Exploring Organizational Resilience from an Inter-organizational Perspective: Relational Resilience based on Business Ecosystems in China

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Exploring Organizational Resilience from an Inter-organizational

Perspective: Relational Resilience based on Business Ecosystems in China

BY

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Abstract

Resilience in organizations has been viewed as a strategy to manage risk and uncertainty. It is generally defined as the ability of an organization to positively adjust and maintain functioning before, during and following adversity. Prior research has largely focused on cognitive and behavioral aspects of organizational resilience highlighting how an organization coordinates its members to make sense of and respond to adversity. A consensus has emerged from prior studies that relational connections within and outside of an organization provide a context in which resilience is activated. There is an emerging research stream that explicitly explores the concept of relational resilience. These studies, however, focus on intra-organizational collaborations, rather than inter-organizational collaborations, which are equally important for organizational resilience but remain largely unexplored.

Rooted in System Theory, organizations have been conceptualized as open systems that constantly interact with the environment in order to acquire critical resources and capabilities needed for their function and survival. In the field of strategy and management, organizational environment constitutes a variety of economic actors (e.g., suppliers, customers, regulators, competitors) and technology with which an organization has to define and manage its relationships in order to pursue its goal (e.g., profit-seeking or non-profit activity). In the face of a globalized and digitalized world economy, the environment in which organizations operate has become more complex and turbulent than ever before due to an increasing number of diverse external

factors on which organizations depend as well as the intensity of changes exhibited by these factors. The survival of organization is critically determined by how well an organization manages its relationships with the environment in order to sustain the continuous flow of resources and information.

Drawing upon the perspective of inter-organizational relationships (IORs), this thesis employs an inductive qualitative approach to investigate how an organization copes with disruption through its external relationships with other organizations in its business ecosystem. Through a two-staged data collection process, this thesis completes four empirical studies including (1) investigating key activities conducted at the boundaries between organizations in twenty-two business ecosystems, (2) identifying fourteen IOR attributes and six distinct dynamic patterns of IOR, (3) identifying one hundred and thirty-seven events that have been categorized into four types of organizational disruption (e.g., mounting-narrow, mounting-broad, sudden-narrow, sudden-broad) and (4) synthesizing the findings from these three studies using a Fuzzy Cognitive Mapping technique in a second-round data collection, leading to a typology of relational resilience. By shifting research attention from intra-organizational collaboration to inter-organizational collaboration in the context of Chinese business environment, this study provides fresh theoretical and empirical insights of relational resilience and contributes to the emerging literature of resilience activation in organizations.

Keywords: Organizational Resilience; Inter-organizational Relationships; Disruption; Uncertainty; Business Ecosystems; China

Table of Contents

List of Tables

List of Figures

11

List of Abbreviations

BE	Business ecosystem
BOB	Between-organization boundary
CEO	Chief executive officer
COO	Chief operation officer
CTO	Chief technical officer
DS	Disruptive space
FDA	Food and drug administration
IOR	Inter-organizational relationship
IT	Institutional theory
MBD	Mounting broad disruption
MND	Mounting narrow disruption
MNE	Multinational enterprise
KBV	Knowledge-based view
POE	Privately-owned enterprise
RBV	Resource-based view
RDT	Resource dependence theory
SBD	Sudden broad disruption
SDE	Spatial dimension of event
SOE	State-owned enterprise
SND	Sudden narrow disruption
ST	Stakeholder theory
TCE	Transaction cost economics
TDE	Temporal dimension of event

Declaration

I hereby declare that the thesis entitled, *"Exploring Organizational Resilience from an Inter-organizational Perspective: New Empirical and Theoretical Approaches based on Business Ecosystems in China"*, has been genuinely composed by myself except where stated in acknowledgement and that the work has not been submitted to any other University or similar institution for a degree.

Statement of Copyright

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Chapter 1 Introduction

1.1 Research Background

In the face of a globalized and digitalized world economy, the environment in which organizations operate has become more complex[1] and turbulent[2] than ever before, generating a greater level of uncertainty for organizations. Examples of organizations that fail to survive in this uncertain environment are plentiful. According to Milliken (1987), environmental uncertainty includes a range of situations organizations face: (1) failure to predict the probabilities of the occurrence of future events; (2) the inability to accurately picture outcomes at a particular point in time when making decisions; and (3) the inability to understand causal relationships due to a lack of information. Such uncertain situations can be intensified by novel events such as the current onslaught of COVID-19 creating significant uncertainty or even suffering for a wide range of stakeholders. As reported in a McKinsey & Company article (Sneader & Singhal, 2020), "we will witness a dramatic restructuring of the economic and social order in which business and society have traditionally operated".

This episode reminds us of the fundamental question of how organizations manage different aspects of uncertain environments. Strategy scholars suggest that organizations can manage uncertainty by either hedging and delaying resource commitments (Kogut & Kulatilaka, 2001; McGrath,

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[1] Complexity refers to a number of diverse external factors organizations face (Bourgeois, 1980)

[2] Turbulence refers to the degree of change exhibited by the external factors (Bourgeois, 1980)

2006) or rapidly reconfiguring resources in dynamic environments (Eisenhardt & Martin, 2000; Teece, 2007). Whilst both perspectives have made insightful and important contributions to our understanding of how organizations cope in uncertain environments, organizational survival does not merely rely on the ability of managing resources but also on the ability to manage any adversity (Sutcliffe & Vogus, 2003) that emerges from environmental uncertainty this being, *organizational resilience.*

The word, resilience is related to, *resile*, the Latin for "jump back" or "recoil" (Merriam-Webster, 2020). Resilience in business is used to describe "the quality of being able to return quickly to a previous good condition after problems" (Cambridge Dictionary, 2020). The concept has increasingly been acknowledged as a crucial capability for an organization to survive over the long-term in an uncertain environment (Burnard & Bhamra, 2011; Linnenluecke, 2017; Ortiz-de-Mandojana & Bansal, 2015). As Williams, Gruber, Sutcliffe, Shepherd, & Zhao (2017) note, resilience in organizations generally refers to the ability of entities (e.g., individuals, organizations, systems) "to react to and recover from duress or disturbances with minimal effects on stability and functioning" (p. 740). This includes (1) the ability to anticipate and respond to adversity (Hamel & Valikangas, 2003; Ortiz-De-Mandojana & Bansal, 2015; Wildavsky, 1988), (2) the capacity to absorb adversity (Burnard & Bhamra, 2011; Meyer, 1982; Lengnick-Hall, Beck, & Lengnick-Hall, 2011; Sajko, Boone, & Buyl, 2020), and (3) the ability to positively adjust and adapt into new environments (Fiksel, 2006; Gittell, Cameron, Lim, & Rivas, 2006; Kamalahmadi & Parast, 2016; Sutcliffe & Vogus, 2003; Wildavsky, 1988).

Notwithstanding, research into organizational resilience is a burgeoning field in which there is a lack of a commonly agreed definition of the concept. Table 1 shows variations in the definitions of organizational resilience across different studies. The lack of an agreed definition highlights some important issues concerning existing resilience research. First, the existing literature on resilience in organizations seems to have been developed separately and at different levels. At the individual employee level, resilience has been conceptualized as a factor of psychological capital built through developmental processes (Luthans, Avolio, Walumbwa, & Li, 2005). At the organizational level, resilience refers to the ability of an organization to positively adjust to adverse situations, while maintaining desirable functions (Sutcliffe & Vogus, 2003) or innovating new business models (Hamel & Valikangas, 2003). At the system level, supply chain resilience focuses on the design principles of supply chain networks at different stages, designed to avoid or limit the impact of disruptions (Kamalahmadi & Parast, 2016). While research on resilience at various levels of analysis has advanced our knowledge, each research stream only provides a limited account of resilience in organizations. As also noted by Linnenluecke (2017), conceptual similarities and differences in organizational resilience developed across different research streams have not been fully explored.

Second, the research context of resilience research varies across different studies. Hallgren, Rouleau, & Rond (2018) identify three broad contexts: risky context, emergency context and disruptive context on which the majority of resilience-related studies are conducted. Risky contexts refer to situations in which entities (e.g., individuals, organizations) are constantly

exposed to potentially extreme events. Resilience in this context emphasizes how entities (e.g., individuals, organizations) anticipate and avoid negative consequences that would otherwise accumulate and lead to a major crisis. Emergency and disruptive contexts refer to situations in which the actual disruptive event occurs and interrupts the activities of business operations and strategies. The main difference between these two contexts is the location in which disruption occurs, i.e., at the core activities of business or externally. Scholars in these contexts investigate how entities respond to and learn from disruption for future resilience provision. Notably, existing empirical studies on resilience predominantly focus on high profile and high impact events. These include a series of large-scale industrial accidents or disasters between the 1980s and 1990s (Linnenluecke, 2017), the aftermath of 9/11, the school gun shootings (Powley, 2009), the Mann Gulch disaster (Weick, 1993), the roof collapse of a museum (Christianson, Farkas, Sutcliffe, & Weick, 2009) or the aftermath of the Haiti earthquake (Williams & Shepherd, 2016). It is not surprising that a case-based approach using interview, archive sources, or second-hand literature, is a common methodological tool for studying resilience (Linnenluecke, 2017; Hallgren, Rouleau, & Rond, 2018). While these studies have advanced our understanding of the causes and effects of disruption, they raise questions regarding the transferability and generality of the insight generated from context specific events, not least because such full-blown disruptions only rarely occur (Kahn, et al., 2018).

Authors/year	Definition
Meyer (1982)	"Resiliency occurs when responses create negative-feedback loops that absorb jolts" (p. 1982)
Wildavsky (1988)	"the capacity to cope with unanticipated dangers as they become manifest, learning to bounce back." (p. 77)
Sutcliffe & Vogus (2003)	"the maintenance of positive adjustment under challenging conditions" (p. 95)
Hamel & Valikangas (2003)	"the ability to dynamically reinvent business models and strategies as circumstances change"
Luthans, Avolio, Walumbwa, & Li (2005)	"positive psychological capacity to rebound, to 'bounce back' from adversity, uncertainty, conflict, failure or even positive change, progress, and increased responsibility" (p. 2002)
Gittell, Cameron, Lim, & Rivas (2006)	"the dynamic capacity of organizational adaptability that grows and develops over time" (p. 303)
Fiksel (2006)	"the capacity for an enterprise to survive, adapt, and grow in the face of turbulent change" (p. 16)
Lengnick-Hall, Beck, & Lengnick-Hall (2011)	"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." (p. 244)
Burnard & Bhamra (2011)	"the ability to withstand systematic discontinuities as well as the capability to adapt to new risk environments" (p. 5583)
Ortiz-De-Mandojana & Bansal (2015)	"the ability of organizations to anticipate, avoid, and adjust to shocks in their environment" (p. 1615)

Kamalahmadi & Parast (2016)	"the adaptive capability of a supply chain to reduce the probability of facing sudden disturbances, resist the spread of disturbances by maintaining control over structures and functions, and recover and respond by immediate and effective reactive plans to transcend the disturbance and restore the supply chain to a robust state of operations" (p.121)
(Sajko, Boone, & Buyl, 2020)	"a system's latent ability to endure despite adversity and to recover and maintain its existing structure after a shock."

Table 1 Selected definitions of organizational resilience (1982-2020)

1.2 Research Gap

Despite these variations, what is in common across all studies is that resilience entails coordination and collaboration amongst stakeholders at the different stages of disruption (before, during, after). For instance, Ortiz-De-Mandojana & Bansal (2015) point out that stakeholders serve as 'an early warning system for shocks by providing valuable information such as changes in regulation and new technologies, which allow organizations to prepare for and respond to environmental change. In the face of adversity, Powley (2009, p. 1294) finds that resilience is "a latent capacity in organizations built overtime through social interaction and relationships". Similarly, Weick & Roberts (1993) find that resilience can be enacted through heedful interrelating. Williams, Gruber, Sutcliffe, Shepherd, & Zhao (2017, p. 742) also describe resilience as "an interactive process of relational adaptation" amongst stakeholders to understand and respond to variations emerging from the changing environment, while maintaining stability and

continuing to function. Notwithstanding, extant theorizing tends to frame organizational resilience as an outcome or capacity (Lengnick-Hall, Beck, & Lengnick-Hall, 2011; Kahn, et al., 2018), which focuses on how an organization builds or improves internal resources and capabilities to sustain its performance in the context of adversity. Little insight has been offered to understand how the relational dynamics amongst stakeholders activate resilience in organizations and the conditions under which the patterns of relational dynamics emerge. As also noted by Linnenluecke (2017), this line of research has currently been under-developed.

More recently, there has been an increasing interest amongst scholars who have explicitly explored the relational dynamics underlying organizational resilience (Barton & Kahn, 2019; Kahn, Barton, & Fellows, 2013; Kahn, et al., 2018; Olekalns, Caza, & Vogus, 2020). These works, however, primarily focus on *intra-organizational* collaborations (team, or group resilience within an organization), rather than *inter-organizational* relationships. The survival of organizations does not merely rely on internal resources and capabilities but also critically depends on their ability to manage the task environment, which involves a great variety of stakeholders (e.g., customers, suppliers, regulators, competitors [Dill, 1958]). As highlighted by Williams, Gruber, Sutcliffe, Shepherd, & Zhao (2017), resilience is the ability of an actor (individual, organization, or community) "to build and use its capability endowments to interact with the environment in a way that positively adjusts and maintains functioning prior to, during, and following adversity" (p. 742). Williams, You, & Joshua (2020) find that reciprocal interaction with valuable partners is essential for small-business

resilience. Literature on supply chain resilience suggests that collaboration between a focal organization and its external partners is a key principle of resilience (Christopher & Peck, 2004; Kamalahmadi & Parast, 2016), although they narrowly focus on supplier-buyer relationship. When disruption occurs, its effects often extend beyond the dyadic supplier-buyer relationships and can quickly permeate throughout a whole value chain, resulting in a major crisis (Craighead, Blackhurst, Rungtusanatham, & Handfield, 2002). To date, it remains largely unexplored in theory and practice how organizations manage adversity by utilizing their external relationships with other organizations. Challenges facing today's organizations, such as political and economic uncertainties, natural disasters (e.g., an influenza, earthquakes, floods), terrorism, and disruptive technology, have heightened the need to understand how organizations survive in a contemporary environment where they are increasingly interconnected and interdependent.

1.3 Research Aim

To address this issue, the present study intends to investigate organizational resilience from the perspective of inter-organizational relationships (IORs). Oliver (1990, p. 241) defined IORs as "relatively enduring transactions, flows, and linkages that occur among or between an organization and one or more organizations in its environment". Since the 1950s, the concept of open systems has become central to organization theory (Bourgeois, 1980; Evan, 1993; Katz & Kahn, 1966). Organizations have been conceptualized and researched as being open systems that constantly interact

with their environments for critical resources and capabilities (Pfeffer & Salancik, 1978).

In the field of strategy and management, the environment commonly refers to the task environment as consisting of customers, suppliers, competitors, regulators (Dill, 1958) and technology (Duncan, 1972), with which an organization has to define and manage its relationships in the pursuit of its goals (e.g., profit-seeking and non-profit activity) (Bourgeois, 1980). The implication of this is that organizations are embedded in a nexus of relationships with a great variety of stakeholders that facilitate the flow of resources necessary for organizational survival and growth. Kahn, Barton, & Fellows (2013) metaphorically described relationships with stakeholders as "the nervous system of the organization." (p. 378)

In recent years, there has been an impressive accumulation of IOR studies that are rooted in several theoretical paradigms, ranging from economic theories (e.g., TCEs) to behavioral theories (e.g., Institutional Theory) (Barringer & Harrison, 2000; Child, Faulkner, Hsieh, & Tallman, 2019; Oliver, 1990) (see Table 2). Needless to say, these theories have provided and will continue to provide important lens to assist understanding complex IOR phenomena (e.g., strategic alliances and inter-organizational networks). The current consensus is, however, that no single grand theory captures the complexity of IORs involving various types of motives, commitments and investments from a wide variety of partners pursuing shared goals (Albers, Wohlgezogen, & Zajac, 2016; Barringer & Harrison, 2000; Provan, Fish & Sydow, 2007). This is because the development of classical theories follows the principle of parsimony and the adoption of these

theories in the study of IORs is to address the particular issues or challenges organizations face at the time relating to economics, social-politics or technology (He, Meadows, Angwin, Gomes, & Child, 2020). Notably, most IOR studies based on these theories tend to focus on a dyadic relationship (Provan, Fish & Sydow, 2007), which does not reflect the reality that organizations tend to develop and maintain multiple kinds of relationships with one another to gain 'greater flexibility', 'more stable exchange relationships and 'the ability to adopt tailored innovations' (Shipilov, Gulati, Kilduff, Li, & Tsai, 2014). Although scholars have attempted to address this situation by drawing from a particular selection of theories, there is a fairly limited number of concepts and theories consistently appearing in the core research endeavors (Oliver & Ebers, 1998). As also noted by He, Meadows, Angwin, Gomes, & Child (2020), there is a lack of effective research instruments that bring different theories together and draw conclusions in the field of IORs.

Following the perspective of relational pluralism (Shipilov, Gulati, Kilduff, Li, & Tsai, 2014), this study first has taken an ecosystem approach (Adner, 2017; Jacobides, Cennamo, & Gawer, 2018) to study the characteristics of the various relationships of an organization with other organizations. The word, 'ecosystem' emerged in the 1930s in referring to "a localized community of living organisms interacting with each other and their particular environment of air, water, mineral soil, and other elements" (Eamonn, 2015, p. 3). Since its first introduction to the business world (Moore, 1993), it has become a manifestation of how organizations manage interdependences across different types of actor and activity (Adner, 2017).

The business ecosystem refers to an economic community constituting a number of actors (e.g., individuals, organizations, institutions) that affect each other through their activities (Jacobides, Cennamo, & Gawer, 2018) "for their mutual effectiveness and survival" (Iansiti & Levien, 2004, p. 8).

Although the ecosystem approach shares some common characteristics with other approaches in understanding how organizations are interconnected and interdependent (e.g., supply chains/value chains), it distinguishes itself from them in many ways. First, it broadens the scope of research by including actors who do not fit in the traditional category of suppliers but rather as 'complementors' in the ecosystems. As Dattee, Alexy, & Autio note (2018, p. 468), "moving to an ecosystem perspective may fundamentally broaden the heterogeneity of actors a company may address and hence, the value the firm may create." This can include arm's-length market relationships, which are excluded in previous IOR studies (Dyer & Singh, 1998) and relationships with competitors across a variety of industries to support the development of new products and services that satisfy customers' needs (Moore, 1993). Second, it allows non-linear connections amongst heterogeneous actors within ecosystems. This provides a new way of understanding the non-decomposable relationships existing amongst organizations that affect the performance of a firm (Adner, 2017). Third, it highlights that although the actors in an ecosystem face similar governance rules set by lead organizations (e.g., platform leaders), an ecosystem does not have the hierarchical controls of the traditional networks such as Kieretsus (Japan) or Chaebols (Korea) in the sense that "all members retain residual control" (Jacobides, Cennamo, & Gawer, 2018, p. 2266).

This study asserts that employing the ecosystem approach not only provides a new way of understanding the value creation and capture relationships between interconnected organizations, but also provides the dynamic contexts in which organizations work together for shared tasks in the pursuit of resilience. This makes a significant contribution to this study and addresses the main research question of how organizations manage relationships external to the organization itself to deal with uncertainty and to sustain the flow of resources and information for their resilience (Benson, 1975; Oliver, 1990).

Theoretical perspective	Key assumptions	Key applications/ outcomes in IOR research	Key mechanisms	Authors
Transaction cost economics (TCE) (Williamson, 1981, 1985)	Human behaviors: bounded rationality and opportunism	Contractual negotiation Risk management of opportunistic behaviors The study of factors that trigger or influence partners' opportunistic behavior The impact of opportunism on performance	Formal governance mechanisms (i.e., contract or contractual negotiation on various terms) Informal governance mechanisms (i.e., trust and control)	Das & Teng (1998) Judge & Dooley (2006) Hennart (1988) Dyer (1997)
Resource-based view (RBV) (Barney, 1991, 2001)	Firms' competitive advantages originate from a bundle of tangible and intangible resources possessed by firms, and these resources are inimitable	Motives of IOR formation (strategic choice and social opportunities) The impact of IOR structure (equity or non-equity based IORs) Resource-seeking and complementarity for mutual benefit Collaborative strength in achieving economies of scale and scope	Strategic fit assessment Small business networks and alliances	Eisenhardt & Schoonhoven, (1996) Das & Teng (2000) Street & Cameron (2007)
Knowledge-based view (KBV) (Grant, 1996)	Knowledge is an important productive resource (i.e., explicit knowledge can help a firm to achieve economies of scale and scope; tacit	Motives of IORs (i.e., knowledge specialization, strategic integration) Outcomes of IORs (i.e., improving the efficiency of production through which	Technology sharing Personnel transfers Knowledge learning Knowledge acquisition Knowledge accessing Knowledge articulation	Grant & Baden-Fuller (2004) Kale & Singh (2007) Inkpen & Dinur (1998)

	knowledge can enhance the ability to innovate). Organizations engage in a variety of knowledge management processes	knowledge is integrated or utilized in accessing knowledge) The role of knowledge learning in the success of IORs. The process of knowledge creation in international joint ventures Antecedents for IORs' sustainability	Knowledge utilization Interorganizational interaction	(Choi & Lee, 1997)
Resource dependence theory (RDT) (Pfeffer & Salancik, 1978)	Organizations have to acquire critical resources from other organizations in their environment for their survival. To reduce the uncertainties associated with resource dependence, organizations require control over critical resources in order to decrease their dependence on other organizations and increase other organizations dependence on them.	Motives of IOR formation (i.e., mutual dependence, scarcity of resource, complementary assets) The impact on the forms of IORs (M&A, interlocks, consortiums, trade association) Outcomes of IORs (i.e., creating unique resource, sustaining competitive advantage) Management of external interdependencies (i.e., boards of directors) Inter-organizational power	Bargaining power organizational autonomy and legitimacy Strategic resource control The role of boards of directors	Drees & Heugens (2013) Oliver (1990) Dyer & Singh (1998)
Institutional theory (IT) (DiMaggio & Powell, 1983;	Organizations are embedded in institutional environments in which prevailing norms and	Motives of IOR formation (institutional pressures, improving social and	Inter-organizational governance structures Collaborations	Dacin, Oliver, & Roy (2007) Oliver (1990, 1991)

Meyer & Rowan, 1977)	rules impose pressures on them. Organizations have to legitimate and conform to these social norms, requirements and rules of their business environment for their survival.	industrial legitimacy; reducing regulatory pressures)	Preference of partners' selection Organizational learning Legitimatization mechanisms	
Stakeholder theory (ST) (Donaldson & Preston, 1995; Freeman, 1984)	An organization has multiple relationships with stakeholders (i.e., suppliers, customers, employees, governments, communities, trade associations) that affect and are affected by its decisions.	A firm's ethics for managing relationships with its stakeholders can lead to the development of close relationships capability, which offers sustainable competitive advantage.	Relational contracts Joint wealth creation High levels of mutual trust and cooperation Communal sharing of property Equality matching	Jones, Harrison, & Felps (2018) Bridoux & Stoelhorst (2016)

Table 2 Commonly used theories in IOR research

1.4 Research Question

The central research question concerns how an organization copes with disruption through its external relationships with other organizations in its business ecosystem. To address this research question, I conducted four empirical studies through a two-staged data collection and analysis process that progressively leads to new insights and answers the main research question (see Figure 1). The first three studies explore: (1) the activities between organizations that form and maintain IORs in the context of business ecosystems, (2) the attributes of IORs within the ecosystems, and (3) the nature of disruption experienced by organizations within the ecosystems. By employing a Fuzzy Cognitive Mapping approach (Özesmi & Özesmi, 2004) in the second-round data collection, the final study synthesizes the findings in previous three studies and provides the final answer to the main research question.

- *RQ1 What are key activities conducted with other organizations in the context of business ecosystems?*

  - **Study One (Chapter 3): Investigating activities in business ecosystems**

- *RQ2 What are the characteristics of IORs in business ecosystems that maintain and facilitate the flow of these activities?*

  - **Study Two (Chapter 4): Exploring attributes and contingencies of IORs in business ecosystems**

- *RQ3 What is the nature of disruptions in organizations?*

  - **Study Three (Chapter 5): Unpacking the nature of organizational disruption**

- *RQ4 How do IORs impact on resilience in the context of disruption?*

  - **Study Four (Chapter 6): A relational view: organizational resilience**
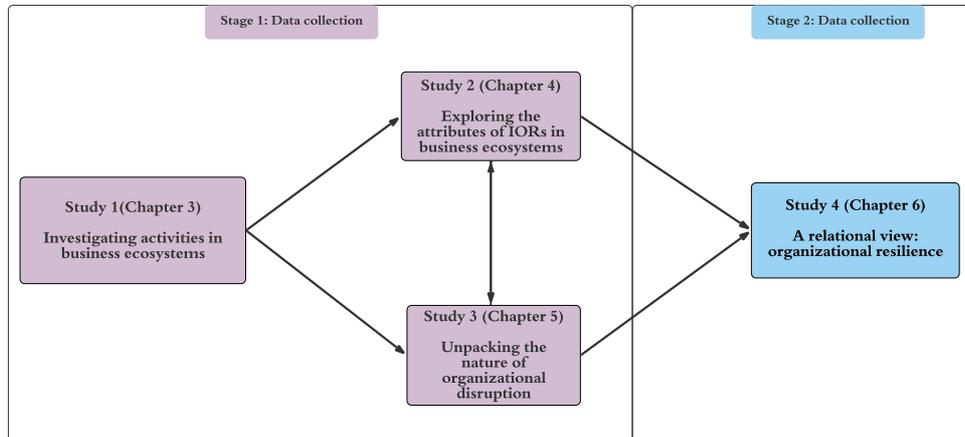
Figure 1 Study overview

The research setting is in the Chinese business environment which provides a natural laboratory for this study. First, China as a transition economy has experienced rapid changes as a result of its industrial reform, socio-economic development, technological advancement, and foreign direct investment, amongst other aspects. Rooted in ancient Eastern thinking, the Chinese ideogram for 'crisis' (Wei Ji 危机) combines two separate symbols: danger and opportunity (Williams & You, 2020). The changes that are happening in China, on the one hand, have provided opportunity for the development of businesses, especially in private sector, and on the other hand, they have generated a great variety of adversity. As noted by business practitioners and scholars (e.g., Cooke, 2009; Quer, Claver, & Rienda, 2007; Meuer, 2014), firms in the Chinese business environment have to continually respond to unpredictable but frequent disruptions in the sense that urgent

decisions must be made in an unknown and uncertain environment and this, for many outsiders, has gone relatively unnoticed. Second, research on IORs has been dominated by the Western view. There is a stream of thought that emphasizes the cultural construct of guanxi used as a governance mechanism of IORs in China (Park & Luo, 2001; Xin & Pearce, 1996). The role of guanxi in business, however, has gradually shifted from being a necessary and determining factor in relationship formation to becoming a latent factor following China's transition and the improvement of the national legal system (Millington, Eberhardt, & Wilkinson, 2006). Zhang & Keh (2009) observe that there is a trend towards a mix of contractual and relational governance mechanisms being employed in inter-organizational exchanges in China (Zhang & Keh, 2009). Little work has been done to advance our understanding of the potential contingent nature of attributes of IORs in China.

