organizational ambidexterity [41]. Some studies suggest that cognitive capital may enable over-commitment to established relationships and norms which may restrict or postpone adjustments (e.g. [58, 59]). For instance, Pillai et al [58] argue that dysfunctional processes of social identification confine new information building by directing attention inwards to the existing information. However, organizational ambidexterity is inherently complex and ambiguous and we argue that cognitive capital enables clarity in setting appropriate ideas to align existing resources while adapting creative ideas, guided by the organizational objectives [57, 60]. Hence, we hypothesize that

Hypothesis 1: Cognitive capital enhances organizational ambidexterity.

Structural capital possesses an accumulation of organizational knowledge embedded in standard operating procedures, business processes, organizational culture, and supportive infrastructure, that coordinate and control the organizational operational activities [24, 44, 47]. The patterns of interactions and mechanisms in structural capital refer to the degree to which prescribed rules describe a particular task; provide guides for decision making; and provide guides for conveying decisions, instructions, and information [61]. Scholars have used the metaphors of ‘red tape’ or ‘riverbank’ to elucidate the role of structural capital in delineating responsibilities, fostering coordination among departments, clarifying goals, procedures, and areas of responsibility [62]. Prior literature identifies that the lack of clear role definitions, assigned responsibilities, expertise, and clarity can result in confusion, stress, and reduced commitment, and failure [63]. Structural capital induces minimal redundancy of tasks, removes
double standards, regulates behaviours, and encourages focus [61], thereby can alleviate inherent tensions derived from role ambiguities in meeting alignment and adaptability objectives [64]. A higher level of structural capital enables firm members to cooperate and to “combine their efforts” with other organization members which ambidextrous firms need [39]. A collective effort may result in an enhanced motivation to cooperate when pursuing a range of different goals and to deal with associated conflicts [65]. Structural capital supports clarity of purpose resulting from difficulties with comprehending the relationship between their tasks and a larger purpose [24, 47]. Consequently, structural capital may enhance organizational ability to act ambidextrously and accumulate a broad range of organizational skills in addressing more difficult tasks. Hence, we hypothesize that

Hypothesis 2: Structural capital enhances organizational ambidexterity.

Relational capital comprises personal relationships between organization members that typically cut across hierarchical levels and may include formal personal coordination mechanisms, i.e., teams, task forces, liaison roles [66], and informal and voluntary modes of personal coordination, i.e., trust, friendship, respect, reciprocity [44, 67]. A strong relational capital, i.e., increased size of an individual’s network, is associated with increasing possibilities for that organizational member to identify and acquire knowledge for both alignment and adaptability purposes [45, 68]. Organizational members may benefit from exercising network coordination in not only obtaining related and complementary knowledge (i.e., alignment) for improving and refining existing competencies [65] or pursuing incremental innovations [68] but also acquiring new and diverse knowledge (i.e., adaptability) for developing new competencies [65], or finding innovative solutions to problems [68]. An increased level of relational capital of organizational members can be associated with an increased ability of these organizational members to acquire and understand complex and ambiguous knowledge from the network contacts [4, 47], resulting in reduced equivocality surrounding adaptability in
exploratory tasks [69]. At the same time, relational capital networks which are characterized by trust and cooperation decrease the likelihood of goal conflict, thereby benefitting shared vision to achieve ambidexterity [41, 57]. Hence, we hypothesize that

Hypothesis 3: Relational capital enhances organizational ambidexterity.

2.5. Organizational ambidexterity and SCRes

Building SCRes is inherently complex with the competing requirement of stability and flexibility [14, 28]. In this regard, prior research directs attention to the need of exploring organizational capabilities to effectively deal with the paradoxes and tension inherent to SCRes [13, 16, 30]. Drawing on the theory of paradox and ambidexterity, we argue that firms need to develop an ambidexterity capability to resolve paradoxical tensions. The central idea is that increasingly complex and diverse SCRes tasks require the adoption of an equally complex and diverse capability that responds to contextual (task) requirements through the combination of contrasting approaches [33, 70]. Relatedly, earlier research highlights that paradoxical demands in SCRes become recurrently salient, triggering an ambidexterity capability to confront these demands simultaneously [14]. In addition, existing research indicates that different activities of organizational ambidexterity capability (i.e., alignment and adaptability) have unique benefits and performance implications [36, 71]. More specifically, it has been argued that alignment activities are particularly beneficial for enacting stability and control, whereas the use of adaptability is conducive to flexibility and innovation [71]. In essence, this implies that SCRes, a simultaneous building of stability and flexibility, can only be achieved through organizational ambidexterity capability. For instance, firms are required to emphasize stability to avoid disruption; at the same time, however, they have to emphasize the flexibility to recover to normal operations following a disruption [26, 28]. These competing demands necessitate the simultaneous use of different organizational activities (i.e., alignment and adaptability), and in particular the adoption of an ambidextrous capability that combines
contrasting activities [70]. Moreover, ambidexterity scholars argue that balancing competing activities in an organizational ambidexterity capability (e.g. exploration and exploitation, alignment and adaptability, incremental and radical innovations) leads to complimentary returns [25, 37, 71]. For example, firms can use the skills and knowledge from monitoring and controlling resources in a stable environment to succeed in implementing resources to meet changing demands during disruption [14]. By combining alignment and adaptability activities, a firm can leverage control and reliability derived from the coherence among all the patterns of activities in the business unit, and thus to ensure stability in SCRes, while simultaneously leveraging the capacity to rapidly reconfigure activities in the business to meet changing demands, thereby also facilitating flexibility demands in enacting SCRes (Burin et al., 2021). Hence, we hypothesize that