1.5 Dissertation Outline

This dissertation consists of seven Chapters in total. Given that the research field is still nascent, the thesis starts by justifying and explaining the research methods adopted (Chapter 2), followed by four empirical studies from Chapter 3 to Chapter 6. Each of the empirical studies is presented in the format of aim, literature review, method, findings and discussion. Chapter 3 (Study 1) gains a comprehensive understanding of the multiple exchange activities occurring at between-organization boundaries (BOBs) within the ecosystems that form and maintain IORs in the context of business ecosystems based in China. Drawing from the findings in Chapter 3, Chapter 4 (Study 2) explores the attributes of IORs and the patterns of these IOR

attributes within activity-based between-organization boundaries (BOBs). Chapter 5 (Study 3) is a dedicated chapter with the aim of understanding the nature of organizational disruption in business ecosystems. Understanding the nature of disruptions that organizations experience is essential to study organizational resilience because it provides conditions under which resilience is enacted. Based on the findings in Chapter 4 and Chapter 5, Chapter 6 (Study 4) is a synthesis study by employing a Fuzzy Cognitive Mapping approach (Özesmi & Özesmi, 2004) in a second-round of data collection and analysis to explore how different attributes of IORs impact on organizational resilience in the different contexts of disruption. This provides an answer to the main research question. The final chapter (Chapter 7) provides an integrated discussion including the development of a new typology for understanding relational resilience, implications for theory and practice, as well as conclusions for a future research agenda.

Chapter 2 An Inductive Qualitative Approach

2.1 Aim

The aim of this chapter is to provide a detailed overview of the most suitable research process for this study. The research approach, design, methodology and data collection methods will be outlined. Each of the following four empirical chapters detail the specific method used, the technique for analyzing data and the quality of the implications. The present chapter begins by exploring the ontological and epistemological underpinnings of the research.

2.2 Philosophical Position

Ontology offers a continuum of positions between two distinct schools of thought concerning what constitutes social reality: objectivism and constructivism (Burrell & Morgan, 1979). The objectivist perspective suggests that the existence of social phenomena and their meanings are independent of social actors, while in contrast the constructivist view is that social phenomena are created by interactions among social actors, which also change over time (Bryman & Bell, 2007). Following this, it is argued that studying organizational resilience in a relational context revolves around interactions among social actors within organizations, giving the research a dynamic nature. Continual interactions among social actors in a dynamic environment lead to new phenomena or cause existing phenomena to change. This implies that such changes create a gap in which existing theory is insufficient to explain the new or little understood phenomena. Therefore, as

Gephart (2004, p. 457) suggests, research on phenomena for which there is little available theory may focus on analyzing "the actual production of meanings and concepts used by social actors in real settings." This view is consistent with that of the researcher: organizational resilience and inter-organizational relationships are constructs depending on social actors within organizations. Based on this reasoning, the research uses a constructivist approach in order to reflect the nature of the field being researched, which would otherwise lead to compromised research outcomes.

Following the identification and justification of the ontological approach in this research, the next step involves the identification of the epistemological position of the research. Epistemology is concerned with how knowledge is generated and validated to reflect existential social reality (Blaikie, 2007; Grix, 2002). While there is a range of different epistemological positions, the most dominant epistemological stances are positivism and interpretivism (Grix, 2002). Positivism requires the application of methods from the natural sciences to study social reality and beyond (Grix, 2002), whereas interpretivism advocates including social roles and their interactions in generating knowledge (Saunders, Thornhill & Lewis, 2009). Like ontology, the distinct contrast between the two perspectives can be viewed as a continuum with positivism at one end and interpretivism at the other, as is shown in Figure 1 (Burrell & Morgan, 1979; Kuhn, 2012). This also implies that, despite studying the same social phenomena, different research methodologies can be applied which in turn lead to different outcomes (Grix, 2002).

Constructivism ◄————————— Ontology ————————► Objectivism

Interpretivism ◄————————— Epistemology ————————► Positivism
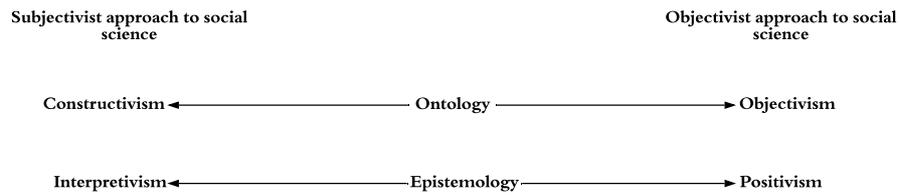
Figure 2 Subjective and objective dimensions (Burrell & Morgan, 1979)

Critically reflecting on the nature of the research and the ontological approach of the study, interpretivism presents a more logical choice to better understand how organizations cope with disruptions by utilizing their connections with external organizations. Moreover, given the ever-increasing complexity and uncertainty in environments, disruption as a key part of this study is subjective in nature. As a result of this, it would be unsuitable to use a positivistic approach to research subjective phenomena because it would not make it possible to reflect the full reality of organizational responses to different types of disruption and so would not allow the nature of the relationships and the connections between the different research components to be explained (Bryman & Bell, 2007).

The approach this research takes is a common choice in social research as the constructivist ontological approach is often combined with an interpretivist epistemological perspective (Burrell & Morgan, 1979; Saunders, Thornhill & Lewis, 2009). More precisely, this approach assumes that humans are active, aware of what is happening and capable of making conscious choices about actions (McNeill & Chapman, 2005). As the research is an exploratory study to understand relational mechanisms that help organizations to cope with disruptions from the viewpoint of their decision-

makers, the research relies on qualitative data, focusing on the interpretation of characteristics, qualities and inherent traits (Grix, 2002; Landman, 2000).

2.3 Research Logic

Having identified constructivist interpretivism as the most appropriate approach, this inevitably means that an inductive research logic is the most suitable. As Figure 2 shows, a deductive approach aims to prove or disprove hypotheses developed from existing theories (Grix, 2002). In contrast, an inductive approach tends to generate knowledge from conclusions, which then leads to theories or abstract ideas (Grix, 2002). As there is a dearth of theoretical and empirical studies on the relationship between organizational resilience, inter-organizational relationships and disruption, an inductive approach appears to be more appropriate given the exploratory nature of the research.
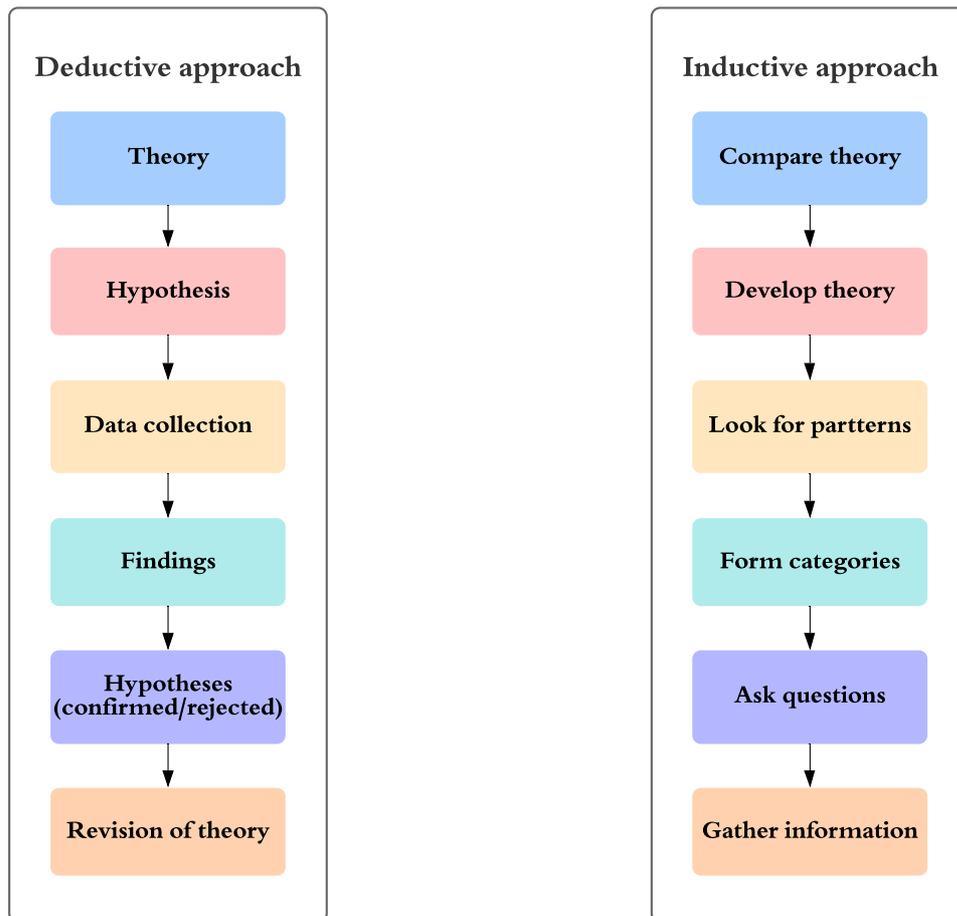
Figure 3 Process of deduction and induction (Bryman & Bell, 2007)

2.4 Research Methodology

Following the above justifications of the philosophical assumptions and the research logic, it is appropriate for the choice of methodology to be aligned with the subjective nature of the study (Creswell & Clark, 2007). In the literature on methodology, there are four common methodologies that are acknowledged to contribute to knowledge generation in a constructivist interpretivist approach (e.g. Bryman & Bell, 2007; Saunders, Thornhill & Lewis, 2009). These are action research, case studies, ethnographic research and grounded theory.

Action research involves researchers at multiple levels in organizational situations promoting change in processes of diagnosing, planning, taking action and evaluating outcomes (Saunders, Thornhill & Lewis, 2009). The case study approach is generally used to investigate specific contemporary phenomena on the basis of a restricted sample of a population studied in detail (Grix, 2002). This is also a popular approach for studying resilience in organizations and management (Linnenluecke, 2017). The advantage of the case study methodology is that it allows the researcher to evaluate different sources of evidence (Saunders, Thornhill & Lewis, 2009) and combine a variety of quantitative and qualitative methods to generate knowledge about contemporary phenomena (Grix, 2002).

Ethnographic research is rooted in anthropology and aims to explain social reality from the perspective of inhabitants who are embedded in a social phenomenon (Saunders, Thornhill & Lewis, 2009). Researchers are required to engage in the culture or language setting over a period of time and experience the social world being researched. This approach is commonly used to study behavioral patterns involving symbols, language and members of groups (Grix, 2002).

The last most common research methodology is grounded theory, which was introduced by Glaser & Strauss (1967). This approach is viewed as the purest example of theory-building. It uses a combination of inductive and deductive research logics to predict or explain behaviors in social and cultural contexts (Saunders, Thornhill & Lewis, 2009). The grounded theory approach, however, does not entail particular data-collection methods, which implies that various forms of data collection can be employed (Denzin & Lincoln, 2000).

Having discussed the most commonly applied research methodologies, it is apparent that action and ethnographic research are not suitable for this study. This is because the research aim is not to understand the management of change in which action researchers, for example, are involved in the process of diagnosing, planning, taking actions and evaluating outcomes. Although ethnographic research aims to understand the relationship between various concepts, which is similar to the aim of this study to understand the relationships between organizational resilience, inter-organizational relationships and disruptions, it concentrates on the behavioral patterns involving groups, language and symbols. This does not align with the objective of the current research: to focus on the dynamics of multiple dyadic relationships with external partners in shaping resilience in contexts of disruption.

The case study approach and the grounded theory approach appear much more suitable for this study, which has a reflective exploratory and explanatory nature. Given the importance of aligning the methodological approach and the philosophical assumptions of the research, Ellram's integrative classification framework (Ellram, 1996) is employed to further compare the suitability of these two methodologies in Table 1. This shows that both methodologies fit three research objectives: explanation, description and prediction. The case study methodology, which explores phenomena to generate knowledge (Mills, Durepos & Wiebe, 2010), also fits the exploration objective while grounded theory does not.

Research Objective

	Exploration	Explanation	Description	Prediction
How	Case study	Case study Grounded theory		
Why		Case study Grounded theory		
Who, what, where			Case study Grounded theory	Case study Grounded theory

(Research Question — vertical axis label)

Table 3 Classification of research methodologies (Ellram, 1996)

2.5 Research Position in Radical Theorizing

To further evaluate the suitability of these two methodologies, it is necessary to understand the type of phenomenon being investigated and the state of current theory in the field. Borrowing from research on innovation, organizational learning and the philosophy of science, Nadkarni and colleagues (2018) develop a typology of radical theorizing based on two dimensions: the type of phenomenon being investigated (new and little understood vs. established but narrowly understood) and the state of current theory (insufficient existing theory vs. pertinent distal theory). This radical theorizing framework is employed to aid the decision on the choice of methodology.

The radical theorizing framework suggests four approaches, as is shown in Figure 4: inductive theory generation, evocative theoretical boundary spanning, theoretical consensus shifting and diverse theoretical integration.

Type of phenomenon

Figure 4 Approaches to radical theorizing (Nadkarni et al., 2018)

The first approach, "inductive theory generation," aims to generate a new theory in order to fill a gap between new and little understood phenomena and insufficient existing theory. The grounded theory approach is widely used because it pays much attention to "the actual production of meanings and concepts used by social actors in real settings" (Gephart, 2004, p. 457), which serves as a basis for theory-building. The second approach labelled "evocative theoretical boundary spanning," borrows established theories from distal disciplines to explain new phenomena which are not substantially explained by existing theories. In contrast to the inductive approach, which focuses on actual observations as a basis for theory building, this approach allows researchers to construct theories, test the application of theories from other disciplines and build theories from actual observations. The third approach, "theoretical consensus shifting," indeed challenges assumptions and logics that are the taken for granted in established theories. It suggests that it is possible to reconceptualize seemingly well-understood phenomena through a completely new theoretical lens. Finally, "diverse

44

theoretical integration" aims to shed light on an issue by bringing two established perspectives together to gain a holistic understanding of phenomena.

Critically reflecting on the nature of the research shifts the focus on organizational resilience from (1) an intra-organizational orientation (e.g. Weick, Sutcliffe & Obstfeld, 1999; Sutcliffe & Vogus, 2003) to an inter-organizational orientation and (2) from extreme research contexts (e.g. Christianson, Farkas, Sutcliffe & Weick, 2009; Williams & Shepherd, 2016) to the broader contexts in which businesses operate, including subjective environments (e.g. perceived disruption). The current research best fits in the radical theorizing framework's top right quadrant: theoretical consensus shifting. Therefore, a case study methodology appears more appropriate to explore existing phenomena through different theoretical lenses.

Nevertheless, the methodology literature also suggests that the nature of the data to be collected plays a key role in identifying the necessary research methodology. The empirical data in this research is collected from China, which provides a natural laboratory for studying organizational resilience. This is because the Chinese business environment is rife with examples of firms or business groups that have to respond to unpredictable but predictably frequent disruptions emerging from continual market-based reform. China, however, is an uncharted territory for research on inter-organizational relationships and organizational resilience in spite of these topics being established in the west. It is important to pay attention to different research contexts because, as Cooke (2009, p. 26) notes, the "intellectual roots, mental models, relationship paradigms and axiomatic foundations of Chinese are fundamentally different from those found in the

western world." Therefore, some aspects of grounded theory, for example allowing relevant issues to entirely emerge from local experts, appear more appropriate for researching unknown contexts (Symon & Cassell, 2012).

2.6 An Integrative Approach – Case studies and Grounded theory

From the above, it seems that there is a need to combine the case study approach and the grounded theory approach in this study. Given that resilience research has been highly context-dependent (Linnenluecke, 2017), an integrative approach with a "qual-qual" combination (Pritchard, 2012) is commonly used in empirical studies of organizational resilience. Some examples are listed in Table 2. These studies usually diagnose what happened in certain situations and then seek to derive insights into how future resilience may be improved.

Author(s)	Focus of investigation	Methodology
Powley (2009)	Investigating social mechanisms that enable organizations to resume operations and heal in the time immediately following a crisis	Narrative inquiry and grounded theory to examine a university shooting incident
Williams & Shepherd (2016)	Examining how locals created ventures in Haiti following a disaster	Case study and grounded theory
Weick (1993)	Reanalyzing the Mann Gulch fire disaster and identifying four potential sources of resilience	Case study and narrative inquiry
Bechky & Okhuysen (2011)	Investigating the role of organizational bricolage in helping organizations to develop responses to unexpected events	Case study and ethnography
Christianson, Farkas, Sutcliffe & Weick (2009)	Investigating a roof collapse on the Baltimore & Ohio Railroad	Case study and narrative analysis

Catino & Patriotta (2013)	Studying the interaction between cognition, emotions and safety culture in the Italian Air Force in learning from errors	Case study and narrative analysis

Table 4 Examples of empirical studies with a qual-qual approach

Moreover, an integrative approach may resolve a common issue – failing to lift data to a conceptual level – which researchers commonly face in inductive research (Nadkarni et al., 2018). This is because data generated in inductive investigations can be mundanely descriptive without theoretical scrutiny and development. For example, the underlying logic of grounded theory is that theory explicitly emerges from the research situation, which leads to constant comparison and theoretical sampling as the core processes in the grounded theory-building approach (Kenealy, 2012). Incorporating a case study approach offers researchers an opportunity to examine the relevant literature in advance of starting data collection, which is absent in the grounded theory approach (Denzin & Lincoln, 2000; Kenealy, 2012). Conversely, employing a grounded theory approach in case studies will amplify empirical validity and generalizability, which are generally lacking in a case study approach (Eisenhardt, 1989). Integrating these two methodologies enables researchers to connect empirical evidence to extant theoretical ideas to generate novel conceptual insights and distinctions.

Having decided to employ an integrative approach using both the case study approach and the grounded theory approach, it is imperative to consider the degree of combination, which revolves around the unit of analysis and the study's research questions. To truly understand how inter-organizational relationships are used to help organizations cope with disruptions, multiple

cases in different contexts are necessary to explore the relationships between these concepts. Following a general guide to case design (Yin, 2014 – see Table 5), a holistic multiple case design is seen to be more appropriate for two reasons. First, multiple cases capture more variations, which enable comparisons across cases to better understand similarities and differences in varied contexts (Yin, 2014). Second, as the research is to understand organizational resilience from the perspective of inter-organizational relationships, the units of analysis are organizations rather than departments or individual persons within the organizations.

Category	Single Design	Multiple Design
Holistic Design	Context Case study	Context Case study Case study
Embedded esign	Context Case study ↓ ↓ sub unit sub unit	Context Case study Case study ↓ ↓ sub unit sub unit
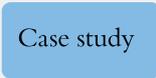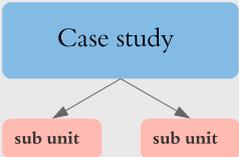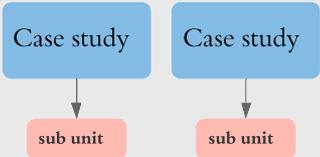
Table 5 Types of case design (Yin, 2014)

2.7 Sampling

2.7.1 Comparing Sampling Techniques

The next stage in the research process is to identify a suitable process for case selection. As it is not feasible to collect data from all possible organizations, it is important to select an adequately sized sample that allows for the credible development of theoretical statements describing the observed phenomenon (Eisenhardt, 1989). Gaining access to appropriate data in a particular organization or a number of organizations is a common challenge in any qualitative research (Saunders, Thornhill & Lewis, 2009). The term 'appropriate' has different connotations in two distinct sampling techniques (shown in Table 4): non-probability (non-random) and probability (random) sampling (Saunders, 2012).

Difference	Non-probability	Probability
Specification of population	Not necessary	Essential as is a sampling frame random
Basis of sample choice/selection	Researcher's judgement	Random
Basis of generalizing from sample	If undertaken theoreticlaly, findings may be transferable	Statistical representation
Nature of aim usually addressed	Exploratory, answered utilizing rich understandings	Explanatory, answered utilizing statistical inferences
Sample size	Relatively small (other than for quota sampling)	Relatively large

Table 6 Non-probability and probability sampling (Saunders, 2012)

Appropriateness in the context of non-probability samples refers to the suitability of the sample chosen to help to gain rich understanding of phenomena (Patton, 2002), which contributes to theoretical generalization. Unlike non-probability sampling techniques, in which the choice of the sample is based on the researcher's judgement of the population's characteristics, probability samples assume that each participant is randomly selected and so the sample statistically represents the population (Saunders, Thornhill & Lewis, 2009). Therefore, probability samples aim to provide a basis for answering research questions by statistically estimating the features of a population. Appropriateness in probability samples is concerned with the accuracy with which the sample selected represents the population.

Following these insights, non-probability sampling techniques appear more suitable for an exploratory study which is based on the researcher's judgement. This implies that researchers tend to actively choose appropriate cases for the sample and exclude others (Saunders, 2012). In addition, from the perspective of alignment between the philosophical underpinnings and the methodology allowing the research question to be answered in sufficient depth, it is suggested that non-probability sampling techniques are more suitable for non-positivist epistemologies and qualitative research, while probability-sampling techniques are more appropriate for a positivist epistemology and quantitative research (Saunders, Thornhill & Lewis, 2009). On the basis of this reasoning, it is decided to employ a non-probabilistic sampling approach.

2.7.2 Non-probability Sampling

Although there is a broad range of non-probability sampling techniques, Saunders (2012) classifies them into four groups according to the degree of probability and sample representation: quota, purposive, volunteer and haphazard sampling. This is shown in Table 7.

Category	Sampling technique	Criteria in relation to research aim	Likelihood of sample being representative	Nature
Quota	Quota	Proportionally represents population	High	Probabilistic
Purposive	Typical case Critical case Extreme case Heterogeneous Theoretical	Illustrate Important Unusual or special Reveal key themese Inform emerging theory	Low	
Volunteer	Snowball Self-selection	Case difficult to identfy Access difficult, research exploratory	Low	
Haphazard	Convenience	Ease of access	Very low	Non-probabilistic

Table 7 Non-probabilistic sampling techniques (Saunders, 2012)

Considering the characteristics of the different non-random sampling techniques in Table 5, quota sampling is a technique similar to probabilistic sampling as it aims to represent the population as a whole, while in contrast haphazard sampling is more subjective as it does not allow generalization of the findings in a statistical sense (Saunders, 2012). Between these two techniques, purposive and volunteer sampling are neither as quantitative as quota sampling or as subjective as haphazard sampling. Volunteer samples include cases that are difficult to identify or access and have to rely on self-selection and referrals of existing cases. Similarly, purposive samples also have a low likelihood of being statistically representative but the choice of cases is determined by the researcher's judgement and can include cases that

are extreme, heterogeneous, critical, typical or theoretical in nature (Saunders, 2012).

Having critically evaluated the differences between these non-random sapling techniques, purposive sampling is chosen as the most suitable approach due to its alignment with a research design integrating the case study and grounded theory approaches. This is because, first, according to Corbin & Strauss (2008, p. 195) theoretical sampling is a method of "data collection based on concepts that appear to be relevant to the evolving storyline," which is particularly relevant to grounded theory, which aims to develop an emerging theory. The data collection starts as soon as cases and participants have been identified. Second, flexibility in combining various purposive sampling techniques is particularly useful. At the level of firm selection, heterogeneous purposive sampling enables researchers to reach vastly different firms in various industries that have experienced disruptions. This provides diverse characteristics and maximum variation, which can be explored and the key themes observed can be explained, which in turn amplifies the value of the research. As Patton (2002) notes, any patterns emerging may represent key themes. At the level of the selection of participants within the selected firms, homogeneous sampling techniques are employed by focusing on the senior management in an organization. This allows researchers to explore similarities and differences across cases in greater depth.

2.7.3 Sample Size

Having identified purposive sampling as being appropriate, the next stage in the research design process is to identify a suitable sample size, which always seems to be ambiguous in inductive qualitative research as there are no hard and fast rules (Saunders, 2012). Patton (2002) points out that the validity of qualitative data is more related to data collecting skills than to the size of the sample, although a sufficient number of observations or interviews are required. There is a consensus among scholars that a 'sufficient' number is the point at which saturation is achieved. As Morse (1994, p. 147) indicates, "saturation is the key to excellent qualitative work" and "there are no published guidelines or tests of adequacy for estimating the sample size required to reach saturation."

Regarding criteria for reaching saturation, a number of scholars suggest appropriate sizes of a non-probability sample, as is shown in Table 6. The advice offered varies depending on the nature of the study. As the present research is designed to employ three purposive sampling techniques – theoretical, heterogenous and homogenous – the guidance in Table 8 suggests that a sufficient sample is in the range between 20 and 35.

Original source	Nature of study	Minimum size (range)
Bertaux (1981)	Qualitative	15
Kvale & Brinkmann (2009)	Interviews	5-25
Bernard (2000); Morse (1994)	Ethnographic	35-36
Creswell (1998); Morse (1994)	Grounded theory	20-35
Creswell (1998); Morse (1994)	Phenomenological	5-25
Guest, Bunce, & Johnson (2006); Kuzel (1992); Romney, Batchelder, & Weller (1986)	Considering a homogeneous population	4-12
Kuzel (1992); Creswell (2007)	Considering a heterogeneous population	12-30

Table 8 Examples of non-probabilistic sampling sizes (Saunders, 2012)

2.7.4 Research Setting

This research was conducted in China for three main reasons. First, the Chinese business environment is characterized by a need for firms to continually respond to unpredictable but frequent disruptions that, for many outsiders, will go unnoticed (Luo, 2007; Meuer, 2014). One of main disruptive forces is related to regulatory changes resulting from three decades of economic and institutional reforms. For example, guided by the principle of 'grasping the big, letting go of the small' (抓大放小), many small State-Owned enterprises (SOEs) have been forced into closure resulting in millions

of workers who are unemployed (Gang, et al., 2012). Most of remaining SOEs are in 'strategic industries', which are perceived as vital importance to national security and/or people's livelihood such as telecommunications, financial services, petroleum and petrochemicals, electricity generation and distribution and defense. Although SOEs remain dominant in these sectors, they face severe inter-SOEs' competitions. For example, in the power industry, the Chinese government has taken a radical approach to end the corporation's monopoly and set up 11 new SOEs, which compete with each other for bidding contracts with the power grid operators (Xu & Chen, 2005). The similar approach of creating internal competitions is applied to other sectors. Another classic example in the telecommunication industry is related to the bidding for the national distribution of 3G standard, which generated fierce competition among three central SOEs: 'China Unicom', 'China Telecom' and 'China Mobile' in 2009 (Gang, et al., 2012). The consequence of such severe competition results in overinvestment in the mobile network in China (Kang, et al., 2012). Firms operating in such environment experience not only primary uncertainty arising from regulatory changes but also compeititve uncertainty emerging from the actions of economic actors (e.g., competitiors) (Sutcliffe & Zaheer, 1998; Williamson, 1985).