Hypothesis 4: Organizational ambidexterity enhances SCRes.

3. METHODOLOGY

Following the positivist paradigm, we assume that the constructs of this study are real and not socially constructed. We believe that the concepts in this study are measurable, and we do so using survey research. Survey research was also appropriate here due to the theory testing nature of the study [72]. Survey research allows the researcher to discover the interaction of more precisely measured variables than is possible using secondary data [73]. To test the hypothesized model in this study, we collected data from the Pakistani manufacturing industry and investigate the effect of organisational variables on supply chain resilience. Pakistan was an appropriate context for studying supply chain resilience and its antecedents as the country is passing through turbulence and social change coupled with intermittent growth and crises [74]. The last two decades have seen the country face many natural and man-made disasters. Pakistan spent over 10 billion dollars during the last decade on disaster relief efforts [75] to rehabilitate floods, earthquake victims. Furthermore, Pakistan is the 33rd ranked country on the
list of global emitters, but it is the seventh most affected country by climate change [76]. It is estimated that Pakistan had to face losses of over $126 billion due to terrorism ensuing after the global war on terror [77]. More recently, the Covid-19 pandemic has proven to be one of the most significant supply chain disruptions of the decade. All these facts combined make the Pakistani business environment an interesting case for the study of resilience and its antecedents.

3.1. Data collection methods

Data in this study were collected from managers working in the supply chain and related functions of the Pakistani manufacturing firms. Research in developing countries has highlighted several concerns about data collection [78-81]. A significant concern is the accessibility of a valid sampling frame. This creates problems that force researchers to take different sampling approaches compared to developed country markets. Similar issues were faced in this study. The sampling frame had to be compiled through the LinkedIn database. LinkedIn is a rapidly growing social networking site in Pakistan [82] that internationally boasts over 740 million users in 200 countries [83]. The LinkedIn database has been used for this purpose in previous studies of operations and supply chain [for example see 84, 85-89].

Using the LinkedIn database, we identified 1,783 operations and supply chain professionals showing affiliations with Pakistan's manufacturing industry. We sent email requests to these managers stating our study's objectives and requesting their consent to participate. In response to our request, about 800 managers provided their consent. In the next round, these managers were sent the link to the online survey. To overcome the possibility of common method bias (CMB), efforts were made to gather two responses per organization. After repeated email interactions over a year, responses from 330 managers were received for a response rate of 41.2 % in relation to 800 professionals showing interest and 18.5 % for the total population.
Armstrong and Overton [90] methodology was used to test the possibility of non-response bias. This method considers late respondents as a proxy of non-respondents and compares early and late respondents [91, 92]. In this research, this comparison was made based on organization size (sales and number of employees) and employee experience using independent sample t-tests. Results for the independent sample t-tests showed no significant differences between the early and late respondents ($p > 0.05$). This led us to conclude that non-response bias was not a problem in this study.

Out of the total of 330 responses received during the data collection, two responses were received from 126 organizations, where the second response was acquired at an average of four weeks after the first response. Responses were combined so that independent variables (social capital dimensions) and the mediating variable (organizational ambidexterity) were measured at time T1 while the dependent variable (supply chain resilience) was measured at time T2 by two independent respondents. In the case of the remaining 78 responses, single respondents were used to represent their respective organizations. Our final dataset consisted of 204 completed responses. Table 2 and Table 3 provide the profile of responding organizations and the respondents.