Second, in contrast to the state sector, the prviate sector in China has become a vibrant force that drives economic growth account for 'more than 60 % of GDP' (Zhang, 2019). For example, privatelyowned enterprieses (POEs) demonstrated by Alibaba, Tencent and Baidu are dominant in the highly competitive IT sectors. They have provided the dynamic sources of innovation that are key drivers of the digial economy in which the application of big data, powerful algorithms, and cloud computing change the nature of

55

work (Pananond, et al., 2020). Simiarly, POEs in other sectors (e.g., real estate, retail, steel) have emerged among the top performers in China, which pose challenges to SOEs (Gang, et al., 2012). With an increasing informazation, marketization and industrialization (Wang, Wu, & Liu, 2017), this has given a rise of Modern Service Industry (MSI) in China that has integrated traditional industries into the internet-based e-commernce. As noted by Wu and colleagues (2016), the emerging characters of MSI are 'crossover and convergence', which "promote the cross-enterprise, -field and -industry cooperation, and the creation of innovative products, services, markets and business models" (p. 667). Undoubtedly, the emergence of crossover has provided new growth opportunities. For example, Alibaba offers products and services related to information technology, finance and logitiscs in addition to its main B2B and B2C businesses. Notwithstanding, it has heightened epistemic uncertainty concerning various 'knowledge problem' (Packard & Clark, 2020). By integrating 'all kinds of resources' from different industries into an unknown area in which to conduct activities, it has complicated the process of innovaiton and product develoopment and operation (Wu et al, 2016).

Third, China's economic development has been spatially uneven. For example, Guo and colleagues find that some coastal cities in China appear more entreprenurers than inland cities (Guo et al, 2016). The rapid growth of coastal areas is because they have benefited from more liberal economic laws as part of the market-oriented economic reform launched in 1978. These areas are commonly referred to as 'Special Economic Zones' (SEZs), which are initially designed to test the efficacy of the new polces and instiatuions supporting the transition from centrally planned economy to the market-

oriented economy (Zeng, 2012). Following the 'crossing the river by touching the stones' or 'doing by learning' approach, these SEZs have made crucial contributions to China's success, such as attracting inward FDI and technologies, promoting exports, generating employment and spillovers to the local economy. Notably, the regional distribution of China's modern service industry has featured one axis on the eastern coast, two belts on the north and south of China, and three clusters in the northeast, center and west of China (Wu et al, 2016). These features have also added to a complex set of challenges already facing firms such as deficiency in workforces (Wang, Cooke, & Huang, 2014) and the cultural embeddedness of services (Weir & Hutchings, 2005). For example, relaizing a crossover service inevitably faces the challenge of managing big data and cloud computing, as well as implementing complex service management across space and time (Wu et al, 2016). In sum, China provides an ideal context in which to explore how firms prepare for and respond to various forms of disruptions using IORs.

2.7.5 Data Sampling

The aim of this study was to understand the environment in which organizations operate from the perspective of ecosystems. Given the limited theory and evidence, I employed an inductive qualitative approach. Following the purposive sampling techniques discussed in Chapter 2, I used a theoretical sampling approach (Eisenhardt & Graebner, 2007) by using a heterogeneous technique (Saunders, 2012) at the firm selection level selecting different firms in various industries and a homogeneous technique (Saunders, 2012) at the participant selection level focusing on the senior management. More specifically, the key criteria for the selection of firms were the type of ownership, the relevance of the industry, the positioning of the different cases

within the industry sector, the internationalization mode and company size measured by turnover and employees: small < £6.5 M turnover and < 50 employees; medium < £25.9 M turnover and < 250 employees; and large > £25.9 M turnover and > 250 employees. Relevant interviewees were ones who had innate understanding of business ecosystems including constituents and activities amongst them.

To enable unbiased exploration, different types of organization were approached through various personal and professional connections and channels in China. This allowed the establishment of a dialogue in Chinese with potential interviewees and the identification of specific key informants who had innate understanding of my research topic. Twenty-four firms in twenty-two industries met the criteria and agreed to participate in the project. They are listed in Table 9.

No.	Ownership	Industry relevance	Perceived market position	Relevant interviewee	Business location (Interview)	Internationalization mode	Firm size
1	PoEs	Chemical & Automotive industry	Strong in leadership position on sustainable product development	Director	Shanghai	Export	Large
2	MNEs	Healthcare & Beauty industry	Leadership position in industry	Senior Director	Shanghai	Wholly owned enterpreises	Large
3	MNEs	Creative industry	Leadership position in organizing live music concerts	Alliance Director	Shanghai	Subsidiary	Large
4	PoEs	Pharmaceutical industry	Strong in leadership position on product innovation	Vice President	Nanjing	Export	Medium
5	MNEs	Pharmaceutical, consumer goods and Medical device	Leadership position in industry	Senior Manager	Shanghai	Wholly owned enterpreises	Large
6	MNEs	Fitness & Equipment industry	Leadership position in the high end market	General Manager	Shanghai	Subsidiary	Large
7	PoEs	IT & Mobile industry	Strong in leadership position on innovation	Chief Operation Officer	Shanghai	Export; Subsidiary	Medium
8	MNEs	Oil & Gas industry	Leadership position in industry	Senior Manager	Beijing	Wholly-owned enterprises	Large
9	PoEs	Manufacturing & Aeroplane industry	Leaership position on product customization	General Manager	Chengdu	Export	Medium
10	PoEs	Fintech	Start-up business in online payment	Managing Director	Shanghai	N/A	Small
11	PoEs	Engineering & Construction industry	Leadership position based on consulting service provider	Chief Executive Officer	Beijing	Subsidiary	Small
12	PoEs	IT & Consultancy	Leadership position in SMEs	Chief Executive Officer	Shanghai	N/A	Small
13	PoEs	IT & Tourism	Leadership position in industry	General Manager	Shanghai	Subsidiary	Large
14	SoEs	Energy & Electricty industry	Leadership position in industry	Director	Shanghai	International M&A	Large
15	JV of SoEs and PoEs	Chemical & Agricultural industry	Leadership position in industry	Senior Director	Nanjing	Export; International M&A	Large
16	PoEs	Private Equity	Strong in leadership position on product development	Chief Executive Officer	Shagnhai	Subsidiary	Large
17	Gov	Gov Service & FDA	Authority in the region	Officer	Chengdu	N/A	Small
18	PoEs	International Trading	Start-up business	Managing Director	Chengdu	Import	Small
19	SoEs	Real Estate	Leadership position on high-tech park development	Director	Shanghai	N/A	Large
20	JV of SoEs and PoEs	Telecommunication industry	Strong in leadership position based on market share	Senior Manager	Shanghai	Export; Subsidiaries	Large
21	SoEs	Banking & Finance industry	Leadership position in industry	Senior Manager	Chengdu	Subsidiary	Large
22	SoEs	Care Home & Insurance	Leadership position in industry	Deputy General Manager	Shanghai	N/A	Large
23	SoEs	Banking & Finance industry	Strong in leadership position in the region	General Manager	Hangzhou	N/A	Large
24	MNEs	Executive Education	Strong in leadership position on risk & crisis management	Chief Executive Officer	Beijing	Subsidiary	Small

Table 9 Sample cases

POE = Privately-owned enterprise (Chinese); SOE = State-owned enterprise (Chinese); MNE = Foreign multi-national enterprise operating in China; JV = Joint venture

2.8 Data Collection Method

2.8.1 Interview Position

Having justified the research approach, including the research logic, methodology and sampling technique, data collection in the current research uses interviews, which "have long been a central technique of knowing in the social sciences, and organization studies is no exception" (Alvesson & Ashcraft, 2012, p. 240). On the basis of epistemological and ontological premises, Alvesson & Ashcraft (2012) classify interviews into four different types: neo-positivist, romanticist, localist and reflexivist. Neo-positivism is a dominant stance that views the interview as a modified oral survey instrument to report interview processes and statements as evidence. This approach aims to capture reality (e.g. behavior, practices, attitudes, values) through a fully planned and structured process which minimizes researcher influence and other sources of bias.

The second type of interviews – romanticist – seeks an authentic dialogue through cultivating interpersonal relations based on rapport, trust, commitment and warmth between the researcher and interviewee. The underlying assumption is that the nearer the researcher comes to the respondent, the better we are able to apprehend the real self (Dingwall, 1997). In this sense, romantic interviews can overcome challenges faced in neo-positivist interviews such as superficial or cautious responses under certain circumstances. However, due to the high level of context-binding in a particular research relationship and interaction, romantic interviews can be difficult to precisely assess.

The third type of interviews is labelled localist and it is distinct from the assumptions and goals of the first two orientations in the sense that it does not assign interviews an ontological status. This is because the interview is not seen as a tool for data collection on something outside itself but is treated as a genre of conversation that produces situated accounts. Localism advocates that a situated social situation deserves study in its own right and therefore interview statements are studied to understand the particular context in which they are produced (Silverman, 2006). Sources of inspiration for localism vary and include certain forms of discourse analysis, conversation analysis and ethnomethodology (Silverman, 2006).

Like localism, reflexivism, the fourth type of interviews, acknowledges that interviews are a social practice in themselves but shares the same premise as neo-positivism and romanticism. However, it challenges the neo-positivist notions of scientific practice and the romantic quest for authenticity that orient the interview. Reflexivisim claims that interviewing is a meta-practice simultaneously involving relational, cultural and political practices in which the process informs the phenomenon under investigation. As Kauffman (1992, p. 187) summarizes, "the researcher researched relationship, as it develops and is expressed in negotiations over the research process, is a map for the analysis more than a qualifier of it."

Among these four approaches to interviews, it appears that all except localism view interviews as gateways to understanding organizational life through knowledge generation. In the methodology literature, neo-positivist and romanticist interviews are the dominant approaches as they offer a number of tools and techniques used to gain quality empirical material. These interview accounts, however, can become political representations of a

preferred 'truth' (e.g. impression management) while neglecting the fact that the interview is a socially and linguistically complicated situation (Alvesson, 2011) or oversimplifying the interview situation (Alvesson & Ashcraft, 2012). In other words, a good technique is important but not only; it is equally important not to downplay the social and linguistic complexities in interviews as advocated by reflexivists. It has been further suggested that an interview without the support of a theoretical understanding leaves interpretation of it poorly grounded and any use of the interview material risks naivety (Alvesson & Ashcraft, 2012). Following these insights, the present research employs a balanced approach in which interview techniques are combined with various theoretical viewpoints when there are reasons for doing this in a reflexive way.

A practical question regarding interviews is how to collect data in interview conversations, which can range from highly structured to loosely unstructured (Grix, 2002). Neo-positivism typically involves a high degree of structure that requires interviewees to respond to parameters set by the researcher, while in contrast romanticism favors a low degree of structure that facilitates openness and relational flow over rigidity (Alvesson & Ashcraft, 2012). Rather than focusing on the degree of interview structure, reflexivism is more concerned with the significance of variations which emerge from the structure (Alvesson & Ashcraft, 2012).

2.8.2 Interview Approach

As this is an exploratory study aiming to seek new insights, interviewing 'experts' is suggested as a principle to orchestrate it (Saunders, Thornhill & Lewis, 2009). There are three distinct approaches to interviews:

structured, semi-structured and unstructured (Grix, 2002). A structured interview is akin to a survey approach and is regarded as the most rigorous and inflexible approach (Grix, 2002). By asking all interviewees a fixed set of questions, on the one hand it enables researchers to directly compare results but on the other hand it may constrain researchers from exploring unexpected areas (Grix, 2002). Compared to structured interviews, semi-structured interviews, in which a set of predetermined questions is designed for all the participants, are more flexible in terms of their application (Saunders, Thornhill & Lewis, 2009). This approach gives participants the freedom to explore unexpected areas related to the enquiry (Grix, 2002). As a result, these interviews may produce rich contextual texts and may be compared, contrasted or converted into statistics, depending on the questions (Grix, 2002). Unstructured interviews purport to introduce a random list of concepts or questions which have not been previously considered (Frey & Fontana, 1991; Grix, 2002). Data from this type of interviews have a reduced probability of being comparable as each respondent's flow is highly random (Grix, 2002).

Among these interview approaches, a semi-structured face-to-face interview approach seems more suitable. First, it provides flexibility in accommodating divergent views. More specifically, it allows researchers to combine different design elements. In an initial exploratory phase, the research can start with a set of open-ended interviews with fewer interviewees. Doing this helps to refine the focus of the study and further develop a more specific set of questions that all participants can be asked. This also enables researchers to have substantial control of recording good quality interview data during the process (Siah, 2014). It is notable that the use of interviews is

generally inadequate (Grix, 2002) and therefore they are often complemented with other sources of data, such as corporate reports, websites and visual data. Second, research shows that managers are more likely to agree to be interviewed rather than complete a questionnaire (Saunders, Thornhill & Lewis, 2009). This is because a face-to-face interview provides them with an opportunity to receive feedback and personal assurances about the way in which the information will be used. Additionally, when interviewing executives who have hectic schedules, it seems to be effective and efficient to have face-to-face interviews at the premises of their organizations. This also provides researchers with opportunities to observe and understand cultural and social facets of each organization. The data collection process is shown in Figure 5.
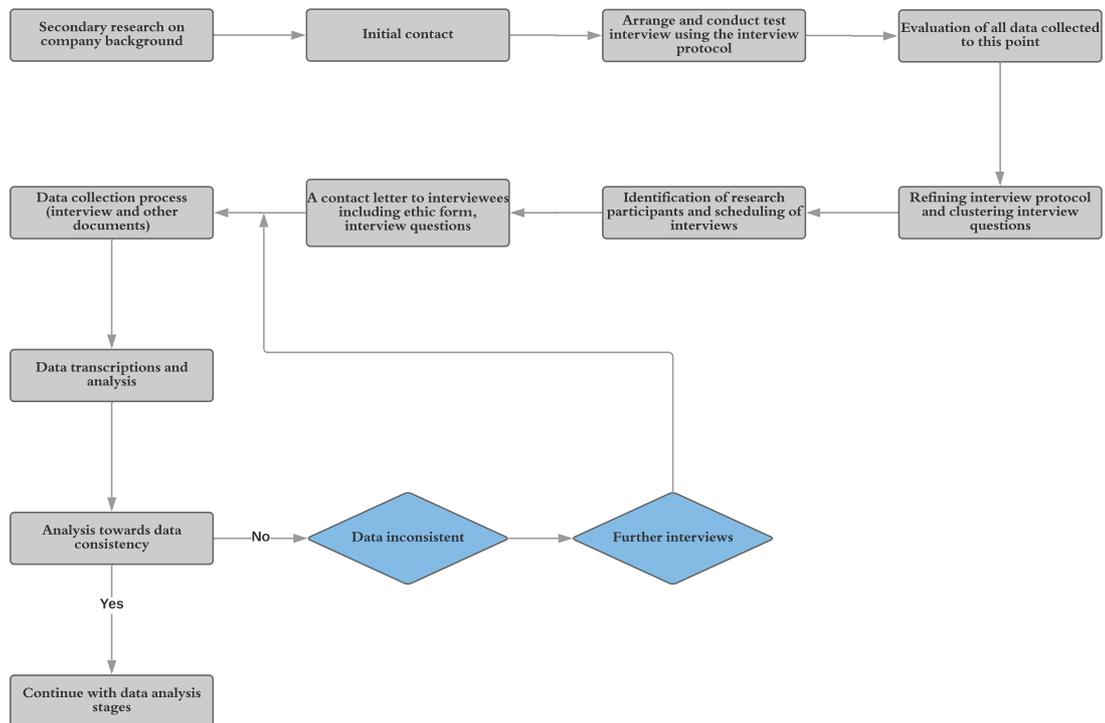
Figure 5 Data collection process

2.8.3 Interview Preparation

Careful interview preparation is key to success in semi-structured interviews and should reflect the five-P mantra: 'prior planning prevents poor performance' (Saunders et al, 2009). Given the ethical implications in an overt approach, in the present research it was necessary to inform interviewees of the objectives of the research prior to the interviews (e.g. Merriam, 1988). Before each interview, the interviewees were informed about how their inputs would be used and any more general questions about the interviews were answered. Written consent was obtained from the interviewees. The interviewees participated of their own free will and for the protection of the candidates it was decided to keep both participant and organization names totally confidential. Where necessary, a non-disclosure declaration was offered and signed by all the relevant parties.

Despite the fact that the semi-structured interview is the most advantageous approach to obtaining data, there are a number of data issues relating to reliability, validity and generalizability (Saunders et al, 2009). This is because the semi-structured interview lacks standardization of the interview process, especially when the researcher probes responses concerning areas interviewees may introduce but which have not been previously considered. The concern about reliability is associated with forms of interviewer and interviewee bias, including comments, non-verbal behavior or tone. Validity is concerned with whether the researcher is able to infer the meaning that the interviewee intended from the language used. Saunders et al. (2009) argue that it is possible to achieve a high level of validity in non-standardized interviews that are conducted carefully. Although there may be no issue concerning validity, there may be one

concerning making statistical generalizations from the findings of semi-structured or in-depth interviews due to a small and unrepresentative number of samples.

In order to overcome these issues, it is necessary to develop an interview protocol (Easterby-Smith et al., 2002; Yin, 2014), which helps the researcher to replicate the same approach and questions across all the interviews (Grix, 2002). Given that every interview will be slightly different in terms of the respondents' feedback, interview questions are designed not only to address the research questions but also to allow respondents to reflect on their own views on particular topics (Sanders et al, 2009). In addition to providing a common basis for the interviews, an interview protocol is seen as a vital tool to maximize the reliability of a study (Saunders et al, 2009). It has been suggested that remaining realistic in terms of interview duration is important to obtain sufficient data (Saunders et al, 2009). It was therefore decided to design a question protocol, allocating a time limit of around an hour and with questions designed in such a way that all the participants should be able to answer all of them. Importantly, the interviewees had the right to refuse to answer questions so long as they could provide reasons for so doing.

Reviewing the research questions, it was decided to structure the interview questions into specific clusters in the first-round data collection. These clusters reflect different data collection areas relevant to the questions and provided guidance to the researcher and interviewee during the interviews. The first section of the interview protocol contains questions about the company background and the participant, providing both a perspective for analysis and a mechanism to double check the suitability of the candidates for the research. The second and third clusters of questions

concern understanding of the activities with which the focal organization engages in business ecosystems with other organizations and explore the determinants of relationship formation, as well as mechanisms that govern the contingency of relationships. The fourth, fifth and sixth clusters of questions investigate disruptions organizations experience, and the causes and effects, as well as any common characteristics of these disruptions. This also enquires about how organizations manage these disruptions and what do they learn for the future risk mitigation or disruption prevention plans. The second-round data collection will be discussed in Chapter 6.

2.8.4 Data Collection

Prior to the interviews, all the interviewees were contacted with a standard letter stating the purpose of the interview and the interview questions. This was essential to minimize potential losses of time and effort for both the researcher and the interviewees as the data collection required extensive travel to meet the hectic schedules of the interviewees. Semi-structured face-to-face interviews guided by the pre-set questions were held at the organizations' premises in Beijing, Shanghai, Chengdu, Hangzhou and Nanjing in China. Mandarin was the main language used in the interviews but it was supplemented with English in order to improve understanding of some terminology which is not available in Mandarin. There was a pre-interview meeting, ranging from 30 minutes to 60 minutes, with each interviewee to ensure that they understood the research topic and the interview questions. All the interviews, ranging from 30 minutes to 90 minutes, were digitally recorded and subsequently transcribed to limit any confusion of context and to mitigate the risk of losing data (Bryman & Bell, 2007; Saunders et al.,

2009). All the records of the interviews were held both digitally and in print in designated folders. A field notebook was also used to record any additional data and information, including wrap-ups and clarifications after the interviews and critical and analytical thoughts about the work being undertaken. Beyond the initial data collection, several follow-up telephone interviews were held to ask additional questions arising during the data analysis.

In addition to the interviews, published documents and other data sources (e.g. photos, emails, presentations, company reports/documentation and other relevant materials) were collected and reviewed in order to improve the substantiation of the findings and increase the overall quality of the study (Eisenhardt, 1989). To improve both internal and external reliability of the analysis, all transcripts were sent to the respondents for checking and correction (Eisenhardt, 1989). I also collected data from other sources. These included publicly available resources, such as media articles, corporate websites, and other sources of data shared by interviewees, including presentation materials, company reports and emails.

Chapter 3 Investigating Activities in Business Ecosystems

3.1 Aim

Drawing on the ecosystem-based perspective, the aim of this chapter is to understand the environment in which organizations depend on each other through the activities for mutual effectiveness and survival. According to Jacobides, Cennamo & Gawer (2018, p. 2264), ecosystems consist of "a set of actors with varying degrees of multilateral, non-generic complementarities that are not fully hierarchically controlled." The ecosystem's focus on multiplicity, complementarity and non-hierarchical control provides a new way of understanding how an organization manages its interdependence, which is critical for organizational resilience. This chapter serves as a foundation for the studies in the following chapters on inter-organizational relationships (IORs), disruption and relational resilience.

3.2 Literature Review

3.2.1 Themes in ecosystem research

The word 'ecosystem' emerged in the 1930s referring to "a localised community of living organisms interacting with each other and their particular environment of air, water, mineral soil, and other elements" (Eamonn, 2015, p. 3). Since its first introduction to the business world in 1993 by business strategist James Moore, it has become a manifestation of how organizations manage interdependences among different types of actors and activities (Adner, 2017). In strategic management, there are three broad

groups of research on ecosystems: a 'business ecosystem' stream focusing on firms and their environments; an 'innovation ecosystem' stream studying particular innovations or focal value propositions, along with the constellation of actors that support them; and a 'platform ecosystem' stream concentrating on how actors organize around a platform (Jacobides, Cennamo & Gawer, 2018).

The business ecosystem stream views the ecosystem as an economic community consisting of a number of actors (e.g. organizations, institutions and individuals) that affect each other through their activities (Jacobides, Cennamo & Gawer, 2018). Moore (1993) states that firms in business ecosystems work cooperatively and competitively across a variety of industries to support the development of new products and services that satisfy customer needs. Similarly, Iansiti & Levien (2004) stress that firms in ecosystems depend on each other for mutual effectiveness and survival. Teece (2007) views the ecosystem as an environment that impacts not only on a firm itself but also on its external connections (e.g. suppliers and customers) within and beyond its own industry. According to Moore (1993), a firm's success is to a large extent determined by its co-evolving capabilities in business ecosystems. This is also referred to as "shared fate" by Iansiti & Levien (2004). The performance of a firm is bound up with the overall performance of the ecosystem in which it is embedded (Iansiti & Levien, 2004). Despite the recognition of firms' co-evolution capabilities in business ecosystems, little research has been done explaining how firms mutually adapt (Jacobides, Cennamo & Gawer, 2018). The idea that a firm's fate depends not just on its

industry but also on the fates of other industries has made it challenging to define the scope of business ecosystems.

The innovation ecosystem stream anchors interdependences of actors in the ecosystem onto a focal innovation or a 'focal value proposition' that is appreciated by the customer rather than the firm. In other words, it focuses on understanding how actors in the ecosystem interact with each other to create and commercialize innovations that benefit the end customer (Jacobides, Cennamo & Gawer, 2018). In this stream, the ecosystem is viewed as "the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution" (Adner, 2006, p. 98) or "a set of actors that contribute to the focal offer's user value proposition" (Kapoor, 2018, p. 2). Adner (2017, p. 42) further develops the concept of ecosystem and defines it as "the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize." The focus on the coherent value proposition of the ecosystem highlights its distinct feature: an alignment among actors, including those who may or may not have alliances among themselves but need to align for the value proposition to be realised (Shipilov & Gawer, 2020). This gives rise to a specific view of a firm's strategy that extends beyond the traditional notions of value creation and value capture through inter-organizational alliances or networks.

The platform ecosystem focuses on a specific technology – a platform – in which complementors and platform sponsors are interconnected through open or standardized interfaces (Gawer & Cusumano, 2014; Parker, Van Alstyne & Jiang, 2017). In this stream, the ecosystem is viewed as a

constellation of the platform leader (Android or iOS operating systems) that establishes a technological direction for the evolution of the platform and all complementors who connect to the platform and use shared technological assets to generate complementary innovations (Shipilov & Gawer, 2020). Therefore, the value of the platform ecosystem is generated through the number of complementors who connect to it. As Gawer & Cusumano (2008) note, the more connections the platform has the more likely it is that the platform generates value not only for customers but also for the ecosystem members. Unlike the innovation ecosystem, the value proposition of the platform ecosystem is not the anchoring point for the customer but instead the platform itself (Shipilov & Gawer, 2020).

It is notable that the early literature on ecosystems (e.g. Moore, 1993) focuses on describing the phenomenon of interdependence among organizations, including those not in the traditional category of suppliers but which instead are 'complementors' (Brandenburger & Nalebuff, 1996). Much of the recent research on ecosystems has focused on innovation and platforms (Adner, 2006; Gawer & Cusumano, 2008). Despite these differences, it is broadly agreed that: (1) actors in the ecosystem are providers of complementary innovations, products or services and they might be from different industries; (2) although these actors may not have formal relationships (e.g. contractual arrangements), they are significantly interdependent in ways that generate competitive advantages. Jacobides, Cennamo & Gawer (2018, p. 2258) refer to this as "new structures of economic relationships," which are different to the existing perspectives on inter-organizational relationships or arm's-length relationships.

3.2.2 Antecedents of Ecosystems

Grounded in modularity theory, the first mechanism that creates a condition for the formation of an ecosystem is modularity (Jacobides, Cennamo & Gawer, 2018). It has been argued that all the distinct components in a modular system are separated by "thin crossing points" (Baldwin, 2008) and the presence of modularity allows the components to be designed by different producers which are highly autonomous organizations but are interconnected in the ecosystem (Jacobides, Cennamo & Gawer, 2018). Autonomy of the organizations in the ecosystem refers to their freedom in designing, pricing and operating their respective modules while they connect with each other through rules of engagement, standards and technological interfaces (e.g. the iOS operating system). Therefore, modularity plays a role in coordinating the independent organizations, which enables the ecosystem to function. However, it is not sufficient because modularization that creates thin crossing points at the boundaries of modules tends to reduce transaction costs (Baldwin, 2008) and this is likely to lead to the emergence of markets (Jacobides, Cennamo & Gawer, 2018). Although there is a lead organization that ensures the stability and coherence of the ecosystem by setting the rules and standards for its members, it does not involve "the fiat and authority structure of a central actor" (Jacobides, Cennamo & Gawer, 2018, p. 2260). This therefore leads to a discussion of the second mechanism: complementarity in economic relationships.

Complementarity in the context of ecosystems includes: (1) unique complementarity (Hart & Moore, 1990); and (2) "super-modular" or Edgeworth complementarity (Milgrom & Roberts, 1990), both of which are distinct from the generic complementarity that can take a place in market-based transactions (Adner, 2017). For example, electricity is a generic complement to any economic activity, and as such it does not require a specific alignment structure among economic actors. In contrast, unique complementarity refers to either a one-way scenario where a function of component A requires a specific component B that would otherwise fail, or a two-way scenario where both components A and B require each other in order to function. Super-modular or Edgeworth complementarity refers to another scenario where "a group of activities are (Edgeworth) complements if doing more of any subset of them increases the returns to doing more of any subset of the remaining activities" (Milgrom & Roberts, 1990, p. 6). Jacobides, Cennamo & Gawer (2018) find that the manifestation of 'more of A makes B more valuable' is different between production and consumption. Supermodularity complementarity in production highlights the cost benefit when coordinated investments in both A and B generate a higher return or incur lower costs than the sum of the costs of independent investments in A and B, while in consumption it is commonly either directly or indirectly associated with one-way or two-way network effects.

3.2.3 Characteristics of Ecosystems

Multilateralism. Adner (2017: 42) points out that an ecosystem consists of "a set of relationships that are not decomposable to an aggregation of bilateral interactions." This implies first that there is a multiplicity of actors in the ecosystem and second any relationship between the actors is highly likely to be affected by all the other relationships in the ecosystem. This provides a new way of understanding non-decomposable relationships among organizations that affect a firm's performance. In an ecosystem involving organizations A, B and C, a successful relationship between A and B (e.g. a joint venture) depends on the relationship between A and C or B and C or both. Shipilove & Gawer (2020) further illustrate this phenomenon by using the case of the Renault-Nissan alliance. They pointing out that although other participants in the ecosystem (e.g. governments, regulatory entities and fuel pump makers) are not members of the Renault-Nissan alliance, they are still important members of automotive ecosystems because they set the relevant regulations, rules and standards for the Renault-Nissan alliance to follow.

Non-generic complementarity. According to Jacobides, Cennamo & Gawer (2018), another unique feature of ecosystems is the non-generic nature of complementarity, which involves creating a specific relationship structure that aligns with value creation. This extends the notion of co-specialization (Teece, 2018) aiming to explore the nature of mutual dependencies. It is argued that non-generic complementarity, including uniqueness and supermodularity, offers a new perspective from which to view benefit, which

is different from the traditional benefit used in transaction cost economics (TCE) that focuses on issues of risk mitigation in a dyadic relationship. The benefit in unique complementarity reflects the accessibility for a firm of a great variety of options offered by the dedicated group of partners in the ecosystem. Similarly, rather than being among a firm's established sets of relationships (e.g. alliances), 'supermodular' complementarity enables it to explore the additional availability of resources or inputs in the ecosystem that can maximize benefit. Non-generic complementarity distinguishes the ecosystem from market-based transactions because there is a cost involved in connecting to the ecosystem which is not fully tangible.

Non-unilateral hierarchical control. Although the actors in an ecosystem face similar governance rules set by leading organizations (e.g. platform leaders [Gawer & Cusumano, 2002] hubs [Dhanaraj & Parkhe, 2006]; keystones [Iansiti & Levien (2004]), Jacobides, Cennamo & Gawer (2018, p. 2266) argue that ecosystems lack the hierarchical controls of traditional networks or groups such as *Keiretsus* (Japan) and *Chaebols* (Korea) in the sense that "all members retain residual control." For instance, a buying firm in a supply chain has control over its suppliers in terms of what they supply and at what cost. Non-unilateral hierarchical control implies that actors in the ecosystem are interdependent but not equally essential (Shipilove & Gawer, 2020). This also raises a question commonly found regarding inter-organizational networks: how do firms in an ecosystem manage the tension between cooperation and competition? Shipilove & Gawer (2020) argue that this is a dynamic process depending on the ecosystem's stage of development. For example, a 'bottleneck' as one of the

components in an ecosystem can be a significant impediment to its development or growth due to its poor quality or performance. This can happen in different parts of the ecosystem (e.g. upstream in value creation or downstream in value capture) or shift from one part to another. In a study of the US solar panel industry, Hannah & Eisenhardt (2018) find that a bottleneck in the early days of the ecosystem emerged as a finance issue and then it shifted to an issue relating to sales.

3.3 Research Method

3.3.1 Data Analysis

Due to technical issues regarding data recording, twenty-two of the twenty-four interviews were transcribed. To maintain validity (Bryman & Bell, 2007), prior to the data analysis all the interview transcripts were sent back to the participants to be checked and corrected. Consistent with the tenets of grounded theory (Strauss & Corbin, 1998), the data analysis followed four steps. In step one, I conducted a fine-grained reading of the data and generated a dataset on the organizations' key activities engaging with other actors. Step two started with open coding of (1) the key actors engaged in the relationships; (2) key exchange activities in the relationships. The key actors were those with whom it was perceived to be necessary to have connections for the firm's survival or growth. The key activities were related to exchanges occurring at the boundaries between organizations, such as regulatory groups, customers, suppliers and competitors (Evan, 1993). Drawing on graph theory (GT), which is commonly used to visually construct

interactions among organizations (e.g. organization-set models, [Evan, 1965]), in step three twenty-two system maps were developed. The purpose of constructing a system map for each case is to present a visual representation of the respondents' thoughts on their organizations' ecosystems through activities with other organizations (Adner, 2017). More specifically, techniques adopting a "causal loop diagram" (Casadesus-Masanell & Ricart, 2010) were employed to assemble the 'key actors' and 'key activities' coded for the (interviewed) focal organization for each case. To illustrate the approach to building the system map, Case 1 (shown in Figure 6) will be used as an example. It was possible to draw a link between 'SoEs Bank' and 'PoEs Chemical Firm' in the input system (upstream market). This is the result of the interviewee's statement that "*Our monthly budget plan for business operations, including buying raw materials, is centralized to our financial center, which helps us to manage the funds we borrow from the state-owned banks every month.*" In the output system (downstream market), the linkage between 'PoEs Chemical Firm' and 'Sales Agent' is based on the statement "*Our domestics sales are mainly through an agency.*" The same procedure was applied for the remaining connections and the 21 other system maps. To enhance the reliability of the data analysis (Bryman & Bell, 2007), provisional interpretations were submitted to some of the informants for feedback.

UPSTREAM MARKET (INPUTS)   DOWNSTREAM MARKET (OUTPUTS)
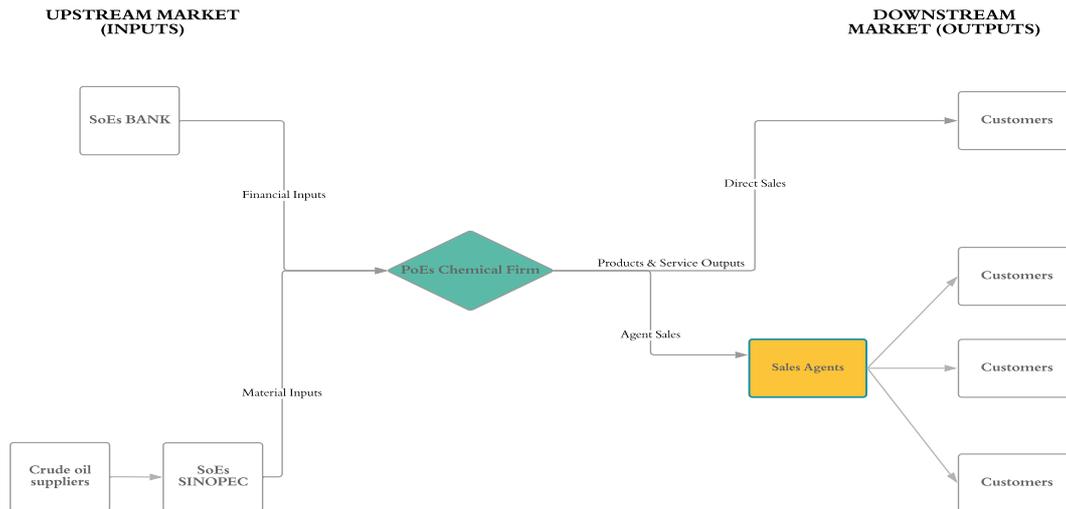
Figure 6 An example of a system map

In the final step, on the basis of each system map, all the actors and associated key activities were induced from the first-order codes to second-order themes in six actor groups – goods actors, regulatory actors, service actors, capital actors, manpower actors and customer actors – and six between organization boundary (BOB) activities – goods activities, regulatory activities, service activities, capital activities, manpower activities and customer activities. For example, the first-order constructs 'borrowing money from state-owned banks,' 'receiving funding from private funds,' 'applying for national funds' and 'corporate investors' were grouped into 'financial boundary' as these codes are concerned with joint value creation through capital inputs. This was repeated until all the first-order codes were exhausted and then all the second-order codes were structured into one aggregated dimension: BOB. Figure 7 and Table 10 present the BOB data structure with supporting evidence. I followed the 'ecosystems-as-structure' approach (Adner, 2017) and connected all these components – actors, activity-

79

boundaries and the focal organization – to form theoretical models of the

business ecosystems, as is shown in Figure 8.

First-Order-Concepts　　　　**Second-Order-Themes**　　　　**Aggregate Theoretical Dimensions**

| Material supply
Component supply
Finished product supply
Property developer | → | Goods boundary |

| Diverse, multiple and non-linear relationships
Providing services for conflict resolutions between organizations
Providing services for gap-fillings
Providing exclusive services | → | Service boundary |

| Interactions with government
Being sensitive to policy and rules
Being flexible to change of goverment-related events and policy
Multi-purposes and methods in collaborating with the government | → | Regulatory boundary |

| Keeping good terms with local banks through maintaining personal relationships (i.e., friendships
Building trust relationships trhough accumulating credits over time
Multi-methods of financing
Asymmetry payment terms | → | Financial boundary |

| Highly depending on expertise of workforce
Recognizable culture shared by members of organizations
An innovative platform for career development
Restoring positive emotions
The change of boundary spanning roles
Unethical or unreliable behaviours
Lack of social justice | → | Manpower boundary |

| Adopting a hybrid business model
Building a good impression to customers
Integrating the personal feelings
Unspoken rules
Product and service safety
Leading position in industry
Customer-oriented strategy | → | Customer boundary |

Between-organization-boundary (BOB)

Figure 7 BOB data structure

81
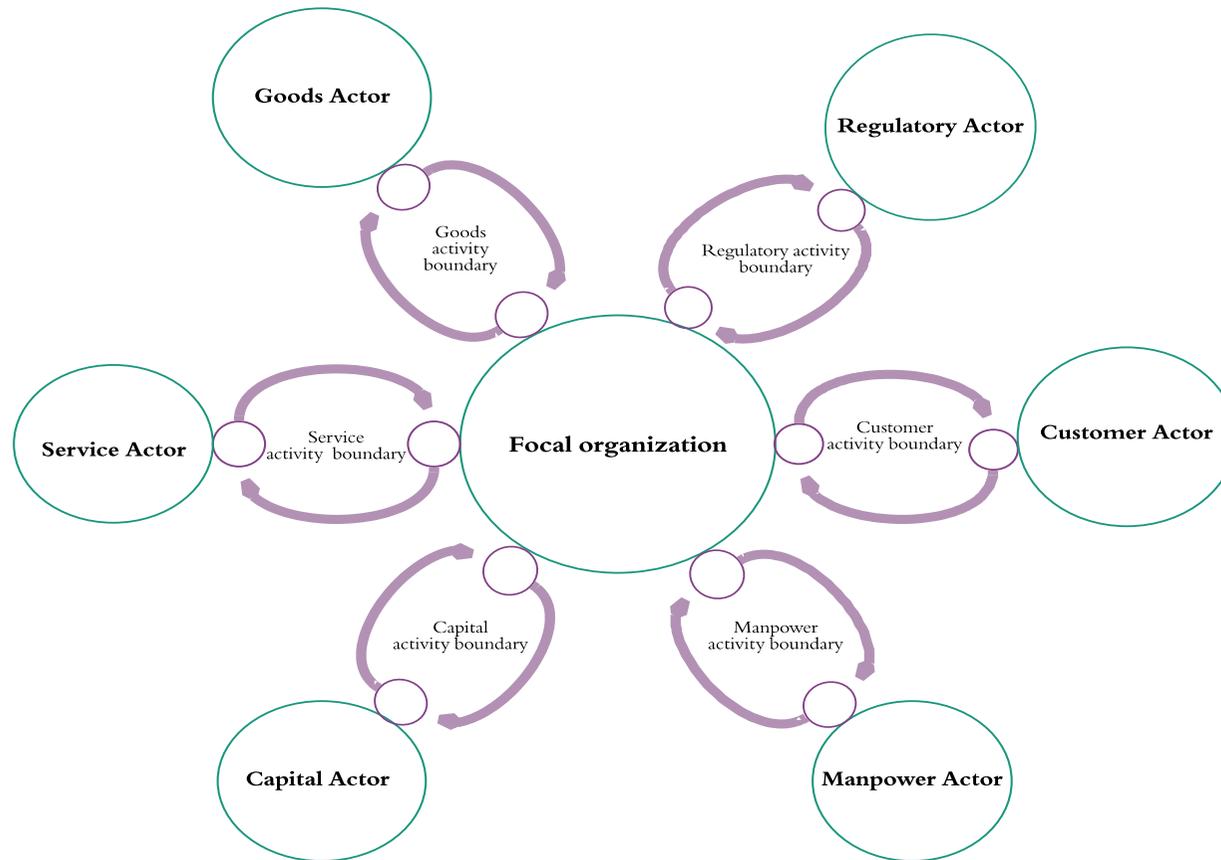
Figure 8 A business ecosystem model

3.4 Findings

3.4.1 Finding 1 Twenty-two Ecosystem Maps

Twenty-two heterogenous ecosystem maps were produced using the first-order codes (see the Appendices). Each map presents the connections of the focal organization with its key partners in both the upstream and downstream systems. It is notable that all the maps are different but they demonstrate how value is created in each system through interdependent collaboration and coordination. The differences may result from firm-related factors, including industry position, size, ownership and so forth. From the perspective of the focal organizations, it seems that multiple value propositions with different partners co-exist and co-evolve in the ecosystems. Adner (2017, p. 47) describes this as an ecosystem strategy in which "a focal firm approaches the alignment of partners and secures its role in a competitive ecosystem." Although the flow of activities in ecosystems is non-decomposable, the relationships among actors can largely be treated as decomposable into dyadic relationships, apart from power supplier and power buyer, particularly in manufacturing industries. This may be explained by the "task network" view (Baldwin, 2007), in which the unit design of the production process is based on tasks. Completing a task often involves a flow of material, information or energy moving from one actor to another, which forms a network of activities consisting of nodes and links. Due to the physical and cognitive limitations of single individuals, teams and organizations (e.g. bounded rationality [Simon, 1969]), capturing

83

dependencies and interactions through nodes and links is an efficient way to model the whole pattern of a network.

3.4.2 Finding 2 Between Organization Boundary (BOB) Activity

The findings show six distinct BOB activities in ecosystems: goods activities, service activities, capital activities, manpower activities, customer activities and regulatory activities, which "specify the discrete actions to be undertaken in order for the value proposition to materialize" (Adner, 2017, p. 43). These activities indeed distinguish the natures of the different complementarities that are the underlying mechanisms of value creation and value capture in ecosystems. There are six BOBs: goods, service, regulatory, financial, manpower and customer. For each BOB, multiple first-order concepts were identified. Goods boundaries (present in thirteen cases) consist of 'supply of material,' 'supply of components,' 'supply of finished-products,' and 'property development.' Service boundaries (present in eleven cases) are defined as various multiple non-linear relationships: 'providing services for conflict resolution,' 'providing services for gap-filling' and 'providing exclusive services.' Regulatory boundaries (present in fifteen cases) are defined as 'interactions with government,' 'being sensitive to policy or rules,' 'being flexible to changes in government-related events and policy' and 'multi-purposes and methods in collaborating with the government.' Financial boundaries (present in eight cases) are defined as 'keeping on good terms with local banks through personal relationships,' 'building trust relationships through accumulating credit over time,' 'multi-methods of financing' and 'asymmetric payment terms.' Manpower boundaries (present

in fifteen cases) are defined as 'highly depending on expertise of workforce,' 'recognizable culture shared by members of organizations,' 'innovative platforms for career development,' 'restoring positive emotions,' 'changes in boundary spanning roles,' 'unethical or unreliable behavior' and 'lack of social justice.' Finally, customer boundaries (present in all twenty-two cases) include 'adopting a hybrid business model,' 'making a good impression on customers,' 'integrating personal feelings,' 'unspoken rules,' 'product and service safety,' 'leading position in industry' and 'customer-oriented strategy.'

Aggregate dimensions: Between organization boundary activities	
Second-order codes	Selected evidence from first-order codes
Goods boundary	• Material supply "Our largest raw material supplier is a state-owned enterprise and we don't have any negotiating power in terms of price and other terms and conditions." – Case 14 "We collaborate with landowners in each country for oil extraction in our upstream and then our logistics teams distribute the crude oil to our manufacturers, which is the middle stream. The downstream includes retail oil, global commercial products, consumer products and so on" – Case 21 "Our company's pesticides are exported to more than 100 countries and we also have over a hundred bases for producing cassava." – Case 2 • Component supply "As there are many suppliers which can supply components we need, we often consider the Xin Jia Bi (to be value for money)." – Case 1 "We are a mechanical processing company. According to our customer's requirements, we

	manufacture components that are used for petroleum equipment, aero-engines and nuclear power equipment." – Case 17 • Finished product supply *"We have three products: medical devices, pharmaceutical and consumer goods." – Case 10* *"We are a US-based professional fitness equipment company. We have five different brands ranging from home to business, but in China we only focus on the supply chain and our products are exported to the US and some to Europe." – Case 12* *"We have central government procurement every year. All of our office and laboratory suppliers have to go through the procedures for government online purchases." – Case 18* *"We import and export cosmetics. Our main supply source is from Thailand and sometimes from Australia, New Zealand and Japan." – Case 20* *"We are a telecom equipment supplier including station, network and communication equipment and mobile phones." – Case 15* • Property development *"We are a large state-owned property developer focusing on high-technology park development" – Case 13* *"We are a project-based company focusing on care home development." – Case 7*
Service Boundary	• Diverse, multiple and non-linear relationships

"Our overall supply chain structure can be generally categorized into three groups: European and American musicians and their companies, concert venues and ticket offices, but we don't have linear relationships like traditional supply chains. Instead, our supply chain shows dispersed patterns because we directly manage relationships with our customers." – Case 8

"We are a start-up business in the fintech industry focusing on R&D for online payments. Unlike traditional manufacturing businesses, it's not very clear who our suppliers are and who our customers are." – Case 22

"We have many partners from all over the world such as hotels, airlines, destinations and other travel agents." – Case 6

"We are engaged in the management of private equity funds. Unlike traditional manufacturing companies, our upstream customers provide us with funds and projects." – Case 9

- Providing services for conflict resolution between organizations

"In the entertainment industry, collaborating with our partners involves intensive communication, such as explaining cultural and policy differences in terms of organizing concerts and sponsorships between China and the West." – Case 8

"Our main business is to provide consulting services to Chinese MNEs for their businesses overseas, particularly in Africa." – Case 23

- Providing services for gap-filling

"As there are many cultural differences between Chinese consumers and Western consumers, as well as the mobile internet environment in China,

	we do localization based on the Android mobile phone OS" – Case 3 *"We are doing business management consulting and training and we also have some software businesses." – Case 4* *"As we don't have much experience in care home management, we have formed a JV with an American firm that will be responsible for operational management." – Case7* • Providing exclusive services *"As we are the only enterprise in this industry, we are responsible for the supply of electricity in all areas, including power transmission, power distribution services, power sales of electricity and direct power supply." – Case 5* *"We issue the report to the FDA" – Case 18* *"We are one of the state-owned banks" – Case 19*
Financial Boundary	• Keeping on good terms with local banks by maintaining personal relationships (i.e. friendshi *"The bank is normally inflexible to lend you money at very short notice, but on the occasion of our case, this is because of personal relationships." – Case 14* • Building trust relationships through accumulating credit over time *"When experiencing financial disruption (i.e. unable to pay the premium for raw material to our supplier), we go to the local bank where we have a good credit record and relationship." – Case 14* • Multi-methods of financing

	"In the face of financial disruption, we first will try to borrow money from the bank or from our shareholders, and even our friends and family. But it's a short-term solution because when interest generated by the loan exceeds the benchmark of our financial risk, we consider inviting new investors and increasing the number of shareholders." – Case 17
	"We are struggling with capital flow and we have to keep searching for funding through various channels almost every half a year" – Case 22
	"Without a positive cash flow, I don't think any firm can survive. These are two different concepts: profit and cashflow. A positive cash flow reflects financing capability, including how quickly you can realize the value of the products and services, the ability to acquire debt (i.e. bank loans, investment funds), and the ability to raise shareholder equity financing." – Case 4
	"We have a dedicated department to do financing in which people are very familiar with people in this industry and get information about how to get money from various channels." – Case 6
	"In general, our cashflow is well managed. If we want to expand our businesses (like M&A), we often increase our capital through stocks and shares or issue social funds or borrow money from banks and other channels." – Case 2
	"From the financial point of view, we have integrated our clients' money and invested in different projects." – Case 9
	"In addition to work with other companies under our parent company, we also collaborate with some large financial institutions or well-known companies, so we can broaden our business networks and increase our capacity for financing." – Case 7

	• Asymmetric payment terms *"Although we have been working with our suppliers for over a year, we still have to make payment in advance. Sometimes, their shipments are delayed for many reasons. To keep our customers happy, we have to refund our customers until the products are delivered." – Case 20*
Manpower Boundary	• Highly depending on the expertise of the workforce *"As the oil industry is volatile, we adopt a three-day planning strategy in order to control our operational costs. This method heavily relies on our people, for example timely monitoring market changes and communicating with other teams." – Case 14* *"As the OS is constantly changing, keeping up the same pace of change demands high quality of people."– Case 3* *"To increase our efficiency and reduce our costs, we have to lay off a lot of employees, but the frontline staff, especially experienced operators, will be always maintained" – Case 17* *"The discernment of people who work in the frontline is very important such as in detecting problems, handling emergencies and controlling the pace of meetings with senior government officials. This all lubricates our relationship development with the government in the late stage." – Case 23* *"It is a very extravagant process training a good consultant and it's difficult to find quality people. We often collaborate with individuals or freelances who are experts in certain fields or involve them in some of our projects." – Case 4*

"We promote flat management because we believe the Chinese concept 'Duck feels spring's coming before human being.' Those who work at the frontline can sense or quickly capture small changes in the market and flat management will enable information to flow quickly to the management team and quickly configure resources that are needed to react to these changes." – Case 6

"People are very important because their talent has a direct impact on customer satisfaction. So we choose 'elite.' This includes many factors such as personality and character, experience and knowledge, and social and professional connections." – Case 9

- Recognizable culture shared by members of organizations

"The success recipe of this company in China is its organizational culture: 'freedom,' 'hope,' 'family' and 'incentives' – that is well-received by a wide range of stakeholders." – Case 11

"Our core competition is our people. Managing people relies on organizational culture." – Case 3

"As we are an international company, we are getting used to remotely working together with people from different countries on any international projects. Because we allow the same process and flow." – Case 21

- An innovative platform for career development

"A company provides us with an entrepreneurial platform that makes our dream come true as an entrepreneur." – Case 11

- Restoring positive emotions

	"As we feel that we should respond to victims and fans during the terrorist attack, our PR team proactively approached and communicated with the artist, who was completely shocked, as were her team. Less than in one month, we and the artist re-launched a charity concert at the same stadium to raise money for victims and fans." – Case 8 • Change of boundary-spanning roles *"A change of employee with whom we normally worked in our supply side led to a short-term interruption in receiving daily feedback or updates from our supplier and sometimes it could be a big problem"* – Case 10 • Unethical or unreliable behavior *"Communication doesn't help because the patent lawyer doesn't tell you the truth. As a result, all our applications were rejected after two years and it cost a fortune."* – Case 22 *"After the argument with the CEO, the CTO quit his job and took our product's patent to our competitor's company."* – Case 14 *"There is an unspoken rule when we buy products from our competitors that we have to clearly say what kind of products we want (i.e. domestic manufactured or overseas manufactured). Although we made it very clear what we want, we still received fake products. That led to terminating our collaboration."* – Case 20 *"We find it's very difficult to work with people who agree but change their minds later when we make the payment and there is no room to negotiate."* – Case 20

	"Compliance management would help to avoid some unethical behaviors (i.e. bribery or ignorance of laws and regulations) so as to reduce disruptions." – Case 15 • Lack of social justice *"Employee emotional management is important, especially those who work at the frontline and deal with customer complaints. If the negative emotion is not timely diverted, it causes employees to be less dedicated to work because they feel unfairness or a lack of justice."* – Case 19
Regulatory Boundary	• Interactions with government *"We proactively and continually communicate with local government. This includes organizing international business trips for them to visit our R&D centre, farms and manufacturers in the US. Our sales demonstrate the quality of our products to the governors"* – Case 11 *"We have to show the local government our strong network connections in the region as well as with the Chinese government. We also have to consider personal needs, including his family and friends, and understand what he wants to achieve through the projects at both the individual and organizational levels."* – Case 23 • Being sensitive to policy and rules *"As music is very ideological, for example, concerning economics or policy, any concerts we organize in China need to be approved by the Chinese government, in particular to investigate the background of these European /American musicians and artists, and checking the lyrics of all songs if they include any ideological opponents of the Chinese government or Communist party."* – Case 8

"Doing business in China, you must pay attention to the introduction of laws and regulations as well as political climate changes." – Case 4

"Changes in policy will not only affect our company but also the entire industry. We normally have a department which is called government relationship (GR) to gain all the necessary information from the government so we can prepare for change in advance." – Case 6

"We are a central state-owned enterprise in China which is greatly influenced by policies, so we don't have many choices regarding our suppliers." – Case 5

"We will keep a good relationship with the local governors where our project is based. In the face of unexpected situations, they will help to lubricate and communicate with relevant departments in order to solve the problem." – Case 7