### Table 2: Industries represented in the sample

<table>
<thead>
<tr>
<th>Industry</th>
<th>Frequency</th>
<th>(%)</th>
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<tbody>
<tr>
<td>Textile &amp; Apparel</td>
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<td>21.5</td>
</tr>
<tr>
<td>FMCG</td>
<td>29</td>
<td>14.2</td>
</tr>
<tr>
<td>Chemicals</td>
<td>19</td>
<td>9.3</td>
</tr>
<tr>
<td>Electronics</td>
<td>18</td>
<td>8.8</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>15</td>
<td>7.3</td>
</tr>
<tr>
<td>Paper &amp; Packaging</td>
<td>14</td>
<td>6.8</td>
</tr>
<tr>
<td>Energy</td>
<td>13</td>
<td>6.3</td>
</tr>
<tr>
<td>Engineering</td>
<td>11</td>
<td>5.3</td>
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<tr>
<td>Construction</td>
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<td>Miscellaneous</td>
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<td>4</td>
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### Organization history

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<th></th>
<th>Frequency</th>
<th>(%)</th>
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<td>Less than 5 years</td>
<td>28</td>
<td>13.7</td>
</tr>
<tr>
<td>5 - 10 years</td>
<td>21</td>
<td>10.3</td>
</tr>
<tr>
<td>Experience</td>
<td>Frequency</td>
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<td>----------------------------------</td>
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</tr>
<tr>
<td>Less than 5 years</td>
<td>56</td>
<td>27.5</td>
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<tr>
<td>5 to 10 years</td>
<td>78</td>
<td>38.2</td>
</tr>
<tr>
<td>11 to 15 years</td>
<td>34</td>
<td>16.7</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>36</td>
<td>17.6</td>
</tr>
</tbody>
</table>

### 3.2. Measures

We used existing validated scales to measure the constructs of this study. To identify the relevant scales, an in-depth literature review was conducted to identify the scales with suitable psychometric properties. We used perceptual measures to elicit responses from the target respondents since the study variables could not be approximated from the secondary data available in the firm's annual reports. In the following section, we provide the details of the scales used in this study. All measurement items used a seven-point scale, with 1 representing “strongly disagree” and 7 representing “strongly agree”.

#### 3.2.1 Organizational ambidexterity

We measured contextual ambidexterity as a reflective combination of adaptability and alignment. Both scales were adapted from Gibson and Birkinshaw [36]. Adaptability measured the ability of the firm to modify its management systems in response to long-term market
changes. The sample item of this scale is "our management systems encourage people to challenge outdated traditions/practices/sacred cows". Alignment measured the ability of a firm to align the incentives of its internal and external stakeholders. A sample item of this scale is "our management systems work coherently to support the overall objectives of the supply chain."

Ambidexterity has been operationalized in organisational research in various ways. The construct has been formed as a second-order formative construct [75, 93], second-order reflective construct [94], and by multiplying [36, 95, 96], subtracting [97], and adding [69]. Using the most popular operationalization, in this research we created an interaction term for alignment and adaptability to represent contextual ambidexterity. We performed the robustness tests to check the sensitivity of our hypotheses results to the alternative operationalization of ambidexterity.

3.2.2 Social capital
We adopted the scale for social capital from Wu and Chiu [98]. Wu and Chiu [98] provided a multi-dimensional construct to measure social capital consisting of structural capital, cognitive capital, and relational capital. Structural capital measured the network of appropriate relations among the supply chain partners. A sample item of the scale included "partners in the supply chain have a strong network tie for the pattern of interactions between them". Cognitive capital measured the degree to which supply chain partners have shared culture and goals. A sample item of the scale includes "partners in the supply chain have similar corporate culture/values and management styles". Relational capital measured the extent to which commitment, trust, and emotional intensity connected the individuals of a supply chain. The sample item of the scale is "partners in the supply chain have mutual respect between them".

3.2.3 Supply chain resilience
We adopted the supply chain resilience scale from Ambulkar, et al. [3]. The items of this scale measured the extent to which a firm can cope with the supply chain disruptions, the degree to
which a firm adopts and responds to supply chain disruptions, and the ability to maintain high awareness of the situations. The component of rigidity or stability through established habits, routines, consistency, control, and low deviation are captured with the items of high situational awareness and quick response in the face of disruption [22, 28]. Whereas the component of adaptability or flexibility through variety, innovation, imagination, and experimentation are captured with the items of coping with changes and adapting to create more novel, robust, and flexible solutions to adapt to disruptions [27, 99].