"In 2016, the U.S. Department of Commerce sanctioned us and required all US suppliers to stop supplying products to us, which caused our entire supply chain to be almost paralyzed. The reason is because we sold our products to Iran, which is one of seven banned terrorist countries identified by the US government." – Case 15

- Being flexible to changes of government-related events and policy

"What we learn from doing business in China over the years is to carefully interpret the different implications of government policy at the different stages and adapt quickly." – Case 1

"China's FDA has introduced new standards for certain types of medical device products in which some situations are very critical to us. Our entire

	supply chain has to quickly respond to the change." – Case 10 *"Government elections will affect the progress of our projects in some African states because they, for example, lead to a decrease in the oil price and economic recession. Consequently, we have to pause our projects until it's recovered." – Case 23* *"At the beginning, our company, and [I believe] all other companies in the tourism industry, was greatly affected by national policy because only a few companies were designated by the government to do this business. But since 2006 the market has become completely free competition. Our business strategy has changed to focus on the domestic market and online customers." – Case 6* *"In the past 12 months, the Chinese government has released a number of policies to regulate the capital market. Companies like us are greatly affected by these changes and some companies are bankrupt or closed down." – Case 9* *"As we are building a retirement community which is categorized as a real estate project, it is often affected by changes in real estate policies." – Case 7* • Multi-purposes or methods of collaboration with government *"We have collaborated with the state-owned oil companies in order to access resources in China. However, our collaboration with them is not only driven by profit but also by government-government collaboration." – Case 21* *"Although it's been privatized, the government still owns a 49% equity share of our businesses." – Case 2*

	"We provide the FDA with technical support to execute the law enforcement power over food and pharmaceutical factories." – Case 18 *"We are managed by the central bank. We need to maintain relationships with it but we are a state-owned bank, so they would help us if we have any problem." – Case 19*
Customer Boundary	• Adopting a hybrid business model *"We have two sales models which are direct selling (B2C) and indirect selling via distributors (B2B)." – Case 14* *"We are a small business, so we work with our end customers and agents." – Case 4* *"We sell our products through agents." – Case 2* *"We sell our products online and offline, as well as through our 70 agents." – Case 20* *"In the downstream market, we have carriers and end users. Our sales channels are online, offline as well as other channels." – Case 15* • Making a good impression on customers *"We became their customers in 1996 through our friend's recommendations. We first attended the product demonstration. After a few trials, we were convinced by their quality and environmental-friendly products." – Case 11* *"Skillful communication and interaction with our customers are very important to our credibility in the eyes of our customers." – Case 23* *"Reputation with our customers is crucial as our business is very much customer-oriented. We have a dedicated team to deal with customer complaints and resolve some issues before customer complaints." – Case 6*

"As long as you have a good reputation (i.e. kou bei or trust), our customers are willing to cooperate with us no matter where they are." – Case 9

"We are a new business. To build trust with our customers, we haven't increased the retail prices over the last three years and we just live on a very small profit." – Case 20

"Customer satisfaction is our priority. Otherwise they would leave us." – Case 19

- Integrating personal feelings

"We integrate our personal feelings into our business and our customers can feel it. This is very powerful to keep our customers' loyalty." – Case 20

- Unspoken rules

"Rooted in Chinese political values for short-term gains in the office term of leaders, we are always at a disadvantage. Even though an incentive policy from the government is in place that encourages hospitals to buy China-made medical devices and we also offer quality products at very competitive prices, hospitals always favor foreign brands for leaders' self-interest." – Case 1

- Product and service safety

"We are facing a big lawsuit in the US in which a customer is requesting compensation of more than $1 billion because one of our products is carcinogenic." – Case 10

"This is mainly about technical safety concerning the entire grid system because if a large-scale power outage occurs it has a very big impact not

only on economics but also social stability." – Case 5

"When we make an investment, we have to manage our risks. Protecting the safety of our clients' funds and maximizing the benefits to our customers are our priority." – Case 9

"Our target customers are in the high-end group aged from 55 to 60 years old. They are looking for better service and quality living conditions." – Case 7

- Leading position in industry

"The second one I think is from the customer's point of view. Our customers are mobile phone hardware manufacturers. At the beginning, our products had an absolute advantage. Many mobile phone manufacturers come to us to cooperate." – Case 3

- Customer-oriented strategy

"As we are in consumer goods, customer satisfaction including on-time-delivery, product quality and post-sales services is very important for our business." – Case 12

"I think there are four factors that build a strong and unbreakable connection between us: on time delivery, quality management, cost management and continual innovation. Integrity is the foundation of all these four." – Case 17

"Doing business it is important to focus on the needs of consumers and markets, as well as what your competitors are doing, because it all gives you signals or pushes in terms of how to make an adjustment of your products and strategy." – Case 6

	"Our customer orientation is only for certain industries and well-known companies in these industries." – Case 13 *"We need to maintain our relationships with our customers." – Case 9*

Table 10 Selected quotes to illustrate the six distinct BOBs

3.4.3 Finding 3 Activity by Ownership type, Firm size, Industry and Location

Ecosystem activity by ownership type. As Figure 4 shows, 27% of the firms are state-owned enterprises, 50% are privately owned enterprises and 23% are non-Chinese MNEs. The regulatory activity of SoEs is significantly higher than that of the other two types of enterprise and this sharply contrasts with their engagement at the financial and manpower BOBs. Non-Chinese MNEs have zero activity at the financial BOB and also relatively low engagement at the service BOB (average 20%) but are fairly active at the other three BOBs, for which the averages for the goods and manpower BOBs are both 80%, while for the regulatory BOB it is 60%. Regarding the PoEs, they are very active at the manpower BOB (average 91%), which is similar to the non-Chinese MNEs, and at the customer BOB (average 91%), which is similar to the SoEs. Their engagement at the three other BOBs seems relatively even, ranging from 45% to 55%.

CASE No.	Goods activity	Service activity	Regulatory activity	Financial activity	Manpower activity	Customer activity	No. of BOB activity	No. of relationships in upstream	No. of relationships in downstream	No. of relationships	State owned enteprise	Privately owned enteprise	Non-Chinese MNEs
1	1	0	0	1	1	1	4	3	3	8	0	1	0
2	1	0	1	0	1	1	4	1	2	7	0	0	1
3	0	1	0	0	1	0	2	3	2	5	0	0	1
4	1	0	1	0	0	1	3	3	4	4	0	1	0
5	1	0	1	0	1	1	4	4	3	8	0	0	1
6	1	0	0	0	0	1	2	7	3	4	0	0	1
7	0	1	0	0	1	1	3	3	1	5	0	1	0
8	1	0	1	0	1	0	3	3	3	4	0	0	1
9	1	0	0	1	1	1	4	4	2	9	0	1	0
10	0	1	0	1	1	0	3	4	1	3	0	1	0
11	0	1	1	0	1	1	4	5	2	5	0	1	0
12	0	1	1	1	1	1	5	6	3	6	0	1	0
13	0	1	1	1	1	1	5	8	4	5	0	1	0
14	0	1	1	0	0	1	3	3	2	5	1	0	0
15	1	0	1	1	0	1	4	3	3	4	1	0	0
16	0	1	1	1	1	1	5	2	2	5	0	1	0
17	1	1	1	0	0	0	3	4	2	3	1	0	0
18	1	0	0	1	1	1	4	4	3	9	0	1	0
19	1	0	1	0	0	1	3	5	6	6	1	0	0
20	1	0	1	0	1	1	4	3	4	3	0	1	0
21	0	1	1	0	1	1	4	5	4	5	1	0	0
22	1	1	1	0	0	1	4	5	3	5	1	0	0
Total	13	11	15	8	15	18	80	88	62	118	6	11	5

Table 11 An overview of BOB activity by case and ownership type

Category	Goods	Service	Regulatory	Financial	Manpower	Customer
State owned enterprise	0.67	0.67	1	0.17	0.17	0.83
Privately owned enterprise	0.45	0.55	0.55	0.64	0.91	0.91
Non Chinese MNEs	0.8	0.2	0.6	0	0.8	0.6

Table 12 Activity engagement by ownership type
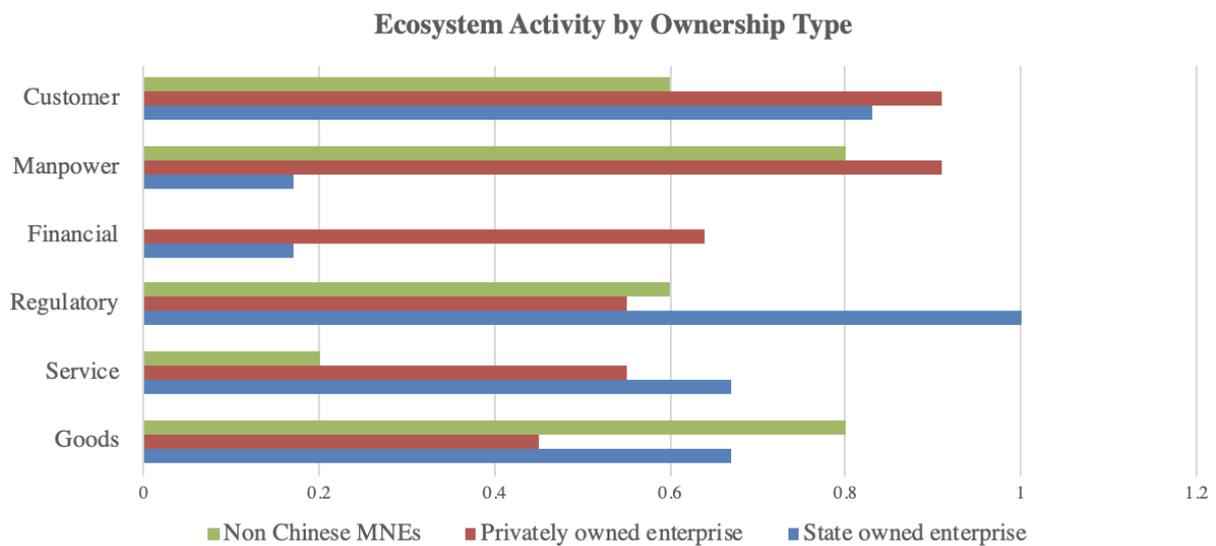
Figure 9 A comparative view of activity by ownership type

Ecosystem activity by firm size. As Figure 5 shows, large-sized firms account for 60% of the sample and the remaining 40% are small and medium sized firms. Both large and medium-sized firms have relatively low engagement at the financial BOB, while in contrast the financial engagement by small firms is 3 times higher than that of large and medium-sized ones, reaching 75% on average. The large firms have lower engagement at the manpower BOB compared to the small and medium-sized firms, both of which are at 75%. Almost all the medium-sized firms are engaged in activity at the customer BOB but only 50% of them are engaged in at least one of the goods, service or regulatory BOBs. The activity of small firms at the service BOB is approximately 30% higher than at the goods, regulatory and customer BOBs. The large firms have an opposite pattern to that of the small firms, with their activity at the goods, regulatory and customer BOBs being higher than at the service BOB.

CASE No.	Goods activity	Service activity	Regulatory activity	Financial activity	Manpower activity	Customer activity	No. of BOB activity	No. of relationships in upstream	No. of relationships in downstream	No. of relationships	Small Enteripise	Medium Enterprise	Large Enterprise
1	1	0	0	1	1	1	4	3	3	8	0	0	1
2	1	0	1	0	1	1	4	1	2	7	0	0	1
3	0	1	0	0	1	0	2	3	2	5	0	0	1
4	1	0	1	0	0	1	3	3	4	4	0	1	0
5	1	0	1	0	1	1	4	4	3	8	0	0	1
6	1	0	0	0	0	1	2	7	3	4	0	0	1
7	0	1	0	0	1	1	3	3	1	5	0	1	0
8	1	0	1	0	1	0	3	3	3	4	0	0	1
9	1	0	0	1	1	1	4	4	2	9	0	1	0
10	0	1	0	1	1	0	3	4	1	3	1	0	0
11	0	1	1	0	1	1	4	5	2	5	0	1	0
12	0	1	1	1	1	1	5	6	3	6	1	0	0
13	0	1	1	1	1	1	5	8	4	5	0	0	1
14	0	1	1	0	0	1	3	3	2	5	0	0	1
15	1	0	1	1	0	1	4	3	3	4	0	0	0
16	0	1	1	1	1	1	5	2	2	5	0	0	1
17	1	1	1	0	0	0	3	4	2	3	1	0	0
18	1	0	0	1	1	1	4	4	3	9	1	0	0
19	1	0	1	0	0	1	3	5	6	6	0	0	1
20	1	0	1	0	1	1	4	3	4	3	0	0	1
21	0	1	1	0	1	1	4	5	4	5	0	0	1
22	1	1	1	0	0	1	4	5	3	5	0	0	1
Total	13	11	15	8	15	18	80	88	62	118	4	4	13

Table 13 An overview of BOB activity by case and firm size

Category	Goods	Service	Regulatory	Financial	Manpower	Customer
Small Enteripise	0.5	0.75	0.5	0.75	0.75	0.5
Medium Enterprise	0.5	0.5	0.5	0.25	0.75	1
Large Enterprise	0.62	0.46	0.77	0.23	0.69	0.85

Table 14 Activity engagement by firm size
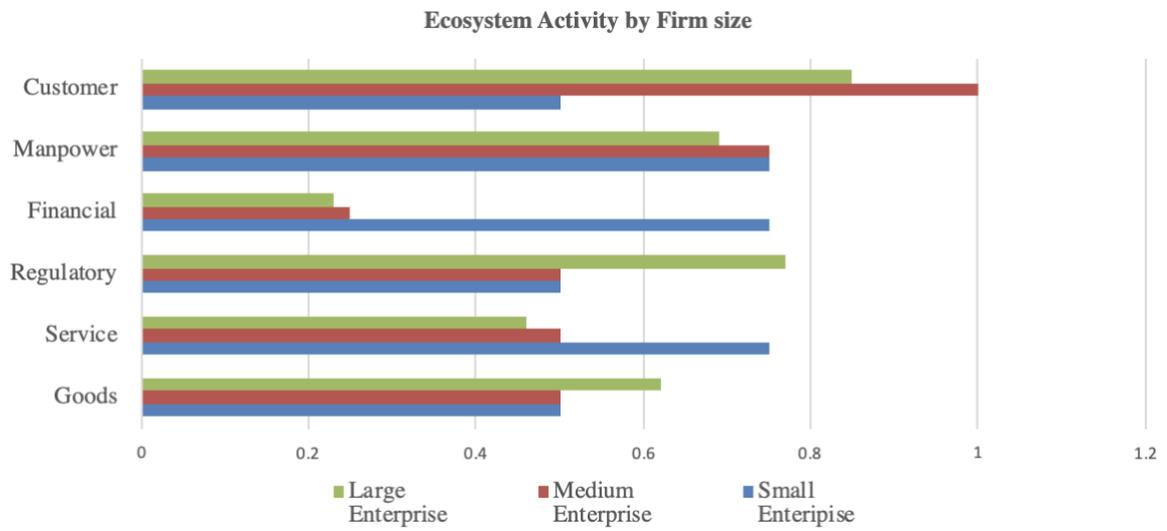
Figure 10 A comparative view of activity by firm size

Ecosystem activity by industry. 60% of the firms are in a service industry and 40% in a manufacturing industry. Manufacturing industry firms are fully engaged in activity at the goods BOB but have low engagement at the service BOB. In contrast, those in a service industry are actively engaged in activity at the service BOB but have low engagement at the goods BOB. Firms in both industries have the same level (38%) of engagement in activity at the financial BOB. In general, engagement in activity at the regulatory, manpower and customer BOBs is higher for manufacturing firms than for service firms.

CASE No.	Goods activity	Service activity	Regulatory activity	Financial activity	Manpower activity	Customer activity	No. of BOB activity	No. of relationships in upstream	No. of relationships in downstream	No. of relationships	Service Industry	Manufacture Industry
1	1	0	0	1	1	1	4	3	3	8	0	1
2	1	0	1	0	1	1	4	1	2	7	0	1
3	0	1	0	0	1	0	2	3	2	5	1	0
4	1	0	1	0	0	1	3	3	4	4	0	1
5	1	0	1	0	1	1	4	4	3	8	0	1
6	1	0	0	0	0	1	2	7	3	4	1	0
7	0	1	0	0	1	1	3	3	1	5	1	0
8	1	0	1	0	1	0	3	3	3	4	0	1
9	1	0	0	1	1	1	4	4	2	9	0	1
10	0	1	0	1	1	0	3	4	1	3	1	0
11	0	1	1	0	1	1	4	5	2	5	1	0
12	0	1	1	1	1	1	5	6	3	6	1	0
13	0	1	1	1	1	1	5	8	4	5	1	0
14	0	1	1	0	0	1	3	3	2	5	1	0
15	1	0	1	1	0	1	4	3	3	4	0	1
16	0	1	1	1	1	1	5	2	2	5	1	0
17	1	1	1	0	0	0	3	4	2	3	1	0
18	1	0	0	1	1	1	4	4	3	9	1	0
19	1	0	1	0	0	1	3	5	6	6	1	0
20	1	0	1	0	1	1	4	3	4	3	0	1
21	0	1	1	0	1	1	4	5	4	5	1	0
22	1	1	1	0	0	1	4	5	3	5	1	0
Total	**13**	**11**	**15**	**8**	**15**	**18**	**80**	**88**	**62**	**118**	**14**	**8**

Table 15 An overview of BOB activity by case and industry type

Category	Goods	Service	Regulatory	Financial	Manpower	Customer
Service Industry	0.36	0.79	0.64	0.38	0.64	0.77
Manufacture Industry	1	0	0.75	0.38	0.75	0.88

Table 16 Activity engagement by industry type
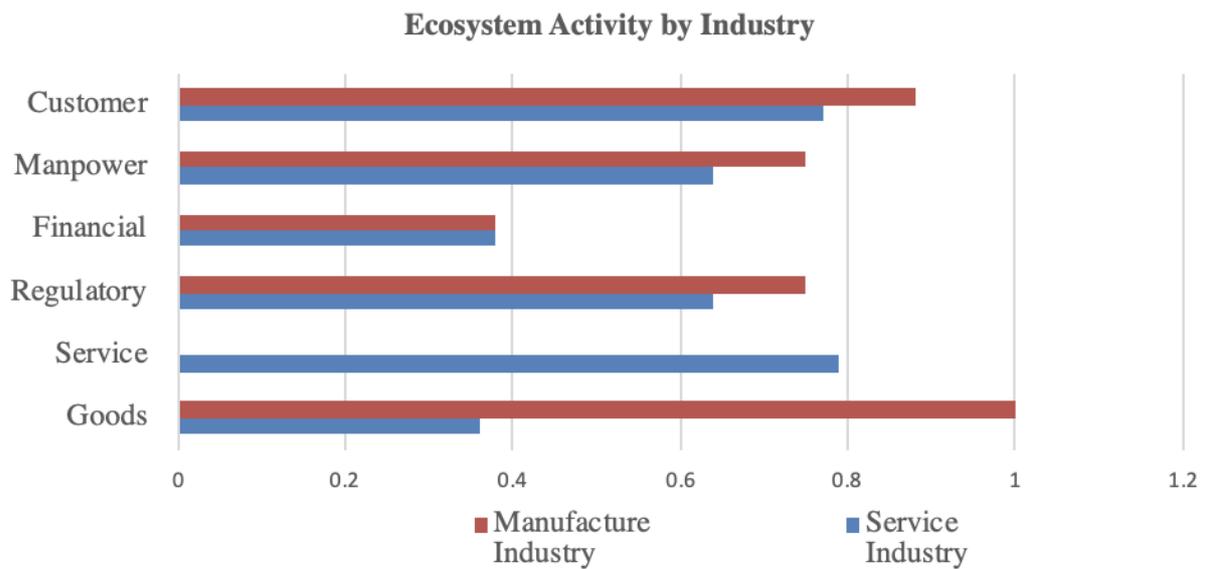
Figure 11 A comparative view of activity by industry type

Ecosystem activity by location. Over 70% of the firms are located in the east, 20% in the north and 10% in the west. Firms located in the north are fully engaged in activity at the regulatory and manpower BOBs and 50% of them in at least one of the goods, service or customer BOBs. Firms in the east are actively engaged in activity at the customer BOB and this is followed by activity at the regulatory, manpower, goods and service BOBs. Compared to the east and the north, firms in the west have significantly higher engagement in activity at the financial BOB and less engagement at the regulatory BOB.

CASE No.	Goods activity	Service activity	Regulatory activity	Financial activity	Manpower activity	Customer activity	No. of BOB activity	No. of relationships in upstream	No. of relationships in downstream	No. of relationships	West	East	North
1	1	0	0	1	1	1	4	3	3	8	0	1	0
2	1	0	1	0	1	1	4	1	2	7	0	1	0
3	0	1	0	0	1	0	2	3	2	5	0	1	0
4	1	0	1	0	0	1	3	3	4	4	0	1	0
5	1	0	1	0	1	1	4	4	3	8	0	1	0
6	1	0	0	0	0	1	2	7	3	4	0	1	0
7	0	1	0	0	1	1	3	3	1	5	0	1	0
8	1	0	1	0	1	0	3	3	3	4	0	0	1
9	1	0	0	1	1	1	4	4	2	9	1	0	0
10	0	1	0	1	1	0	3	4	1	3	0	1	0
11	0	1	1	0	1	1	4	5	2	5	0	0	1
12	0	1	1	1	1	1	5	6	3	6	0	1	0
13	0	1	1	1	1	1	5	8	4	5	0	1	0
14	0	1	1	0	0	1	3	3	2	5	0	1	0
15	1	0	1	1	0	1	4	3	3	4	0	1	0
16	0	1	1	1	1	1	5	2	2	5	0	1	0
17	1	1	1	0	0	0	3	4	2	3	1	0	0
18	1	0	0	1	1	1	4	4	3	9	1	0	0
19	1	0	1	0	0	1	3	5	6	6	0	1	0
20	1	0	1	0	1	1	4	3	4	3	0	1	0
21	0	1	1	0	1	1	4	5	4	5	1	0	0
22	1	1	1	0	0	1	4	5	3	5	0	1	0
Total	**13**	**11**	**15**	**8**	**15**	**18**	**80**	**88**	**62**	**118**	**4**	**16**	**2**

Table 17 An overview of BOB activity by case and location

Category	Goods	Service	Regulatory	Financial	Manpower	Customer
West	0.75	0.5	0.5	0.75	0.75	0.75
East	0.56	0.5	0.69	0.38	0.63	0.88
North	0.5	0.5	1	0	1	0.5

Table 18 Activity engagement by location
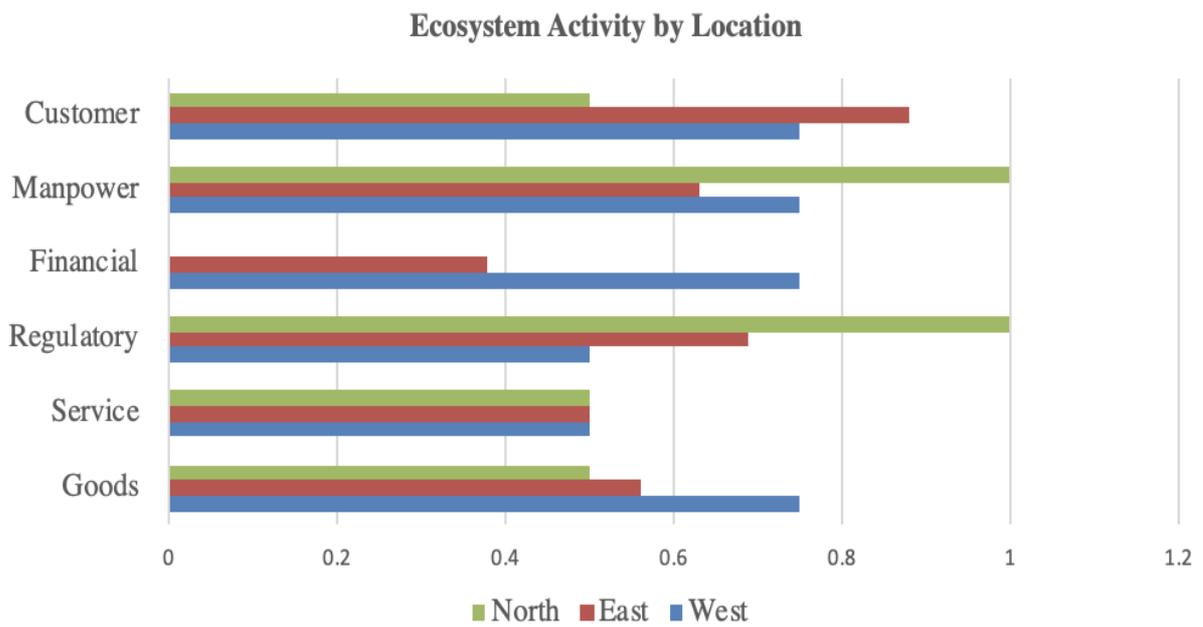
Figure 12 A comparative view of activity by location

3.5 Discussion

The aim of this study has been to understand the environment in which organizations depend on each other for their mutual effectiveness and survival from the perspective of ecosystems. Insights from the ecosystem approach differ from those from other approaches to studying interdependence between organizations. In the literature on inter-organizational networks and alliances, little attention has been devoted to understanding the initial conditions from which networks emerge. This is because the initial social structure defaults to being given by the industry to which organizations belong, and the initial structure of alliances is formed building on this (Shipilov & Gawer, 2020). In contrast, the ecosystem literature is interested in the origins of ecosystems (Ozcan & Santos, 2015), which provides a new way of understanding complex inter-organizational relationships among multiple actors.

In addition, the focus of research on inter-organizational networks and alliances has been largely on ties or links between actors rather than on value propositions per se. Adner (2017, p. 51) points out that under the umbrella of strategy in terms of value creation or value capture, this approach is often incomplete due to its failure to specify the purpose of ties and links and sometimes to differentiate between ties with the same actor that may fall into two distinct ecosystems. For example, when firm A collaborates with firm B in medical devices and with firm B in consumer goods, the network

perspective tends to reinforce these ties by simply combining them, whereas the ecosystem perspective treats them separately as two distinct sub-systems.

The twenty-two maps show a great variety of structures of coordination between the focal organizations and other actors both upstream (production) and downstream (consumption) with different types of complementarity. Complementarity is commonly viewed as a driver of interdependence between organizations – namely inter-organizational relationships (Shipilov & Gawer, 2020). Following this logic, I argue that complementarity plays an important role in forming and shaping the dynamics of interdependence between actors in ecosystems. Previous studies on inter-organizational networks often begin with a baseline hypothesis that forming alliances with other organizations is for resource complementarities (e.g. Gulati, 1995; Gulati & Gargiulo, 1999). However, they narrowly focus on production complementarities in the upstream market while neglecting consumption complementarities in the downstream market (Shipilov & Gawer, 2020). By employing the ecosystem-based view, the present study has revealed six distinct meaningful complementarities by focusing on task-related activities at the boundaries between organizations in ecosystems – goods, service, manpower, regulatory, finance and customer – which leads to a number of implications.