3.2.4 Control variables
Following guidelines suggested by Carlson and Wu [100], we embraced a more conservative approach towards the use of control variables. We controlled for variables that were empirically and theoretically linked with the relationships of interest [100-103]: firm size measured by the number of employees and sales revenue and firm age [104]. Firm size was controlled as it is reasonable to believe that larger firms would have stronger systems in place to overcome supply chain disruptions and hence would be more resilient [105]. Firm age measured by the number of years since the firm was formed, was included as a proxy for experience [105] which may have a strengthening effect on supply chain resilience. Beyond firm-level controls, we controlled for the industry, given the diverse nature to which firms in different industries may experience supply chain disruptions [106]. Five dummy variables were created representing (1) textile, (2) pharma and chemicals, (3) fast-moving consumer goods, (4) energy and electronics, and (5) construction industries, constituting each industry as 1 and 0 for rest.

3.3 Common method bias
Common method bias (CMB) becomes a problem in research due to the simultaneous measurement of independent and dependent variables. We took several proactive steps to overcome CMB in this research and followed several guidelines in this respect [107-109]. Significant effort was made to represent each firm in the sample with two responses separated
by an average time-lag of approximately a month. Researchers such as Ketokivi and Schroeder [110] have suggested that multiple respondents are essential to mitigate CMB. In our data collection effort, we were successful in receiving multiple responses from more than 50 percent of the responding organizations (i.e., 126 out of 204).

Given that we did not receive multiple responses from all the responding organizations, statistical procedures were applied to detect CMB. We used a theoretically unrelated marker variable to assess CMB [111]. We chose environmental munificence for this purpose. The variable was measured based on the subjective assessment of responding managers about the "estimated average sales growth (per year) of their organization in past three years" [112]. We took its correlation with the variables in our hypothesized model. The marker variable did not show a significant correlation with any of the model variables. This provided evidence that CMB was not a concern in this research.

4. ANALYSIS AND RESULTS
4.1. Measurement model validation
Before measurement model evaluation, we tested univariate and multivariate assumptions. Univariate normality was assessed based on skewness and kurtosis coefficients. The coefficients of skewness for the variables ranged between -0.75 and -0.39, while the kurtosis coefficients ranged between -0.61 and 0.27. Both were within acceptable limits [113]. We assessed the possibility of multivariate outliers using the chi-square significance test on Mahalanobis distances. No significant multivariate outliers were found ($p > 0.005$). Furthermore, residual plots did not point towards any significant issues of multivariate normality and heteroscedasticity. The scatter plots between independent and dependent variables provided strong evidence of linear relationships. Hence the assumption of linearity was met. Finally, the most significant variance inflation factor between the social capital
dimensions and organizational ambidexterity was 2.30, well below the threshold of 10. Hence, we concluded that multicollinearity was not a problem [114].

We used confirmatory factor analysis (CFA) to validate the measurement model. Model fit indices ($\chi^2 = 1.50, p < 0.01; \text{CFI} = 0.97, \text{SRMR} = 0.042, \text{RMSEA} = 0.050$) showed a good model fit [115]. Convergent validity was assessed based on the factor loadings and average variance extracted (AVE). Results of the measurement model showed that factor loadings for all the constructs averaged above 0.7, and all the AVEs were above 0.5 [116]. Combined with the significant $p$-values for all items, this provided sufficient evidence for convergent validity.

Discriminant validity was assessed by comparing the square root of AVE for each variable with its bi-variate correlations with all other variables. Our results showed that in each case square root of AVE was higher than all the associated bi-variate correlations, providing evidence for discriminant validity [116]. Internal consistency was estimated based on composite reliability (CR). All constructs showed suitable levels of reliability (CR $\geq 0.7$). However, the CR of cognitive capital was on the lower side (0.69) but still high enough to proceed. Table 4 provides the standardized loadings, AVE, and CR for all the constructs, while Table 5 shows the comparisons between the correlations and the square root of AVEs along with the means and standard deviations (SD) of the constructs in this study.

Table 4: Measurement model validation-reliability and convergent validity

<table>
<thead>
<tr>
<th>Constructs/Indicators (CR, AVE)</th>
<th>Standardized loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognitive capital (CR = 0.70, AVE = 0.55)</strong></td>
<td></td>
</tr>
<tr>
<td>Shared goals of supply chain partners</td>
<td>0.83</td>
</tr>
<tr>
<td>Same business vision of supply chain partners</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>Structural capital (CR = 0.82, AVE = 0.60)</strong></td>
<td></td>
</tr>
<tr>
<td>Strong network ties of supply chain partners</td>
<td>0.81</td>
</tr>
<tr>
<td>Dependence on network structure for communication channels</td>
<td>0.79</td>
</tr>
<tr>
<td>Cross hierarchical and cross functional connections of supply chain partners</td>
<td>0.73</td>
</tr>
<tr>
<td><strong>Relational capital (CR = 0.85, AVE = 0.66)</strong></td>
<td></td>
</tr>
</tbody>
</table>
Mutual respect between supply chain partners 0.79
Trust between supply chain partners 0.86
Reciprocity between supply chain partners 0.78