First, by focusing on multiplicity, complementarities between organizations and non-hierarchical control, my findings extend beyond the two types of complementarity identified by Jacobides, Cennamo & Gawer (2018) from a primary focus on activities in production and consumption to regulatory, financial and manpower activities. This provides a more

comprehensive view of the environment in which organizations depend on each other for their survival or growth, or both. More specifically, it delineates boundary conditions under which inter-organizational relationships perform in ecosystems. In doing so, it offers a new way of understanding the characteristics of IORs and their relational dynamics, which affect organizational resilience. The 118 ties identified in ecosystems will be analysed and discussed in the following chapter on inter-organizational relationships.

Second, and relatedly, beyond offering two types of complementarity – unique and super-modular (Jacobides, Cennamo & Gawer, 2018) – my findings also show that some relationships between actors in ecosystems are driven by the use of generic complements, especially at the regulatory boundary. This is similar to an observation by Teece (1986) but it is opposed to the view of Jacobides, Cennamo & Gawer (2018) that as generic complementarity does not require a specific alignment structure among economic actors it does not fit the features of ecosystems. There are two possible reasons for this opposition. First, the two types of complementarity proposed by Jacobides, Cennamo & Gawer (2018) are indeed derived from analysing characteristics or patterns of production and consumption, while the analysis in the present study includes activities not only in these two areas but also in other areas. For example, regulatory actors are not economic actors but regulation could be a matter of death or life to organizations, especially those that are state-owned enterprises. This specific alignment structure is often designed to have boundary-spanning roles in managing government relations. Second, from the perspectives of non-hierarchical controls and non-

decomposable relationships in ecosystems (Adner, 2017), all complementarities that drive the formation and contingency of inter-organizational relationships are identical in the sense that the probability of one relationship affecting another relationship is equal in ecosystems.

Third, the aggregate ecosystem model (Figure 2) is composed of different BOBs with which it is necessary for a firm to engage in order for it to survive and grow. This poses a challenge to organizations in terms of how to continually manage multiple flows of activities with other actors in and across different BOBs, especially when faced with disruptions (e.g. natural or manmade disasters). Organizational resilience, which is defined as the ability of an organization to manage adversity (Sutcliffe & Vogus, 2003), has increasingly been acknowledged as a crucial capability for an organization to cope with disruptions and survive over the long term in dynamic and uncertain environments (Bhamra, Dani & Burnard, 2011; Ortiz-de-Mandojana & Bansal, 2015). This includes (i) more quickly responding to environmental changes and recovering faster from adversity when it occurs (e.g. Sutcliffe & Vogus, 2003); (ii) absorbing strain and preserving stability under duress (e.g. Limnios, Mazzarol, Ghadouani & Schilizzi, 2014); and (iii) developing flexible resources or innovating new business models in order to adapt to environmental changes (e.g. Hamel & Valikangas, 2003). From the perspective of strategic management, resilience, which enables organizations to successfully manage adversity, is also a source of sustainable competitive advantage. Although the present study has laid out the ground for contextualising the meaningful organizational resilience that helps organizations avoid value depletion in the face of adversity, it does not

114

provide a full answer in terms of why and how to manage ties or inter-organizational relationships in ecosystems that are essential for building resilience. These questions will be addressed in the following chapters on inter-organizational relationships, disruption and organizational resilience.

Chapter 4 Exploring the Attributes of IORs in Business Ecosystems

4.1 Aim

By employing inductive theorizing based on qualitative in-depth interview data from twenty-two organizations, this chapter attempts to explore attributes of IOR and patterns of IOR attributes within activity-based boundaries in business ecosystems. The emphasis on the ecosystem approach provides a new way of looking at IORs by extending the primary focus on ties between actors for value creation and value capture in production and consumption to other ties simultaneously and actively operating at the regulatory, manpower and financial boundaries. More specifically, by focusing on a firm and its environment as the unit of analysis, which consists of "organizations, institutions, and individuals that impact the enterprise and the enterprise' customers and suppliers" (Teece, 2007, p. 1325), this approach captures heterogeneous actors engaged with the firm forming a web of relationships. The present study explores the characteristics of IORs and the dynamisms of IORs at each boundary within this web.

4.2 Literature Review

4.2.1 Emergence of IORs in Strategic Management

Scholars in the strategy field are concerned fundamentally with explaining differential firm performance (Rumelt, Schendel, & Teece, 1991). In answering this question, scholars tend to view firms as autonomous entities

that strive for competitive advantages from the industry structure view (Porter, 1980) or from the resource-based view (Barney, 1991). Although this is important, it has been criticized for neglecting the fact that a firm's critical resources may extend beyond its boundaries (e.g., Dyer & Singh, 1998; Gulati, Nohria, & Zaheer, 2000). Organizations are open systems, which often interact with their external environments to acquire critical resources (Pfeffer & Salancik, 1978) to gain competitive advantages. Dyer & Singh (1998, p. 661) refer to this as "the inter-organizational rent-generating process", which is fundamentally different to the arm's-length market relationships that 'are not rare or difficult to imitate' (p.662). This implies that the inter-organizational relationships – commonly referred to as strategic alliances[3] in empirical contexts – generate competitive advantages[4] through the joint idiosyncratic contributions in exchange relationships with the alliance partners. Indeed, the theoretical interest in the study of IORs originates from the social embeddedness of economic activity through which organizations manage their interdependence (Granovetter, 1985). Un like the logic of arm's-length market relationships, which pursue immediate economic gains, the embeddedness is a logic of exchange that promotes long-term cooperative relationships at both individual and collective levels for learning, sharing risks and co-evolving. Uzzi (1996) argues that building the long-term

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[3] Alliance is 'an inter-organizational relationship where two (or more) organizations pool their resources to achieve some common objective through formal and informal coordination'. Shipilov & Gawer (2020:95)

[4] The competitive advantages of partnerships include investments in relation-specific assets, substantial knowledge exchange, the combination of complementary but scarce, resources or capabilities, lower transaction costs than competitor alliances (Dyer & Singh, 2000).

cooperative relationship can be achieved through trust, reciprocity, fine-grained information transfer, and joint problem solving arrangements.

Exchange relationships involve a number of long-lasting transactions, flows, and linkages amongst organizations (Oliver, 1990) to accomplish certain strategic objectives (Salvato, Reuer, & Battigalli, 2017). There has been an impressive accumulation of IOR studies examining different issues in various stages of IORs (e.g., formation, maintenance and mortality), such as their characteristics, antecedents, consequences and blind spots (Dyer & Singh, 1998; Grandori & Soda, 1995; Oliver, 1990; Lumineau & Oliveira, 2018; Schermerhorn, 1975; Van de Ven, 1976; Whetten, 1981). Van de Ven (1976) argues that an IOR is a social action system that shares the basic elements[5] of any form of organized collective behavior through which structure and process are necessary to organize members' activities to reach collective goals. Whetten (1981) points out that, although scholars from different research traditions (e.g., public administration, marketing, economics and sociology) are interested in a different facet of IOR, improving coordination has a practical significance. Schermerhorn (1975) describes the formation and realization of an IOR as a process in which organizational decision-makers decide on cooperation as their preferred action strategy (decision maker demand) from a possible action strategy (decision-maker need). This influences organizational behaviors in implementing this strategy. Oliver (1990) integrates the IOR literature with

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[5] The basic elements, according to Van de Ven (1976), include behavior amongst members aiming at collective goals, interdependence amongst members through activity and an unique identity seperating from its members

six fundamental contingencies of relationship formation (necessity, asymmetry, reciprocity, efficiency, stablity, and legitimacy) and then examines the conditions under which the critical contingencies are likely to predict the formation of IORs. Surprisingly, in a review work on the empirical study of IORs, Provan, Fish, & Sydow (2007) find that very little research has been devoted to studying IOR in business and private sectors. Moreover, Lumineau & Oliveira (2018) identify four blind spots concering IORs: (1) asymmetry between parties; (2) uniform relationships between parties, (3) the assumption of a single level analysis; and (4) universal time.

Author(s)	Purpose of study	Unit of analysis	Type of study	Aspect of IOR identified	Key findings
Schermerhorn (1975)	Identify the motives for inter-organizational cooperation	Dyad	Theoretical	Decision-maker need for IORs • resource scarcity, value expectancy, coercive pressure Decision-maker demand • organization image/identity, resource requirements, domain considerations, support capacities (organization and environment)	Emphasis on the decision maker when entering inter-organizational arrangements
Van de ven (1976)	How and why relationships between organizations voluntarily emerge and are maintained	Dyad	Theoretical	Situational factors • Resource dependence; commitment to problem issue or opportunity; awareness; consensus; domain similarity Process dimensions	Based on six assumptions, nine testable hypotheses are developed to explain why and how IORs emerge and are maintained

				• Intensity of resource flows, intensity of information flows Structural dimensions • Formalization of IR, centralization of IR, complexity of IR Outcome dimensions • Perceived effectiveness	
Whetten (1981)	Review literature on IOR formation and focus on theme of improving coordination	Dyad /Network	Literature review and synthesis	Forms of inter-organizational relations • Dyadic • Organization set • Action set • Network	Focus on one aspect of IORs: improving coordination; identifies preconditions for successful coordination
Oliver (1990)	Identifying contingencies for IOR formation and how they apply for different types of relationship	Dyad /Network	Theoretical	Six contingencies of relationship formation: • Necessity • Asymmetry • Reciprocity	Contingencies for different types of relationship formation based on the six determinants

				Efficiency • Stability • Legitimacy	
Dyer and Singh (1988)	Identifying potential sources of inter-organizational competitive advantage and how these are earned and preserved under what conditions.	Dyad /Network	Theoretical	Four determinants of relational rents: • Relation-specific assets • Knowledge-sharing routines • Complementary resources and capabilities • Effective governance Four mechanisms of sustaining relational rents: • Inter-organizational asset connectedness • Partner scarcity	Four potential sources of inter-organizational competitive advantage and four the isolating mechanisms that preserve relational rents

				- Resource indivisibility (coevolution of capabilities) - The institutional environment	
Gulati & Gargiolu (1999)	Identifying drivers of the emergence of inter-organizational networks	Network	Empirical / Positivist / Quantitative	Alliance formation between two organization: - Interdependence - Structural differentiation - Repeated ties - Common ties - Joint centrality	Empirical support for 5 factors determining inter-organizational alliances
Vlaar, Van de Bosch & Volberda (2006)	Identifying four mechanisms that facilitate IORs formation	Dyad /Network	Theoretical	- Focusing attention - Forcing articulation, deliberation and reflection	Focus on the formation of IORs

				• Instigating and maintaining interaction • Reducing judgement errors and individual biases, and diminishing incompleteness and inconsistency of cognitive representation	
Grandori & Soda (1995)	Reviewing the important forms of network and identifying the mechanisms and variables that influence network emergence and shape	Network	Literature review and synthesis	• Network mechanisms • Network forms	Identified 10 coordination mechanisms and 3 types of networks

Table 19 Selected seminal works on IORs

4.2.2 Interdependence Related Concepts in IORs

Despite heterogeneous foci and terminological differences, a consensus emerging from previous studies is that interdependence is a reality of organizational life in which firms are embedded in networks constituting formal and enduring inter-organizational relationships that are strategically significant not only for themselves but also for other organizations (e.g., suppliers, customers, competitors, other entities) entering in the networks (Gulati, Nohria & Zaheer, 2000). In this regard, forms of IOR can range from a dyadic relationship between two organizations to a network relationship consisting of all interactions between organizations (e.g., dyads, organization sets or action sets [Whetten, 1981]). Two broad approaches emerge from the literature theorizing inter-organizational networks: one focusing on the firm level and the other on the network level (Provan, Fish & Sydow, 2007). As Provan, Fish & Sydow (2007) note, most studies building on theories such as resource dependence or transaction cost economics focus on a dyadic relationship, whilst alternativel other network scholars focus on the set of nodes connected by ties representing relationships in the whole network.

These two approaches are complementary to each other. On the one hand, theories and perspectives at the firm level that focus on attributes and characteristics of a dyadic relationship (e.g., Gulati, 1995) have provided a foundational work to research on the network level. This is because dyadic relationship between nodes in a network serves as the basic building blocks of the whole network (Provan, Fish & Sydow, 2007). Scholars attempt to

explain how individual firms and their behaviors may affect outcomes at the network level, such as network structures, stability, and effectiveness (e.g., Ahuja, 2000; Burkhardt & Brass, 1990; Burt, 1992; Uzzi, 1997). These are often augmented by a variety of informal coordinating mechanisms, such as trust, reciprocity, fine-grained information transfer and joint problem-solving arrangements (Granovetter, 1985; Uzzi, 1996). On the other hand, research at the level of the network tends to investigate the properties and characteristics of the whole network, together with the impacts of network-structures and behaviors on individual organizations, such as organizational learning or innovation (e.g., Powell, Koput, & Smith-Doerr, 1996; Walker, Kogut, & Shan, 1997).

Many terms are used in the literature to describe the phenomenon of interdependence, which is joint action by two or more people or organizational entities. Salvato, Reuer, & Battigalli (2017) make an effort to distinguish the three key terms – *collaboration, cooperation and coordination* – that are commonly employed in organization and management theory. *Collaboration* refers to joint work by two or more entities (e.g., individuals or organizations) to accomplish something but it does not specify the aim and effectiveness of joint work. Although *coordination* also refers to a joint work conducted by two or more entities, it differs from *collaboration* in a sense that it emphasizes a performance of the joint work in an orderly, efficient and effective way. Rather than focusing on the effectiveness of the joint work, *cooperation* highlights the level of alignment on interests between entities, which is central to the act of working together. Salvato, Reuer, & Battigalli

(2017) further point out that coordination can be viewed as a form of collaboration that can be obtained through structural or hierarchical arrangements, while cooperation is an outcome resulting from an intrinsic motivation, such as shared goals, an alignment of interests, or the development of shared identity amongst entities (Gulati, Wohlgezogen, & Zhelyazkov, 2012; Hardy, Lawrence, & Grant, 2005; Lindenberg & Foss, 2011).

Additionally, other terms used to describe the act of working together include 'boundary spanning team' (Marrone, 2010) or 'teamwork' (Humphrey & Aime, 2014), which refer to the collaborative actions or efforts. It is argued that the term, 'teamwork', often goes beyond simple collectives as it implies a shared identity, shared goals within which team members hold (Salvato, Reuer, & Battigalli, 2017). Other related terms such as 'altruism', 'pro-social behavior', and solidarity are not commonly used in the literature of organization and management because they may not require collaboration between the actors. However, these terms may emphasize some important behavioral and motivational aspects of collaboration in organizational setting (Salvato, Reuer, & Battigalli, 2017). For example, in a group project, cooperation may be interpreted as a solidary behavior in which the actor who has a free-ride opportunity without any negative consequence contributes to the common good.

Interdependence related concepts used in research on IORs	
Key concepts	**Selected Definition**
Collaboration	Collaboration is defined as 'a cooperative, inter-organizational relationship that is negotiated in an ongoing communicative process, and which relies on neither market nor hierarchical mechanisms of control' (Hardy, Phillips, & Lawrence, 2003, p. 323) Collaboration '(1) leverages the differences among participants to produce innovative, synergistic solutions and (2) balances divergent stakeholder concerns' (Hardy, Lawrence, & Grant, 2005, p. 58)
Cooperation	'Cooperation is the outcome of an intrinsic motivation that results from the sharing of goals, the alignment of interests, or the development of a shared identity among participants' (Salvato, Reuer, & Battigalli, 2017, p. 963) Cooperation is a 'joint pursuit of agreed-on goals(s) in a manner corresponding to a shared understanding about contributions and payoffs' (Gulati, Wohlgezogen, & Zhelyazkov, 2012, p.533)
Coordination	Coordination is 'the integration of organizational work under conditions of task interdependence and uncertainty' (Faraj & Xiao, 2006, p. 1156) 'A temporally unfolding and contextualized process of input regulation and interaction articulation to realize a collective performance' (p.1157) 'The process of interaction that integrates a collective set of interdependent tasks' (Okhuysen & Bechky, 2009, p. 463)

	'Coordination involves fitting together the activities of organization members, and the need for it arises from the interdependent nature of the activities that organization members perform' (Argote, 1982, p. 423)
Boundary spanning team	'A team's effort to establish and manage external linkages can occur within an organization (e.g., across marketing and manufacturing teams) or across organizational boundaries (e.g., to external customers, suppliers)' (Marrone, 2010, p. 912) Teams are 'assemblies of interdependent relations and activities organizing shifting sets or subsets of participants embedded in and relevant to wider resource and institutional environments'. (Humphrey & Aime, 2014, p. 450)
Altruism	'Altruism is a motivational state with the ultimate goal of increasing another's welfare' (Batson & Shaw, 1991, p. 108) 'The fact of caring about the needs and happiness of other people more than your own' or 'unselfish concern for the welfare of others; selflessness' (Salvato, Reuer, & Battigalli, 2017, p. 964)
Solidarity	'Support by one person or group of people for another because they share feelings, opinions, aims, etc' or 'Unity of purpose, interest, or sympathy' (Salvato, Reuer, & Battigalli, 2017, p. 964) 'A positive perception of the group and its members as structurally interdepedent, united, and cohesive' (Willer, Flynn, & Zak, 2012, pp. 125-126)
Prosocial behavior	'Behavior which is positive, helpful, and intended to promote social acceptance and friendship' or 'Actions that benefit other people or society as a whole, characterized by helping that does not benefit the helper'(Salvato, Reuer, & Battigalli, 2017, p. 964)

	'Prosocial behavior represents a broad category of acts that are defined by some significant segment of society and/or one's social group as generally beneficial to other people' (Penner, Dovidio, Piliavin, & Schroeder, 2005, p. 366)

Table 20 Interdependence related concepts

4.2.3 Drivers of Interdependence in IORs

From the perspective of strategic objectives focusing on value creation, the motives for forming and maintaining IORs include accessing partners' resources and capabilities (e.g., Eisenhardt & Schoonhoven, 1996; Harrison, Hitt, Hoskisson, & Ireland, 2001), tapping into another firm's co-specialized resources, learning from alliance partners (e.g., Inkpen & Tsang, 2007), accessing markets and growth options, sharing risks, and softening competition, among others (e.g., Barringer & Harrison, 2000). Competitions amongst firms that fight for the control over the common pool of resources such as customers, employees, financial capital, endorsements, knowledge inputs or anything else necessary for their survival or growth (Porter, 1980), can be another motivation. Forming IORs can prevent competitors from accessing resources or enable firms to gain critical resources for their supernormal returns. An alternative view is the zero-sum perspective of strategic management that acknowledges coexistence between cooperation and competition (e.g., coopetition [Brandenburger & Nalebuff, 1996]), in which firms in the same industry compete in some areas but not in others. cooperation or competition may be determined by the perception of participants on the situation - whether or not their goals are aligned (Tjosvold, 1986) because it is perceived as a positive association with rewards for team members.

Unlike the strategic management view, which primarily focuses on economic incentives and administrative control through formal legal contract (e.g., financial rewards and punishments), behavior economics offer other

possible explanations of why organizations enter into strategic alliances even though they can better serve their own interests. Scholars have found that cooperation is the result of a positive and pro-social motivation (Penner, Dovidio, Piliavin, & Schroeder, 2005), such as a warm feeling (Becker, 1974), rewards in addition to the material payoff (e.g., Andreoni, 1989). Other studies show that cooperation is motivated by the anticipation of guilt from defection (Battigalli & Dufwenberg, 2007).

From the multilevel perspective, Salvato, Reuer, & Battigalli (2017) identify three types of mechanisms that affect interdependence between or amongst organizations. These are situational mechanisms, action-formation mechanisms, and transformational mechanisms that affect the formation of IORs (e.g., equity or non-equity, acquisition or alliance). Situational mechanisms at the marco-level such as cultural challenges, governance forms, task structure and financial and legal arrangements may affect the cooperative or defective behaviors of individuals in inter-firm teams and work groups. Action-formation mechanisms at the micro-level including individual cognition, emotion and behavior may create or affect quality connections between managers of potential partners, which are essential in determining a manager's investment decisions (e.g., ally or acquire). Gulati & Westphal (1999) find that firms are more likely to form a strategic alliance with each other if they had a prior board interlock relationship. Transformational mechanisms describe how these micro-level factors affect relationships at the firm level. For example, broader forms of trust between firms can be influenced by micro-level arrangements in terms of how individuals

representing each firm relate to each other (Zaheer, McEvily, & Perrone, 1998). This may explain why and how some firms are more inclined than others to engage in alliances rather than acquisitions.

From the perspective of relational pluralism, firms tend to develop and maintain multiple kinds of relationships with one another in order to gain "greater flexibility", "more stable exchange relationships" and "the ability to adopt tailored innovations" (Shipilov, Gulati, Kilduff, Li, & Tsai, 2014). Beckman, Haunschild, & Phillips (2004) find that, when firms faced higher market uncertainty, they increased the 'multiplexity' of their relationships, either by adding board interlock ties to alliances or vice versa. In a study of inter-firm cooperation and competition in the U.S. airline industry, Gimeno (2004) finds that two firms are more likely to form co-specialized cooperative alliances when they both have numerous competitive interactions with the same rivals.

Perspectives	Key drivers
Strategic Objectives (Barringer & Harrison, 2000; Brandenburger & Nalebuff, 1996; Eisenhardt & Schoonhoven, 1996; Inkpen & Tsang, 2007; Harrison, Hitt, Hoskisson, & Ireland, 2001; Porter, 1980; Tjosvold, 1986)	• Accessing to partners' resources and capabilities • Tapping into another firm's co-specialized resources • Learning from alliance partners • Capturing markets or opportunities for the growth • Sharing risks • Softening competition • Competitions • Coopetition
Behaviour economics (Andreoni, 1989; Battigalli & Dufwenberg, 2007; Becker, 1974; Penner, Dovidio, Piliavin, & Schroeder, 2005)	• A positive and pro-social motivation • A warm feeling • Non-material rewards • The anticipation of guilt from defection
Multilevel perspective (Salvato, Reuer, & Battigalli, 2017)	• Situation mechanisms (e.g., cultural challenges, governance forms, task structure etc.) • Action-formation mechanisms (e.g., individual cognition, emotion and behaviour) • Transformational mechanisms (e.g., trust)
Relational pluralism (Beckman, Haunschild, & Phillips, 2004; Shipilov, Gulati, Kilduff, Li, & Tsai, 2014; Lumineau & Oliveira, 2018)	• Gaining greater flexibility • Building more stable exchange relationships • Developing the ability to adopt tailored innovations

Table 21 Key drivers of IORs from various perspectives

4.2.4 Managing IORs

Oliver (1990, p. 241) describes IOR as "relatively enduring transactions, flows, and linkages that occur among or between an organization and one or more organizations in its environment". This reveals a central purpose of organization that involves an ongoing process of interaction between actors to accomplish "a collective set of interdependent tasks" (Okhuysen & Bechky, 2009, p. 463). Sobrero & Schrader (1998) argue that managing IORs is a coordination problem that emerges when activities[6] are distributed amongst actors. Okhuysen & Bechky (2009) discuss three conditions for coordination – accountability, predictability, and common understanding – each of which addresses how a wide variety of coordinative mechanisms (e.g., plans and rules, objects and representations, roles, routines, proximity) functions in resolving some uncertainties and accomplishing interdependent tasks. Accountability enables organization members to be clear who is responsible for specific elements of the task. Although it lays out the ground on which the coordination starts, the continuous coordination depends on predictability, which refers to the ability of interdependent parties to expect subsequent task related activity. Finally, the common understanding enables coordination through sharing perspectives in order to bring groups together and develop agreements in achieving the whole task.

Drawing on the concepts of coordination and control, Albers and colleagues (2016) identify five key parameters (interface, intraface,

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[6] The activity has two basic elements in a social action system, which are resource and information flows (Van de Ven, 1976).

specialization, formalization and centralization) to explain how to facilitate connectivity amongst organizations across all levels. According to Sobrero & Schrader (1998), coordination can be broadly categorized into contractual coordination, which concerns structural characteristics of IORs in terms of how to distribute rights on the mutual exchange between actors involved, and procedural coordination which involves the implementation of the mutual exchange through day-to-day interactions of employees. Therefore, the outcome of IORs depends not only on initial structural characteristics, but also on relational characteristics that evolve over time. Prior studies, however, have mostly treated these two forms separately. For instance, scholars in economics and strategy have a strong focus on contractual coordination mechanisms (Sobrero & Schrader, 1998), whereas scholars in sociology or political science tend to focus more on procedural coordination mechanisms (Oliver & Ebers, 1998). This may result from practices in which IORs are managed by two distinct groups, with one (e.g., top management) being involved in negotiating and crafting the contractual coordination mechanisms and the other (e.g., business units) being in charge of the implementation of the agreement (Doz, Hamel, & Prahalad, 1989).

However, Sobrero & Schrader (1998) find that the fit between the characteristics of task and two forms of coordination is a determinative factor of a relationship performance. This finding is important because on the one hand it supports the distinction between contractual and procedural coordination mechanisms and on the other hand it highlights the links between the task related characteristics and two forms of coordination.

Although other factors such as the partners' characteristics and the larger context are expected to impact the structures and processes of an IOR, focusing on the task, which is firm specific factors, enables researchers to explore how those variables that are directly controlled by partners influence the structure and coordination of activities amongst organizations (Sobrero & Schrader, 1998). First, the nature of the task determinates the choice of contractual coordination mechanisms, which have to be aligned with procedural mechanisms. Scholars (e.g., Doz, Hamel & Prahalad, 1989; Provan, Fish & Sydow, 2007; Sobrero & Schrader, 1998) agree that achieving actual coordination depends not only on contractual mechanisms (e.g., legally binding contract) but also, more importantly, on the day-to-day communication of employees involved in the activities of IOR. Second, from the perspective of organizational learning, the nature of the task involves transfer of knowledge between two or more organizations (Sobrero & Schrader, 1998), which is a dynamic learning process. The implication is that the characteristics of IORs are not static but change over time. Therefore, the 'right' structural arrangement of IORs through contractual coordination mechanisms is important but it is subject to failures if it does not take into consideration of coevolution between tasks and structures.

In extant theorizing on the role of coordination mechanisms in IORs, empirical findings have primarily focused on the value creation and risk mitigation of IOR formation based on cost/benefit analysis. For example, to minimize governance costs, vertical integration in an industrial value chain involves decision-makings on the make-or-buy choice in every stage of

production (Williamson, 1985), whereas horizontal integration is driven by economies of scope when governance costs are low through market exchange (Teece, 1982). This, however, neglects dynamics of IOR characteristics, which can be affected by coordination mechanisms, such as the change of roles, rules and routines (Okhuysen & Bechky, 2009). As is evident, high failure rates of IOR formation and high transaction costs are involved in managing IORs (Argyres & Mayer, 2007). Barringer & Harrison (2000) point out that it is difficult to place a dollar value on some factors, such as perspectives, expectations and interests that can be significantly different in procedural coordination eventually leading to conflicts. Although it is importance to understand these factors that shape inter-organizational collaboration dynamics, they implicitly neglected in the extant theorizing (Brattstrom & Faems, 2019).

4.2.5 Critical Reflection on IOR Literature

The literature on IORs is now extensive and span many disciplines from organizational theory and behavior, strategic management, business studies, public administration, sociology and health care services, and communication (Barringer & Harrison, 2000; Grandori & Soda, 1995; Provan, Fish & Sydow, 2007). Although it has significantly advanced our understanding of a complex phenomenon of alliances and networks (why they are formed, how they are structured, how they operate and develop), a consensus is present that no single grand theory captures a complexity of inter-organizational networks (e.g., Albers, Wohlgezogen & Zajac, 2016; Barringer & Harrison, 2000; Provan, Fish & Sydow, 2007). As Oliver &

Ebers (1998) note, each study focuses on a particular selection of theories, levels of analysis and specific kinds of relationship ties, and there is a fairly limited number of concepts and theories consistently appearing at the core of research endeavors. Such fragmentation in the IOR literature causes not only confusion but also redundancies in research effort (Barringer & Harrison, 2000). For example, many terms (e.g., partnerships, strategic alliances, collaborative arrangements) are used to describe networks yet many studies, in particular those basing their work on resource dependence theory (Pfeffer & Salancik, 1978) and transaction cost economics (e.g., Williamson, 1985), only focus on dyads (Provan, Fish & Sydow, 2007).

Existing theorizing tends to focus on the assumption that individual organizations share similar interest, perspectives and expectations, which implicitly neglect the notion of differences amongst organizations (Brattstrom & Faems, 2019). Indeed, IORs involve various types of motives and various levels of commitment and investment by a wide variety of partners (Albers, Wohlgezogen, & Zajac, 2016). Consequently, a duality of valences[7] , including positive and negative valences to any IOR, is likely to co-exist and manifest in multiple ways including opportunism vs. cooperation or trust vs. distrust (Lumineau & Oliveira, 2018). These heterogeneous factors embedded in relationships are intertwined over time and shape inter-organizational collaboration dynamics (Majchrzak, Jarvenpaa, & Bagherzadeh, 2015). As is evident, the success of managing mutual

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[7] 'A valence refers to the degree of attraction or aversion in which one party feels toward a specific event, entity or object' (Lumineau & Oliveira, 2018:447)

dependencies depends not only on initial structural characteristics but also on the dynamics of relational characteristics after the initiation or formation stage (Brattstrom & Faems, 2019). Recently, there has been a call for IORs to be studied from a pluralistic perspective in order to 'uncover hitherto overlooked features of IORs and the underlying mechanisms concerning the operation of IORs' (Lumineau & Oliveira, 2018: 441). Few studies, however, have devoted their attentions to multiple valences, which are essential to understand how IORs operate and lead towards specific outcomes (Lumineau & Oliveira, 2018).

The temporary nature of IORs is another important aspect in understanding the IORs' dynamics (Lumineau & Oliveira, 2018). The dominant assumption in the literature is that time is "a non-spatial continuum in which events occur in apparently irreversible succession from the past through the present to the future" (Ancona, Okhuysen, & Perlow, 2001, p. 513). Inherent in this definition are three aspects of time: (1) conceptions of time (e.g., types of time [clock time, event time], socially constructed time [9-9-6 working hours]), (2) mapping activities to time (e.g., single or repeated activities, multiple activity) and (3) actors relating to time (e.g., temporal perception or temporal personality). It is notable that many empirical studies on inter-organizational networks is driven by the secondary data (e.g., SDC, CORE). Although it contains the time variable, the quantitative focus narrowly captures increases or decreases in the number of ties an organization has with other organizations (Shipilov & Gawer, 2020) but fails to explain dynamic characteristics of IOR that are influenced by activities across

temporal zones in facilitating coordination or actors relating to time (Ancona, Okhuysen, & Perlow, 2001). Shipilov & Gawer (2020) also criticize the reliability of sources in these database systems because they are biased towards public announcements of alliances published in English.

Grounded in relational ontology, which highlights the emergence of relations and boundaries together through activity (Good & Thorpe, 2019), the phenomenon of IORs is part of the boundary-relations problem confronting all types of organizations (Evan, 1965). According to Langley et al (2019, p. 706), boundary relations are often seen as "a dichotomy that assigns superior legitimacy and power to the favored side while excluding the other". Oliver (1990) indicates that IORs are embedded in a multi-faceted context, so there are boundaries between entities across different levels (micro vs. macro [Lumineau & Oliveira, 2018], vertical vs. horizontal [Santos & Eisenhardt, 2005] and temporary boundaries [Ancona, Okhuysen, & Perlow, 2001]). Similarly, Jones, Hesterly, & Borgatti (1997) also point out the importance of context as it provides exchange conditions under which network governance and social mechanisms are likely to emerge. To contextualize the boundary, it is important to understand activities between organizations and more importantly, the organizing aspects of these activities because they provide dynamic contexts in which organizations work together. More specifically, a dynamic context is created by activities, which involve several actors across all different levels working together to create and sustain the values promised. There is, however, a dearth of research on IORs that explicitly incorporate the activity-boundary.

Given the above, the aim of this study is to employ an ecosystem-based view to understand IORs and shed light on the phenomenon to support those who design and manage IORs at the multi-boundary activities. As was discussed in Chapter 3, the ecosystem approach is a novel way to depict value creating relationships between interconnected organizations (Autio & Thomas, 2014) because it breaks down the conventional industry boundaries and concentrates on questions of access and openness (Adner, 2017). By shifting the traditional focus of IOR research to the ecosystem perspective, it provides a new way of understanding how relational characteristics are shaped through which the interaction of four elements (actor, activity, position and link) in the interdependent collaboration. In addition, the ecosystem approach offers a methodological tool in exploring the patterns of relational characteristics at the boundaries between organizations (BOBs).

4.3 Research Method

4.3.1 Data Analysis

Step 1: open coding. The first step was open coding (Strauss & Corbin, 1990) to identify empirical codes that describe the factors influencing IORs formation and contingencies. I iteratively consolidated redundancies, and gradually collapsed the codes into first-order categories (Gioia, Corley, & Hamilton, 2013). To ensure the faithfulness of emerging codes, codes that were close to informants' vocabulary were used (e.g., Kou Bei 口碑). In addition, three independent researchers who had no prior exposure to this research were asked to provide independent views on the coding of the data

after reading the corresponding interview transcripts for selected cases. Discussions were then held with the researcher about any discrepancies, emerging codes, constructs and dimensions.

Step 2: conceptual categories – characterizing IORs. In the second stage of data analysis, axial coding was used (Strauss & Corbin, 1990). This is an inductive and recursive process in which similar first-order codes are reduced by combining closely related codes into second-order themes. Moving back and forth between data and research framing on the attributes of IORs (e.g., Oliver, 1990), I gradually progressed towards a more theory-driven explanation by obtaining higher-level aggregate dimensions (Gioia, Corley, & Hamilton, 2013). The IOR data structure that emerged is shown in Figure 13. I identified five aggregate theoretical dimensions: controlling (present in seventeen cases), energizing (present in twenty-one cases), aligning (present in twenty-one cases), internalizing (present in fifteen cases) and committing (present in fifteen cases). Quotes supporting the data structure are shown in Table 22.

Step 3: Association between IORs and BOBs. Finally, I explored the association between our aggregate dimensions of IOR attributes and BOB to explain how IORs with the same characteristics perform differently at different activity boundaries. To achieve this, I first employed the magnitude coding (Miles, Huberman, & Saldana, 2014) by applying a dichotomous variable (1 = present in BOB, 0 = not-present in BOB) to each second-order theme in the IORs and each second-order theme in the BOBs by cases. Second, bi-variate correlations between IORs and BOBs were calculated using

Spearman's rank (or rho) coefficient, a non-parametric monotonic test of association. This was followed by independent means tests based on the mean values of each of the aggregate IOR dimensions for each of the second-order themes in BOBs (present in OE vs. not-present in OE). Finally, non-parametric tests of independence were performed using a Mann-Whitney U-test to examine the distribution of each IOR aggregate dimension across the two categories (1, 0) for each second-order theme in BOBs. Tables 23 (bivariate correlations) and Table 24 (Tests of independence of means) shows the pattern of association between IORs and BOBs based on the standardized means of the count of IORs in each case.

First-Order-Concepts	Second-Order-Themes	Aggregate Theoretical Dimensions

Necessary legal or regulatory requirements
Mandates from higher authorities
Resource dependence for contigency cooperation (e.g., sole source)

→ Necessity →

Control of rules governing exchange
Position in industry
Organisational size
Autonomy of decision-making

→ Asymmetry →

Controlling

Collaboration, cooperation and coordination for mutual beneficial goals or interests
Mutual support
Risk sharing

→ Reciprocity →

Distinctive features or characteristics (e.g., reliability, performance, dependability, maintainability, technology)
General excellence recognised by external stakeholders (e.g., Kou Bei)

→ Quality →

Assets or resources reconfiguration to change
Development of new business operation process
New products or services launched

→ Innovation →

Energizing

Organisation's members' collective understanding about what their organisation is (e.g., ownership tie)
Shared perception of the features and central values that distinguish the organisation from other organisations

→ Identity →

Conduits for exchanging or obtaining information (e.g., regular meetings, travel, emails)
A speed of collective forms is constructed to address the specific goals or issues

→ Communication →

The degree to which organisations accept each other's claims to specific goals and functions
A process of negotiation to reach the point of decision-making

→ Consensus →

Enhancement of reputation, image and prestige
Increase of its congruence with prevailing norms and rules
Complement to expectations of external constituents

→ Legitimacy →

Aligning

Transaction costs
The fear of losing this relationship
The loss or unpleasant consequence
Opportunity costs

→ Cost →

Improvement of internal input/output ratio
Anticipation of increase on asset return
Reduction in unit costs and waste
Flat-organisational structure

→ Efficiency →

Internalizing

Specific or range of dates agreed among organisations for goods or services being delivered to the designated customers or locations

→ On-Time-Delivery →

The terms and conditions of paying for goods or services received or delivered (e.g., frequency, speed)
The action or process of implementing the agreed terms and conditions

→ Payment →

Loyalty to rational principles and values in action
The moral justifiability of principles to which one is committed
The reputation for truthfulness and honest

→ Integrity →

Committing

Figure 13 IOR data structure

Aggregate dimension	Second-order theme	Example quotes
Controlling	Necessity	"After the reform of 'Plant-Grid Separation' in China's power industry, we have become the largest electric utility company, not only in China but also in the world. However, we can't choose our power suppliers by ourselves because of national regulatory requirements of central stated-owned enterprises." – Case 5
	Asymmetry	"It is impossible to negotiate prices with our customers because they are stated-owned enterprises. However, we still have to buy from them because they are very few licensed suppliers who can provide us with the ethylene oxide." – Case 1
Energizing	Reciprocity	"Fundamentally, establishing relationships with others is based on mutual-interest. It is a value that you can bring to your business partner or your business partners can bring to you to achieve a win-win situation."–Case 1
	Quality	"As the project we are working on is not within our specialty, we depend on our partners that have successfully done such mega-projects before and have rich experiences. Our partners are often

		large financial institutions and well-known property developers."– Case 22
	Innovation	"We are constantly looking for new business models and partnerships, in improving our operations and maximizing our investment on return. You will find that people in finance or investment banking are very good at this." –Case 16
Aligning	Identity	"We are targeting companies which not only afford to buy our property but also should be well-known in the industry"– Case 5
	Communication	"We certainly notice the difference amongst people. Some employees can deliver our services in an appropriate manner, but others can't. One factor reflecting on the high quality of people in this case is about individual communication skills or emotional intelligence, which are critical to develop and maintain relationships with our clients." – Case 9
	Consensus	"Organizational culture is a considerable factor that affect our decision for building the partnership. Otherwise, it would be difficult to reach congruence." – Case 14

	Legitimacy	"From a financial point of view, or. At least, from my perspectives 'word of mouth' is an important factor to form relationships. The 'WoM' constitutes many factors, including our professionalism, background, personal networks & resources, fulfilments, emergency management, and so on. Our reputations are collectively made up by all these factors" – Case 9
Internalizing	Cost	"We prefer to collaborate with foreign-owned enterprises because of their rigor concerning quality control (e.g., Q-notes, Escape). This also helps us to improve our efficiency and reduce our unit costs" – Case 9
	Efficiency	"We have two main types of suppliers – external manufacturer and component supplier. The difference between them is that the former one is to manufacture our products and the latter one is to supply materials or components we need in our production." – Case 5
Committing	On-Time-Delivery	"Our capability of implementing projects and delivering out commitments is one of key factors in our relationships but also it's crucial for us to survive in a fast-changing industry." – Case 7
	Payment	

		"The reason why we prefer working with our foreign clients is because there is no delay in payment" – Case 9
	Integrity	"It may take years to develop a trustworthy relationship. Even though there is a good deal, we would still prefer working with someone whom we know." – Case 16

Table 22 IOR aggregate dimensions and second-order themes

	IORs					BOBs				
	Controlling 1	Energizing 2	Aligning 3	Internalizing 4	Committing 5	6	7	8	9	10
1										
2	0.00									
3	-0.06	0.29								
4	-0.24	0.04	0.33							
5	-0.18	0.08	-0.07	0.42+						
Goods 6	**-0.41+**	0.05	0.27	**0.45***	0.18					
Service 7	**0.41+**	-0.22	-0.32	**-0.53***	**-0.39+**	-0.83***				
Regulatory 8	-0.15	0.30	-0.08	-0.24	-0.16	0.03	0.10			
Financial 9	-0.14	0.05	-0.24	0.01	**0.40+**	-0.14	0.00	-0.30		
Manpower 10	0.15	**0.38+**	**0.50***	-0.12	0.08	-0.37+	0.10	-0.26	0.31	
Customer 11	0.00	**0.36+**	-0.11	**0.39+**	**0.40+**	0.09	-0.24	0.18	0.11	-0.07

n=22

+$p<0.1$; *$p<0.05$; **$p<0.01$; ***$p<0.001$

Table 23 Bivariate correlations between IORs and BOBs

BOB	IOR (means and standard deviation in parenthesis)				
	Controlling	Energizing	Aligning	Internalizing	Committing
Goods = 1 (n=13)	0.39 (0.30)			0.58 (0.40)	
Goods = 0 (n=9)	0.67 (0.35)			0.22 (0.26)	
Service = 1 (n=11)	0.64 (0.32)			0.23 (0.26)	0.21 (0.27)
Service = 0 (n=11)	0.36 (0.32)			0.64 (0.39)	0.42 (0.26)
Regulatory = 1 (n=15)					
Regulatory = 0 (n=7)					
Financial = 1 (n=8)					0.46 (0.17)
Financial = 0 (n=14)					0.24 (0.30)
Manpower = 1 (n=15)		0.76 (0.29)	0.63 (0.20)		
Manpower = 0 (n=7)		0.52 (0.26)	0.39 (0.20)		
Customer = 1 (n=18)		0.74 (0.24)		0.50 (0.39)	0.37 (0.28)
Customer = 0 (n=4)		0.42 (0.42)		0.13 (0.25)	0.08 (0.17)

Table 24 Tests of independence of means

4.4 Findings

4.4.1 Finding 1 IOR Attributes in Business Ecosystems

Controlling. Controlling is a combination of necessity and asymmetry in ecosystems. We see *necessity* at play where the focal organization has relationships with other organizations because of mandates from higher authorities, such as legal or regulatory requirements. Necessity also includes situations of exclusive resource dependence on other organizations.

> *"Although we operate independently, we are managed by the central bank of China. So, the relationship between us is 'control-being controlled'"* – Case 21

In terms of *asymmetry*, we see IORs leading to inequality when one actor exerts its power over others by any means, such as setting up exchange rules, or when the benefits of forming IORs far exceed the disadvantages, such as the loss of decision-making autonomy.

> *"X supermarket is one of our main customers and its influential power is huge in many aspects: purchasing volumes, price and other strict terms and conditions. We can't afford to lose this customer even though we don't favor the terms and conditions."* – Case 6

Energizing. Energizing arises through a combination of reciprocity (pursuing mutually beneficial goals or interests), quality (a focus on the distinguishing features of a good or service) and innovation (responding to change through novelty) within the IOR. *Reciprocity* is at play where mutual-

interest is mentioned, and where IOR formation optimizes or combines existing resources to maximize the benefits.

> *"In my observation, the determinants of relationship formation are based on the premise of a mutual benefit including both social and economic benefits. But economic benefit is a foundation. Without it, relationships become very fragile."* –
> Case 15

Quality attributes reflect whether or not a product or service meets or exceeds a customer's expectations, with a focus on distinguishing features (e.g., appearance and taste). Quality in IORs can also refer to stability and dependability in relations with other organizations. The term 'Kou Bei' in the Chinese context is associated with the notion of value perceived by stakeholders when establishing relationships. This may be influenced by price, availability, reliability and other judgements of quality.

> *"The most important factor in our supply chain with our partners is stability. To establish a long-term relationship, factors, such as a supplier's position in the industry, its relationship with our competitors and its knowledge, capability and resources, are very important."* – Case 20

In terms of *innovation*, we see IORs providing the capability to respond to change with partners, such as that involving technical system upgrades, or improving the performance of an existing technical system by introducing new elements in the organization's production or service operations. Innovation is also seen to occur in the way that IORs help bring about new

rules, procedures and structures that are initiated, developed and implemented to improve the performance of the organization.

> *"As part of our innovation, we formed a joint venture with an American firm in order to access know-how and improve our professionalism. We also re-design according to the local environment." –* Case 22

Aligning. Aligning in IORs occurs through sharing of identity (shared values and norms that form the organization's distinctive character), communication (sharing of information and signals), consensus (forming agreement on modes of action) and legitimacy (acting in a similar way as other actors under pressure from them). *Identity* is seen as critical for success as respondents indicated how identity misalignments can cause deleterious results. Identities derived from several sources, such as its founding institutions (e.g., government agencies), founders' belief, and industrial positions, which collectively shape organizational orientation when engaging with other organizations.

> *"As we are a central state-owned enterprise (Yang Qi), it is difficult for us to work with privately-owned enterprises (PoEs) based on our past experiences. So we would prefer to working with SoEs." –* Case 22

Communication is associated with interpersonal skills in managing the encoding and decoding process of situations at a moment in time and then highlighting the filtered message that bridge the gap between the focal organization and its stakeholders.

> *"Interpersonal communication skill is very important when dealing with customer complaints. Better communication can avoid things getting worse even although the problems can't be solved immediately." –* Case 11

Consensus involves a process concerning norms, values, and regulations of exploring plausibility in a particular environment. By sharing the interpretation of an emerging story, the focal organizations mentioning this felt they could make better strategic decisions with partners. Consensus is influenced by an organizational culture that not only provides organizational members with emotional coherence, but also helps organizations to distinguish themselves from other organizations.

> *"As the oil industry in China is monopolized by three central state-owned enterprises, our collaboration with them is beyond business to business relationships, instead, it is a business to government relationship. The important factor in maintaining this relationship is consensus. Our influence on them, for example, is that we provide them with advanced technology such as that required in oil extraction and advanced concepts of environmental management." –* Case 8

Legitimacy in the context of IORs is a process of institutionalization in which the organization adopts or implements a new standard or process as used by other organizations.

> *"When we select suppliers, we would request them to supply evidence, showing that they have complied with governmental*

and environmental regulations or industrial standards or previous projects they have done, to prove they can complete the task." – Case 5

Internalizing. I identify an internalizing attribute of IORs to be a combination of cost (actions of related actors having cost implications for the focal firm) and efficiency (deciding the appropriate governance structure for the IOR). In terms of *cost*, the data indicates that IORs come and go as a direct consequence of the pricing actions of other actors. IORs act as a price system in that they provide organizations with the necessary information that can guide mutually beneficial actions in a particular transaction.

> *"Reducing our cost and maximizing our profit are our principles for being in business. This affects our relationship with other organizations. For example, if a supplier increases its price that results in the loss of our profits, we would switch our suppliers."*
> – Case 19

In terms of *efficiency*, IORs give partners the ability to be flexible and agile in response to environmental changes. IORs can be characterized in classical contractual terms, as well as in a mutually adapting relational-contracting form.

> *"As we operate in a fast-changing market, our capability of quickly responding to technology and market change, I think, is the most important factor of our success...This is because we have established an information network between suppliers and*

clients where we can receive feedbacks timely from either the

upstream market or downstream market." – Case 7

Committing. The *committing* attribute of IORs emphasizes mutual commitments between organizations in developing and maintaining a valued relationship. Although mutual commitments vary (e.g., a distinct beginning, duration), the findings show three components: on-time-delivery, payment and integrity (Cheng Xin in Chinese). With *on-time delivery*, we see an obligation aspect of the IORs.

"To build an unbreakable connection with our client, the first

and foremost important factor is On-Time-Delivery." – Case 9

Payment is used to judge the outcomes of commitment and the extent to which payments from partners affect the firm's cash flow that may delay or cancel the projects.

"If the payment is delayed, we have to delay or even cancel the

project. Situation like this happening, it would severely damage

the relationship with customers but we have no choice." – Case

11

Integrity (Cheng Xin) reflects the potential for a discrepancy between an expected outcome and an actual outcome. Such discrepancies lead to negative outcomes, possibly the termination of an IOR. They also reflect confidence, which the trusting party has to the trustworthy party in terms of ethics and execution capability of a promise, as well as a process of accumulating trust through interactions with others over time.

"Cheng Xin (integrity), I think, is a solid foundation in our relationships with our clients. Our clients often come to us with their needs or requirements…we would provide them with a feasible plan and a promise. Cheng Xin here includes not only giving the promise to our clients on a specific task but also referring to our execution capability, which is also an important performance index." – Case 9

4.4.2 Finding 2 Association between IORs and BOBs

I note that five aggregate IORs appear on all types of BOBs but in various intensities. Controlling is negatively correlated with goods BOBs but positively correlated with service BOBs. Energizing is positively correlated with both manpower and customer BOBs. Aligning is positively correlated with manpower BOBs. Internalizing is positively correlated with goods and customer BOBs and negatively correlated with service BOBs. Committing is positively correlated with financial and customer BOBs but negatively correlated with service BOBs. Table 23 provides support to the bi-variate correlations, showing the means for each group (1, 0) where differences are significant at the $p < 0.1$ level. Non-parametric Mann-Whitney U-tests of independence of the distribution of IORs by BOB group all support the same pattern ($p < 0.1$). Figure 14 shows the relative position of each IOR occurrence for each BOB in schematic form. We note that while only certain IORs appeared significant in correlation and independence tests, we still see a spectrum of intensity for each BOB when we look at their relative values. We

also note that this spectrum is somewhat tighter for Regulatory boundaries, and that this BOB finds no significant IOR in the test of independence.
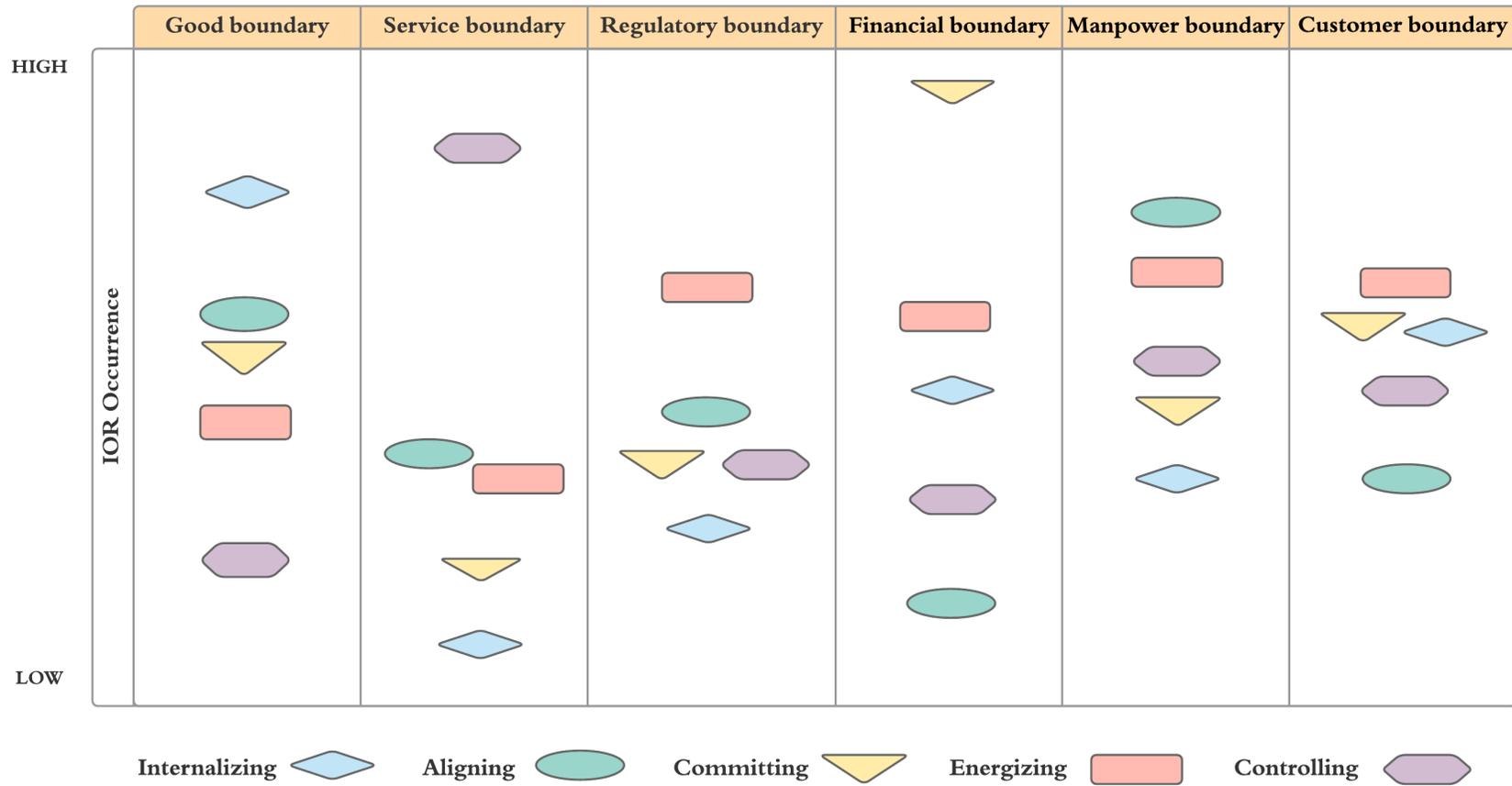
Figure 14 IORs' patterns in each BOB

4.5 Discussion

This study has sought to understand the attributes of IOR and patterns of IOR attributes within activity-based boundaries in business ecosystems. Unlike previous theoretical and empirical studies on IOR formation and contingency, the study has employed an ecosystem approach to deriving new data structures for IORs and BOBs on the basis of extremely rich interview data from China. I have revisited and broadened these previous studies by suggesting that business ecosystems contain a constellation of multiple relationships in which there is a differentiated need for organizations to control each other, energize each other, align with each other, internalize from each other and commit to each other. The manner in which they do this is contingent on the activity boundaries amongst actors (which I call 'BOBs') as the ecosystem seeks to create value through activity by turning inputs into outputs. The study has suggested that the differentiated need for a fit between IORs and BOBs arises through their co-evolution, i.e., how the activities at various boundaries between different types of actors in the system develop over time along with the nature of the relationship between the actors.