Supply chain resilience (CR = 0.88, AVE = 0.64)
Adapting to supply chain disruptions 0.83
Quick response to supply chain disruptions 0.88
Coping with changes due to supply chain disruptions 0.77
High situational awareness 0.73

Adaptability (CR = 0.76, AVE = 0.52, SOL = 0.95)
Encouraging people to challenge outdated traditions 0.63
Flexible systems allowing quick response 0.81
Systems evolving rapidly in response to business priorities 0.71

Alignment (CR = 0.86, AVE = 0.66, SOL = 0.92)
Systems working coherently to support overall supply chain objectives 0.87
Minimizing waste of resources 0.78
Consistent objectives to unite workforce efforts 0.79

Table 5: Correlations, means, and standard deviations

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Cognitive capital</td>
<td>4.75</td>
<td>1.35</td>
<td></td>
<td></td>
<td></td>
<td>0.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2- Structural capital</td>
<td>4.96</td>
<td>1.26</td>
<td>0.59**</td>
<td></td>
<td></td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- Relational capital</td>
<td>5.15</td>
<td>1.26</td>
<td>0.70**</td>
<td>0.63**</td>
<td></td>
<td>0.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4- Supply chain resilience</td>
<td>4.93</td>
<td>1.21</td>
<td>0.40**</td>
<td>0.39**</td>
<td>0.33**</td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- Alignment</td>
<td>5.21</td>
<td>1.24</td>
<td>0.56**</td>
<td>0.64**</td>
<td>0.66**</td>
<td>0.36**</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>6- Adaptability</td>
<td>5.01</td>
<td>1.22</td>
<td>0.51**</td>
<td>0.63**</td>
<td>0.62**</td>
<td>0.40**</td>
<td>0.70**</td>
<td>0.72</td>
</tr>
</tbody>
</table>

** Significant at the 0.01 level (2-tailed); Bold numbers on the diagonals indicate square-root of AVE

4.2. Structural model evaluation

Before developing the structural model, we created an interaction term made from summated scales of adaptability and alignment to be added in the model. Results of the structural model are provided in Table 6 and Figure 1. Hypothesis 1 suggested a positive direct impact of cognitive capital on organizational ambidexterity. Results showed that this relationship was not significant ($\beta = -0.15, p > 0.05$). Hence, H1 was not supported. Cognitive capital provides a perspective on how to approach and interpret an issue and act as filter to include certain
information in to strategizing process while excluding other (Lin and McDonough, 2014). Thus, individuals need to adopt a paradoxical frame, i.e., recognise and accept the simultaneous existence of contradictory forces (Smith and Tushman, 2005) for ambidexterity as non-paradoxical frame tend to emphasize only one of the contradictory forces. Moreover, the insignificant effect of cognitive capital on ambidexterity in our study provide further credence to Wilm et al., (2019) arguments that solely recognizing contradictory forces does not foster ambidexterity, however it is an important antecedent to this process. Thus, there is a need to further explore this link specifically to identify important mediators that foster ambidexterity capability. Hypothesis 2 postulated a positive relationship of structural capital on organizational ambidexterity. Our results showed that this relationship was significant ($\beta = 0.50$, $p < 0.01$). Hence, H2 was supported. The results of this study also supported hypothesis 3, which suggested a positive effect of relational capital on organizational ambidexterity ($\beta = 0.49$, $p < 0.05$). These results are in line with the previous studies that have shown structural and relational dimensions of social capital to influence dynamic capabilities [117]. Social capital generated through the strength of ties between supply chain partners, communication channels that cut through the hierarchical and functional boundaries, a culture of mutual trust and respect between the supply chain partners transforms into capabilities that allow the supply chain to combat the ever-changing market through developing supply chain ambidexterity. Finally, in hypothesis 4, we suggested a positive relationship between organizational ambidexterity and supply chain resilience. Our results proved this relationship to be significant ($\beta = 0.42$, $p < 0.01$), in support of H4. This corroborates with the basic assertions of capability researchers who suggest that dynamic capabilities contribute to the development of further (dynamic or ordinary) capabilities [118-120].
4.3. Mediation checks

We also assessed the indirect relationship between social capital dimensions and supply chain resilience. Our results showed that in the absence of organizational ambidexterity, the social capital dimensions (structural and relational capital) show the marginal effect on supply chain resilience ($p > 0.05$). However, we tested the indirect effects using bootstrapping technique [121] with 5,000 bootstrap samples and 95 percent confidence intervals. Results showed that structural capital ($\beta = 0.183, p < 0.01$, lower confidence limit = 0.076, upper confidence limit = 0.377) and relational capital ($\beta = 0.199, p < 0.05$, lower confidence limit = 0.012, upper confidence limit = 0.994) had a significant indirect impact on supply chain resilience through the mediating role of organizational ambidexterity. Overall, the findings suggest a partial mediation effect. Overall, the findings suggest a partial mediation effect. Our results are in line with the previous studies that suggest a positive relationship between social capital and supply chain resilience [49, 122]. However, our results differ in that we have identified a new path that mediates the social capital $\rightarrow$ supply chain resilience relationship i.e., through supply chain ambidexterity.

**Figure 1: Structural model results**

![Structural model results diagram](image-url)
Table 6: Structural model results

<table>
<thead>
<tr>
<th>Hypothesized relationships</th>
<th>( \beta )</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive capital ( \rightarrow ) Organizational ambidexterity</td>
<td>-0.149</td>
<td>0.571</td>
</tr>
<tr>
<td>Structural capital ( \rightarrow ) Organizational ambidexterity</td>
<td>0.509</td>
<td>0.000</td>
</tr>
<tr>
<td>Relational capital ( \rightarrow ) Organizational ambidexterity</td>
<td>0.492</td>
<td>0.018</td>
</tr>
<tr>
<td>Organizational ambidexterity ( \rightarrow ) Supply chain resilience</td>
<td>0.424</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Indirect effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive capital ( \rightarrow ) Organizational ambidexterity ( \rightarrow ) Supply chain resilience</td>
<td>-0.054</td>
<td>0.445</td>
</tr>
<tr>
<td>Structural capital ( \rightarrow ) Organizational ambidexterity ( \rightarrow ) Supply chain resilience</td>
<td>0.183</td>
<td>0.008</td>
</tr>
<tr>
<td>Relational capital ( \rightarrow ) Organizational ambidexterity ( \rightarrow ) Supply chain resilience</td>
<td>0.199</td>
<td>0.043</td>
</tr>
</tbody>
</table>

Model Fit: \( \chi^2 = 1.93, p > 0.05, CFI = 0.98, SRMR = 0.049, RMSEA = 0.054 \)

<table>
<thead>
<tr>
<th>( )</th>
<th>( )</th>
<th>( )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age ( \rightarrow ) Supply chain resilience</td>
<td>0.111</td>
<td>0.086</td>
</tr>
<tr>
<td>No of employees ( \rightarrow ) Supply chain resilience</td>
<td>0.019</td>
<td>0.661</td>
</tr>
<tr>
<td>Sales revenue ( \rightarrow ) Supply chain resilience</td>
<td>-0.049</td>
<td>0.013</td>
</tr>
<tr>
<td>Industry (Textile) ( \rightarrow ) Supply chain resilience</td>
<td>-0.028</td>
<td>0.855</td>
</tr>
<tr>
<td>Industry (Pharma and Chemicals) ( \rightarrow ) Supply chain resilience</td>
<td>0.176</td>
<td>0.332</td>
</tr>
<tr>
<td>Industry (FMCGs) ( \rightarrow ) Supply chain resilience</td>
<td>-0.339</td>
<td>0.079</td>
</tr>
<tr>
<td>Industry (Energy and Electronics) ( \rightarrow ) Supply chain resilience</td>
<td>0.186</td>
<td>0.288</td>
</tr>
<tr>
<td>Industry (Construction) ( \rightarrow ) Supply chain resilience</td>
<td>-0.040</td>
<td>0.863</td>
</tr>
</tbody>
</table>

Model Fit: \( \chi^2 = 2.02, p > 0.05, CFI = 0.90, SRMR = 0.068, RMSEA = 0.071 \)

4.4. Robustness test

We further tested the sensitivity of our hypotheses results to the alternative operationalization of ambidexterity [96]. As an alternative conceptualization, we modelled contextual ambidexterity as a second-order reflective construct in our research model [see for example 94]. The hypothesis results were found to be consistent. Hypothesis 1 remained insignificant while all other hypotheses were significant. Similarly, no significant changes were found in the indirect effects. Our results thus confirmed previous research showing consistent results using alternative ambidexterity operationalizations [69, 97].

5. DISCUSSION

This study shows how the social capital of organizations may help in developing the ambidextrous capability to enable SCRes. More specifically, our data provide support for
structural capital and relational capital to be important antecedents that enabled organizational members to feel more resourceful and capable of pursuing competing objectives. This study validates the role of organizational ambidexterity capability to resolve competing demands in enabling SCRes. Our post-hoc mediation analysis provides evidence on the partial mediating effect of organizational ambidexterity in the relationship between structural capital and SCRes and between relational capital and SCRes. These findings have important implications for both research and practice, which are elaborated below.

5.1. Implications for research

Grounded on the theory of paradox and ambidexterity, this study contributes to shedding light on the underlying paradoxical tensions in SCRes. The identification of paradoxical demands in enabling SCRes provides support not only to the claims of multidimensionality of SCRes [26, 28], but also serves to inform the debate about what organizational capability a firm should develop to enable SCRes [11]. While prior studies have developed an acute understanding of the competing determinants of SCRes, the research on organizational capabilities to resolve the paradoxical demands in enabling SCRes remains scant [14]. We theoretically develop and empirically test the role of organizational ambidexterity capability to manage SCRes paradoxes. In doing so, this study also contributes to providing empirical evidence on the theoretical conjectures of the theory of paradox and ambidexterity [70] by showing a positive and significant effect of organizational ambidexterity capability on SCRes. Moreover, our findings respond to calls for research to explore antecedents that may help firms resolve the paradoxical tensions in fostering resilience [13, 16, 30]. The developed understanding of SCRes in this study may support a continued theory development in the area.

This study contributes to SCRes literature by identifying organizational resources that integrate, reconfigure, and build to translate into higher-order capabilities (such as organizational ambidexterity) to enable SCRes. In doing so, our empirical research goes
beyond the dominant trend of identifying high-order resilience-building capabilities (see Appendix Table A), without explaining how such capabilities are put into practice. Drawing on social capital theory, our study suggests how structural and relational capital can complement firm members to facilitate ambidextrous capability. Developing structural and relational capital seems to be rare and difficult and some studies raise doubts about the positive effects of social capital on performance in certain contexts. For instance, Villena, et al. [123] identify that social capital in a collaborative buyer-supplier relationship positively affects buyer performance, but excessive social capital may reduce the buyer’s ability to be objective and make effective decisions as well as increase the supplier’s opportunistic behaviour. Our study complements the significance of social capital for ambidextrous orientation. Such empirical evidence may provide a springboard effect for future research to explore the competitive capability-building prospects of social capital.

Recent studies (e.g. [4, 11] argue that SCRes literature has been limited to identifying resilience-building strategies focused on a firm’s supply chain operations, such as sourcing, supply chain visibility, or logistics, etc. To this limitation, our findings identify organizational level capability (organizational ambidexterity) rooted in human resources (such as social capital) and contribute to delineating a comprehensive understanding of resilience-building mechanisms. Our post-hoc mediation analysis shows that there is not only a significant relationship between organizational ambidexterity and SCRes, but structural and relational capital has some direct influence on SCRes as well. From the results of our study, it is clear that firm human resources have a key responsibility to build ambidexterity and to realize the firm capacity to manage the risk and recover from disruptions.

5.2. Implications for practice

Our study offers practical implications for managers facing supply chain disruptions. Our results delineate organizational mechanisms that enable SCRes, namely organizational
ambidexterity as the joint pursuit of adaptability and alignment. Our findings provide clear evidence that managers to better manage supply chain disruptions need to combine alignment and adaptability. In light of disasters like the recent Covid-19 crisis or the Suez Canal blockage, managers seem to emphasize strongly on adaptability, however, particularly the ability of the joint pursuit of aligned and adaptable practices allows firms to better pursue multifaceted capabilities like SCRes. The results show that organizations who can handle trade-offs at the same time (organizational ambidexterity) benefit positively also in other higher-order capabilities (i.e. SCRes). Of course, achieving ambidexterity in an organization is a complex learning process that can be enhanced by the combination of organizational social capital. Having said this, in practical terms, managers need to prepare early for supply chain resilience and invest early into their internal and external social capital as they will be much better equipped to even deal with known unknowns, but even unknown-unknowns. Practically this means, that managers should improve structural and relational capital by increasing face-to-face interactions among employees and preventing bureaucracy from creeping into firm operations and decision making. These aspects enhance organizational members’ capacity to pursue competing tasks and increase the willingness of employees to assist their firms during and after disruptions.

5.3. Limitations and future research

The limitations of our research present an opportunity for further research. First, our findings are based on cross-sectional data, and our data collection methods may have limitations of a perceptual nature. For instance, O’Reilly and Tushman [37] argue that the challenges in measuring an ambidexterity capability may have resulted in limited evidence for the value it offers to businesses. Future research can take a longitudinal or experimental research path to provide a better understanding of how the identified nomological relationships develop among research variables to realize SCRes. Second, although our data captures different industries, it
is limited to firms in the Pakistani market. Chae, et al. [124] highlight the role of context as the reason for contradictory findings of an information technology capability (such as BDA in this research) on firm performance. Future research may explore whether the proposed theoretical model is supported in specific industries in other markets (e.g., Europe & Latin America).

Third, we examined ambidexterity at the firm level. We acknowledge that ambidexterity may occur at the level of individuals or departments; thus, our firm-level observations might present a relatively high-level representation of the nature and impact of ambidexterity. Fourth, this study conceptualized organizational ambidexterity in terms of contextual ambidexterity. Although we believe that the contextual conceptualization is the most appropriate one in the context of our study, future studies on SCRes may want to explore other conceptualizations of ambidexterity (i.e., structural and temporal ambidexterity). For example, a structural ambidexterity perspective may lend itself to studying contrasting SCRes tactics. Finally, our investigation on social capital may represent only one piece of the puzzle in achieving organizational ambidexterity, and future research can extend our research and examine socio-technical perspectives that interact for consistent organizational sense making [125], i.e., how other organizational elements such as data analytics [126] interact/couple with ambidexterity capability when managing the paradoxes of SCREs. We hope further research will utilize, refine, and extend the findings of this study to contribute to a better theory of enabling SCRes.

6. References


### 7. Appendix

Table A: A representative sample of studies to explore SCRes antecedents.

<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>SCRes antecedents</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Um and Han [127]</td>
<td>Survey based study of 342 firms</td>
<td>Supply chain risks (sourcing, manufacturing, delivery)</td>
<td>SCRes capability mediates the relationship between supply chain risks and SCRes. Whereas supply chain risk management strategy moderates the mediation.</td>
</tr>
<tr>
<td>Asamoah, et al. [129]</td>
<td>Survey based study of 110 SMEs</td>
<td>Internal and external social network relationships</td>
<td>A firm's external and internal social networks can be leveraged to enhance its supply chain resilience and customer-oriented performance.</td>
</tr>
<tr>
<td>Durach and Machuca [130]</td>
<td>Survey based study of 229 firms</td>
<td>Supply chain disruption (SCD) management skills, interpersonal SCD information sharing, interpersonal SCD management complementarity</td>
<td>Investments in interpersonal skills and interpersonal complementarity are significant antecedents of both relational and re-deployable firm resilience. Interpersonal dimension in buyer-supplier relationships impacts organizational-level resilience.</td>
</tr>
<tr>
<td>Cheng and Lu [131]</td>
<td>Survey based study of 297 firms</td>
<td>Absorptive capacity, trajectory, operating frontier</td>
<td>Firm’s operating frontier, trajectory and absorptive capacity activities improve proactive and reactive dimension of SCRes.</td>
</tr>
<tr>
<td>Brusset and Teller [19]</td>
<td>Survey based study of 171 firms</td>
<td>External capabilities, integration capabilities, flexibility capabilities</td>
<td>Firm’s external capabilities, integration capabilities, flexibility capabilities enable SCRes.</td>
</tr>
<tr>
<td>Kwak, et al. [132]</td>
<td>Survey based study of 174 firms</td>
<td>Supply chain innovation</td>
<td>Innovative supply chains have a strong positive influence on all dimensions of risk management capability, which in turn has a significant impact on enhancing competitive advantage.</td>
</tr>
<tr>
<td>Chowdhury and Quaddus [133]</td>
<td>Survey based study of 272 firms</td>
<td>Supply chain orientation, learning and development, and supply chain risk management culture</td>
<td>supply chain orientation, learning and development and supply chain risk management culture significantly influence the SCRes.</td>
</tr>
<tr>
<td>Wieland and Wallenburg [134]</td>
<td>Survey based study of 270 firms</td>
<td>Relational competencies (cooperation, communication, integration)</td>
<td>Communicative and cooperative relationships have a positive effect on resilience. Improved resilience enhances a supply chain's customer value.</td>
</tr>
</tbody>
</table>
A fit between the information processing requirements of a firm and its information processing capability leads to greater ambidexterity (exploitation and exploration), which in turn improves supply chain resilience (SCR) in the form of agility, redundancy and flexibility.