Controlling IORs in service boundaries. First, I have found a prominent role for controlling IORs in OEs containing services (and non-goods) boundaries. Indeed, as Case 16 told us:

> *"Many new regulatory policies have been issued over the last 12*
>
> *months to regulate our industry [equity-fund]."* – Case 16

This aggregated dimension has a resource dependence and an institutional foundation (Pfeffer & Salancik, 1978). Engagement by organizations in exchanges with other organizations involves conforming to

the dictates of higher authorities that set the rules governing exchange (Pfeffer & Salancik, 1978), including informal rules governing *guanxi-networking* in China (Gu, Hung, & Tse, 2008). Higher authorities include organizations possessing critical resources, industrial and professional associations and government agencies. What I have found in the analysis provides support to the narrative of state-owned enterprises (SOEs) - which receive resource and policy support from the central government and local-government due to their strategic position in the national economy - having power over exchange partners and influencing partners' compliance (Zhang & Keh, 2009).

The concept of controlling is underpinned by an assumption that forming IORs leads to a loss of decision-making autonomy (Pfeffer, 1987). Non-compliance may cause failure in acquiring resources, a loss of existing resources and even expulsion from the field (Leblebici & Salancik, 1982). However, organizations can manage their external interdependences by offering, for example, environmental protection projects/policy standards, advanced technology and management skills, together with substantial investments to form collaborations (Gao, 2006). Such strategies often are adopted by non-Chinese multinational enterprises to build relationships with the Chinese government. The government appreciates their contribution and long-term commitment to China's development and in return creates a favorable business operating environment for them. This is in line with the findings from He & Tian (2008), which call such behaviors 'formal public relation strategies' (p.371).

As part of China's economic transition, the central government has supported growth in the business services sector and has demanded service

quality improvements during the country's transformation (Leutert, 2016). However, despite the improvement of China's legal systems in recent years, institutions in the service industry are still weak and there has been a number of issues such as abuse of trust (Luo, 2006), agency problems and opportunism (Zhang & Keh, 2009). This would also explain the controlling attribute of IORs being high in service BOBs.

Energizing IORs in manpower and customer boundaries. Second, I have found a role for *energizing* IORs in ecosystems with manpower and customer BOBs. As Case 7 noted:

> *"The reason we prefer collaborating with these large financial institutions or well-known companies is because they have resources and capabilities, such as the capability to acquire land and to better manage mega projects, which we or other firms don't possess."* – Case 7

The aggregate dimension of energizing is grounded in the resource-based view of the firm (Barney, 1991). Simply put, the firm is energized in its relationships at manpower and customer BOBs. IORs of an energizing form have the potential to help the focal organization gain sustainable competitive advantage through reciprocity, quality and innovation. My findings show that the attribute of reciprocity in the Chinese context is strongly coined by economic benefits for exchange (*liyi* in Chinese) (Yang & Wang, 2011). Unlike the popular meaning of quality with an absolute sense such as 'best', 'quality' in IORs is associated with the notion of value defined by stakeholders. As Buzzell & Gale, (1987, p. 111) note, quality is "whatever the customers say it is, and the quality of a particular product or service is

whatever the customer perceives it to be". This is consistent with Feigenbaum's definition of quality as 'best for certain customer conditions' (Reeves & Bednar, 1994, p. 424) and the widely used definition attributed to Juran & Gryna (1988) as 'fitness for use'. Cooperating with other organizations enhances an organization's innovative capability by acquiring know-how in terms of technology and management skills and other resources. This fits with manpower boundaries where human capital is emphasized as a main mechanism to drive performance as well as with customer boundaries where a mix of tangible (e.g., delivery of quality products) and intangible (e.g., reputational) resources are exchanged.

Aligning IORs in manpower boundaries. Thirdly, I have found aligning in ecosystems that have a preponderance of manpower BOBs. This contingency is reinforced by the following comment by Case 5:

> *"We also consider some soft variables in selecting suppliers. For example, we often have the opportunity to make a contact with the person from the supplier side and, we would observe his/her working style and evaluate if it's compatible with ours."* – Case 5

The aligning aspect of IORs can be interpreted from various perspectives. IOR formation and maintenance achieves coherence amongst multiple actors in collaborative activities. From this emanates an identity for the focal organization, the means of communication and the level of consensus. Organizational identity is defined in terms of shared values and norms that form an organization's central and distinctive character (Dutton & Dukerich, 1991). For example, China's SOEs are known to prefer to

collaborate with other SOEs or the local government owned enterprises as because 'shared ownership type and long-term operations…bestow mutual trust, thus lowering the necessity for using formal contracts to safeguard their interests' (Zhang & Keh, 2009, p.136). There is also an institutional aspect to aligning. The legitimacy attribute would be on a basis of voluntary exchange. As Oliver (1990) notes: leveraging partners' reputation and prestige to improve the organization's congruence with the prevailing norms is a 'significant motive in the decision for organizations to interconnect' (p. 246). This is relevant to activities across boundaries involving an exchange of manpower. It is in the interests of all parties that individuals are aligned to the overall goals of the ecosystems as they operate at the boundaries within it.

Internalizing IORs in goods and customer boundaries. Fourth, internalizing IORs are apparent in OEs containing goods (and non-services) and customer BOBs. For instance, Case 1 was conscious of cost and efficiency when seeking to be active over customer BOBs across China:

> *"As China is a massive country, it is unlikely that we set up our*
>
> *sales offices everywhere, we often cooperate with the third party*
>
> *at the provincial level or regional level." – Case 1*

In the emerging data structure, internalizing, including cost and an efficiency aspect, focuses on how an organization should construct its boundary-spanning activities to reduce various transaction costs and minimize the likelihood of arbitration. The concept of efficiency addresses the question of how transactions between organizations should be governed to deliver the desired outcomes. Relatedly, the cost aspect refers to an OE-level "price system" (Hennart, 2008, p. 343), which is an organizing method

regarding boundary activities between organizations. This includes production cost (e.g., raw materials, labor and service), transaction cost (e.g., using markets to achieve economic efficiency) and coordination cost (Santos & Eisenhardt, 2005), (e.g., exchanging information, numbers of bargaining and negotiations). The goods BOBs in our data were characterized by material, component and finished product supply. The notion of internalizing transactions within the OE to improve efficiency is completely in line with goods exchange activities.

Committing IORs in financial and customer boundaries. Fifth, I found committing IORs to be predominant in OEs containing financial and customer BOBs – and to a lesser extent for non-service BOBs where the mutual commitment between organizations seems to be relatively enduring. As Case 9 noted,

> *"We prefer to work with [partners] because there is a guarantee of payment we receive from them…we have been working with our client for over nine years. It starts with a small order, probably less than value $100K, and now the annual order value is increased to $4 million." – Case 9*

The mutual commitments in my data are underlined by on-time delivery and by punctual and accurate payment. From the perspective of relationship marketing (Morgan & Hunt, 1994), it is perhaps not surprising to see this in financial BOBs as well as customer BOBs. Delivering products or services on time increases customers' affective commitments (i.e., emotional attachment) to a specific brand or organization through experiences that

satisfy their needs (Meyer & Allen, 1991). Delaying or failing to make payment to suppliers may lead to the termination of the relationship with the suppliers and there may be costs associated with the loss (i.e., switching costs). Although the potential costs of losing business partners may produce 'continuance commitment' (Meyer & Allen, 1991, p. 77), this only happens through the recognition of values. Thus, a committing IOR demonstrates both attitudinal and behavioral perspectives of commitment. From the attitudinal perspective, commitment to relationships reflects an enduring desire that develops and maintains a valued relationship (Morgan & Hunt, 1994). From the perspective of behavior, relationship commitment is a consequence of repetitive actions with an exchange partner, which, in turn, have an influence on attitudes to behaviors occurring again in the future (Meyer & Allen, 1991).

Chapter 5 Unpacking the Nature of Organizational Disruption in Business Ecosystems

5.1 Aim

The expressions 'disruptive event' and 'disruption' have become pervasive in business and management discourse. In the literature, there is a vast array of terms that have been used in describing a situation in which organizations find it difficult to continue in normal ways. Various perspectives have been taken, including those of cognition (how we understand disruption), behavior (how we act in the face of disruption) and emotion (how we feel about disruption). Yet little attention has been devoted to understanding the nature of disruption that is critical to understand organizational resilience. Characteristics of disruption provide a foundation for insights into different adverse situations in which organizations adopt different actions in preparing for and responding to disruptions. To address this deficit, the study aims to (1) develop a new typology framework based on temporal and spatial dimensions and (2) explore disruptions in twenty-two Chinese business ecosystems.

5.2 Literature Review

5.2.1 Disruption, Related Concepts, and Definitions

Organizations have always been faced with disruptions that "originate from many sources, both internal and external to organization, natural disasters, human error, IT failures, supply chain problems, customer boycotts…" (Williams & You, 2018, p. 10). In reviewing the disruption-related literature in organization and management, there are many different

terms used in describing a situation that generates a variety of the adversity leading to a discontinuity or impairment of organizational strategies. This include threat (Staw, Sandelands, & Dutton, 1981), environmental jolt (Meyer, 1982), disturbance (Greening & Rutherford, 2011), disruptive event (Morgeson, 2005), disruption (Greening & Rutherford, 2011), crises (Pearson & Clair, 1998; James, Wooten, & Dushek, 2011), surprise (Cunha, Clegg, & Kamoche, 2006; Bechky & Okhuysen, 2011), organizational deviance (Vaughan, 1999), shock (Flig Horn, Sekiguchi, & Weiss, 2019; Olekalns, Caza, & Vogus, 2020), and amongst others (see Table 25). Some definitions are relatively broad including almost any expected or unexpected issues that may occur within or beyond organizations (e.g., surprise, rare events), whereas others narrowly focus on partial accounts of disruption, such as outcomes (e.g., threat, rare and unusual event), causes (e.g., adverse event, disrupted contexts) and characteristics (e.g., organizational crisis, extreme situation). Other scholars have specifically defined what the specific terminologies comprise, such as 'organizational deviance' (Vaughan, 1999), 'event system' (Morgeson, Mitchell, & Liu, 2015), 'disaster' (Vaughan, 1999), 'extreme context' (Hannah, Uhl-Bien, Avolio, & Cavarretta, 2009), and 'environmental jolts' (Meyer, 1982). This situation of multiple overlapping terms, perhaps, is because the field is still relatively nascent (Hallgren, Rouleau, & Rond, 2018) or because disruption in organizations is a multidisciplinary construct involving a variety of issues studied in different academic sub-disciplines such as organizational behavior, organizational theory and communication, which themselves are not reconciled.

Key Terms	Definitions related disruption related research
Threat	"An environment event that has impending negative or harmful consequences for the entity" (Staw, Sandelands, & Dutton, 1981, p. 502)
Environmental jolts	"Environmental jolts are defined as transient perturbations whose occurrences are difficult to foresee and whose impacts on organizations are disruptive and potentially inimical." (Meyer, 1982, p. 515)
Disturbances	"Disturbances involve connected supply chain actors adapting to variations in material flow or information" (Greening & Rutherford, 2011, p. 105)
Disruption	"Disruptions involve the removal of ties/nodes from the network (either permanently or temporarily) as a consequence of some unanticipated critical event" (Greening & Rutherford, 2011, p. 105)
Disruptive event	Disruptive events refer to "specific happenings' that (1) 'tend to be discontinuous in that they apart from the features of the task environment'; (2) 'create novel environments for which teams do not have preexisting responses'; (3) 'interrupt ongoing performance episodes'; (4) 'signify a transition from one performance episode to another". (Morgeson, 2005, p. 498)
Accident	"Any unintended and untoward event that disrupts the ongoing or future output of a system could be viewed as an accident." (Shrivastava, Sonpar, & Pazzaglia, 2009, p. 1359)
Incident	"Failures at the first two levels of [system], even if they temporarily disrupt the output of the entire

	system…they are called incidents." (Shrivastava, Sonpar, & Pazzaglia, 2009, p. 1359)
Organizational crisis	"An organizational crisis is a low-probability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by belief that decisions must be made swiftly" (Pearson & Clair, 1998, p. 61). Three additional aspects of crisis include "rarity of the event, significance of the event, and the level of impact on stakeholders" (James, Wooten, & Dushek, 2011, p. 461)
Organizational deviance	"an event, activity, or circumstance, occurring in and/or produced by a formal organization, that deviates from both formal design goals and normative standards or expectations, either in the fact of its occurrence or in its consequences, and produces a suboptimal outcome" (Vaughan, 1999, p. 273)
Adverse events	"The larger scale and impact of adverse events is the result of the increased density of global networks of people, organizations, and countries. High-risk events that, at first, seem to cause only local, isolated effects can now snowball in magnitude and do damage to vital infrastructures that impact events on a regional and event global scale" (van der Vegt, Essens, Wahlstrom & George, 2015, p. 971)
Rare events	"Events are more likely to be considered as 'rare' when individuals or organizations that observe or directly experience these events see them as unusual–in the sense that they depart from ordinary experience with the same type of event, or are unique in the sense of having no close parallel." (Lampel, Shamsie, & Shapira, 2009, p. 836)

Surprises	"Any event that happens unexpectedly, or any expected event that takes an unexpected turn" (Cunha, Clegg, & Kamoche, 2006, p. 319).
	"A break in expectations that comes from situations that are not anticipated or do not advance as planned" (Bechky & Okhuysen, 2011, p. 239)
Rare and unusual Events	"Rare and unusual events occur infrequently and thus present unique learning challenges because of organizations' lack of direct experience" (Beck & Plowman, 2009, p. 910)
Extreme Events	"A discrete episode or occurrence that may result in an extensive and intolerable magnitude of physical, psychological, or material consequences to – or in close physical or psycho-social proximity to – organization members" (Hannah, Uhl-Bien, Avolio, & Cavarretta, 2009, p. 898)
	"Extreme events are defined in terms of three necessary conditions: they must (1) have the potential to cause massive physical, psychological, or material consequences that occur in physical or psychosocial proximity to organization members, (2) the consequences of which are thought unbearable by those organization members, and (3) are such that they may exceed the organization's capacity to prevent those extreme events from actually taking place" (Hallgren, Rouleau, & Rond, 2018, p. 113)
Disasters	"a potentially traumatic event that is collectively experienced, has an acute onset, and is time delimited; disasters may be attributed to natural, technological, or human causes" (McFarlane & Norris, 2006, p. 4)
	"Disaster is a type of routine nonconformity that significantly departs from normative experience for a particular time and place" (Vaughan, 1999, p. 292)

Extreme Environments	"In the immediate postimpact emergency, the environment is loosely connected, broken down in bits and pieces; current decision-making and organizational structure become fragmented and erratic." (Lanzara, 1983, p. 76)
Extreme contexts	"An environment where one or more extreme events are occurring or are likely to occur that may exceed the organization's capacity to prevent and result in an extensive and intolerable magnitude of physical, psychological, or material consequences to organizational members." (Hannah, Uhl-Bien, Avolio, & Cavarretta, 2009, p. 898)
Extreme operating environments (EOEs)	EOEs include "natural, technological and complex disasters and conflict zones which may pose the most severe environments in terms of resources, communication, institutional support from governments and large multi-national corporations, and societal support in terms of clear expectations and norms". (Gerde & Michaelson, 2016, p. 928)
Extreme situations	"Extreme situations as management situations that are at the same time (1) evolving, (2) uncertain, and (3) highly risk. The evolving nature of extreme situations refers to rapid, discontinuous and simultaneous changes" (Bouty, et al., 2012, p. 476)
Risky contexts	"Risky contexts are characterized by near-constant exposure to potentially extreme events such that an unusually great degree of emphasis is inevitably placed on the reliability of systems and the particular routines, processes, and materials these involve." (Hallgren, Rouleau, & Rond, 2018, p. 117)

Gradual drift	"Gradual drift occurs when a series of small actions that violate relational expectations accumulate over time" (Olekalns, Caza, & Vogus, 2020, p. 8)
Shock	"Abrupt shocks are triggered by a single event either within or outside the relationship that threatens the viability of an ongoing relationship, sometimes causing a relation to break completely" (Olekalns, Caza, & Vogus, 2020, p. 8) "Shock can be defined as incidents that (i) happen suddenly and unexpectedly; (ii)rupture our trust in causal relationships; and (iii) bring about a shifting reality that causes controversy about routes to adjustment" (Horn, Sekiguchi, & Weiss, 2019, p. 1)
Event system	"Events are bounded in space and time such that they have an identifiable temporal beginning and end and evolve in a specific setting. They also represent some discontinuity, thereby possessing a nonroutine character; Events may originate inside or outside the organization, but they constitute observable actions or circumstances; Events can result from the actions of a single entity on another entity or can occur when the actions of multiple different entities converge." (Morgeson, Mitchell, & Liu, 2015, p. 520)
Creeping strain	"the gradual development of situations that stretch group's resources to the point of impairment" (Kahn, et al., 2018, p. 512)
Disrupted contexts	"Disrupted contexts are triggered by extreme events that occur outside the core activities of organizations or communities and are frequently portrayed as unique, unprecedented, or even uncategorizable" (Hallgren, Rouleau, & Rond, 2018, p. 135)

Emergency contexts	Emergency contexts refer to actual events as "the result of core operations gone awry… or be entirely unrelated to core operations" (Hallgren, Rouleau, & Rond, 2018, p. 125)

Table 25 Constructs and definitions related to disruption

Despite diverse definitions in the disruption-related literature, Morgeson, Mitchell, & Liu (2015) suggest that previous studies can be broadly categorized into two research traditions: variance-oriented research and process-oriented research (e.g., Morgeson, Mitchell, & Liu, 2015). From the variance-based view, disruption is viewed as a discrete event. The study primarily focuses on the cause and effect relationship of the event and explore the covariation amongst features (e.g., causes, consequences) identified in order to generate insights into how organizations are better be able to manage in the future. From the process-based view, disruption is viewed as a process that involves a chain of events prior to, during and after disruption. Similarly, Williams, Gruber, Sutcliffe, Shepherd, & Zhao (2017) categorize research on crisis into two broad streams: "crisis as an event and crisis as a process" (p.735). Although these two perspectives (variance orientation vs. process orientation) offer incommensurate ontologies from which to view things, they are complementary to each other (Lampel, Shamsie, & Shapira, 2009). As Morgeson, Mitchell, & Liu, (2015, p. 518) note, "variance-oriented theories elevate matters (e.g., features) at the expense of processes, whereas process-oriented theories elevate processes at the expense of features". In the study of 'surprise', Cunha, Clegg, & Kamoche (2006) use two dimensions: issue (expected vs. unexpected) and process (expected vs. unexpected) to

categorize four distinct forms of surprise-related concepts. Hallgren, Rouleau, & Rond (2018) offer a different view to categorize previous studies in the extreme research context based on a two-by-two matrix: 'actual' or 'potential' and 'related' or 'unrelated'. All these studies are a manifestation of how these views coexist in organizations and work together.

While these pioneer works of categorization have contributed to our understanding of the fragmented field in disruption-related literature, they say little about the nature of disruption. Disruptions are phenomena that have always 'been part of the human experience since people started living in groups' (Quarantelli, Lagadec, & Boin, 2007, p. 16). From the perspective of sensemaking, disruptions, indeed, reflect the experience of being 'thrown into an ongoing, unknowable, unpredictable' situation, while searching for answers to understand what the plausible stories are (Weick, Sutcliffe, & Obstfeld, 2005, p. 410). Morgeson, Mitchell, & Liu (2015) argue that events occurring in organizations are bounded in time and space. Good & Thorpe (2019, p. 11) state that temporal and spatial relations "are mutually constituted aspects of experience". Thus, studying a phenomenon through the time and space dimensions is viewed as a common tool to make a sense of organizational life (e.g., Nadkarni & Chen, 2014; Morgeson, Mitchell, & Liu, 2015; Good & Thorpe, 2019). Nadkarni & Chen (2014) employ a multidimensional framework of CEO temporal focus on the past, present and future in studying the rate of new product introduction in both stable environments and dynamic environments. Good & Thorpe (2019) study business sustainability from a relational approach of temporality and spatiality. Despite this, to the best of my knowledge, there is a dearth of

empirical study that has been devoted to studying disruption explicitly from the relations of the temporality and spatiality.

5.2.2 Temporal Dimension of Event

Time is defined as "a non-spatial continuum in which events occur in apparently irreversible succession from the past through the present to the future" (Ancona, Okhuysen, & Perlow, 2001, p. 513). One of implications in this definition is that time can be represented by 'engineering' activities or events on the continuum (Ancona, Okhuysen, & Perlow, 2001). Alternatively, as Morgeson, Mitchell, & Liu (2015) note, events are bounded in time. When mapping a single event to time, it focuses on the duration of the event with its beginning and end points (e.g., how long the event lasts). It may involve the rate at which the event moves on the continuum (e.g., fast or slow) at a constant or irregular pace until completion. For example, Ancona, Okhuysen, & Perlow (2001) conceptualized expected and unpredictable events, such as earthquake, an influenza pandemic, a terrorist attack, as being event-based time, since they can be used as a reference point for events occurring before or after. They are often categorized as low-probability and high-consequence events (Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017), which signal 'abrupt shocks' (Olekalns, Caza, & Vogus, 2020). Sometimes, unexpected events challenge the existing organizational mind-set (e.g., common assumptions) (Hallgren, Rouleau, & Rond, 2018). As noted by Weick (1993), when confronted with extreme situations (e.g., The Mann Gulch Disaster), managers should acknowledge that their habitual modes of thinking may be no longer be adequate.

Morgeson, Mitchell, & Liu (2015) argue that the longer an event lasts, the more impactful on organizations they will be, in comparison to those of a shorter duration. This is because, from the perspective of open systems (Katz and Kahn, 1966), any activity or event involves the flow and transformation of energy and this follows the fundamental law of nature in which energy can neither be created nor destroyed but can change its form (Shrivastava, Sonpar, & Pazzaglia, 2009). A single event of longer duration is more likely to transform from the old to the new one because of entropy accumulation[8], which can create a greater impact on entities (e.g., organizations, teams, and individuals). Kahn, et al (2018) describe the 'creeping strain' that can gradually stretch endowments of organizations to the point of impairment. Other scholars found that, sometimes, catastrophic failures result from long periods of incubation (e.g., Hallgren, Rouleau, & Rond, 2018). Moreover, the transformation of a single event may occur in different stages of development in a predictable form such as model of group development (e.g., forming, storming, norming, and adjourning [Tuckman & Jensen, 1977]) or life cycle of an organization (e.g., entrepreneurial, collectivity, formalization and elaboration [Quinn & Cameron, 1983]). Organizations develop routines that better serve as a means of managing events or activities more fitting the needs at a particular stage. When organizations evolve over time, established routines can become a source of mindlessness of emerging events (Langer, 1992) or even inertia (Hannan & Freeman, 1983) to an organization's adaptation to new environments. This may explain why such 'unnoticed' or

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[8] According to the second law of thermodynamics, entropy tends to increase over time and its accumulation has serious consequences (Shrivastava, Sonpar, & Pazzaglia, 2009)

'ignored' events at a particular stage can trigger a number of intriguing issues when moving to another stage and may eventually lead to a catastrophe.

The single event can also occur multiple times in which the repetition of the event on the continuum is often described by the frequency or rhythm of the occurrence and the interval between repetitions (Ancona, Okhuysen, & Perlow, 2001). For example, Feldman & Pentland (2003, p. 95) delineate that organizational routines are the "repetitive, recognizable patterns of interdependent actions, carried out by multiple actors". On the one hand, organizational routines provide a relatively stable environment in which organizations are able to operate efficiently and effectively in achieving their goals. On the other hand, "repetitive" routines can also generate minor changes, even when nothing is noticeably changing, however, the creeping development of these unnoticed minor changes can lead to unexpected outcomes (e.g., surprise [Cunha, Clegg, & Kamoche, 2006]).

In addition to a single event in time, Ancona, Okhuysen, & Perlow (2001) identify variables that are used to describe the relationships between multiple activities or events and time. These include the allocation of time amongst activities, the sequence of activities, the synchronization of activities and the relocation of time when two activities conflict with each other. It is possible that multiple activities occur on a single temporal map or on a number of temporal maps (Ancona, Okhuysen, & Perlow, 2001), however, the present study is concerned with the single temporal map.

5.2.3 Spatial Dimension of Event

Although event time plays an important role in understanding disruption, this, alone, is inadequate. As stated by Good & Thorpe (2019, p. 11), "there is no time without the spatial relations that constitute the movement of space". The notion of space in organizations is not only a geometrical term to describe static entities but also a social product (Lefebvre, 1991) in the sense that it involves participants (e.g., social actors) in creating and unfolding physical, social and conceptual phenomena. According to Morgeson, Mitchell, & Liu (2015, p. 522), event space is defined as "the specific location where an event originates and how its effects spread through an organization…events can arise at every hierarchical level and can have a downward, upward, or within-level impact". The origin of an event and the travel of the event, indeed, involve an ongoing process of forming and maintaining relationships between events and entities (e.g., individuals, teams, organizations). Notably, there are numerous events occurring on a daily basis, yet not all events capture or engage attention (Nigam & Ocasio, 2010; Ocasio, 2011). For those events that capture attention, Morgeson (2005) divides them into two categories: automatic information processing (e.g., routines) and controlled information processing (e.g., sensemaking). When events are characterized as 'novel', 'disruptive' or 'critical', the more explicit and logic information processing are likely to be adopted in organizations (Morgeson, Mitchell, & Liu, 2015).

Furthermore, Morgeson, Mitchell, & Liu (2015) identify three interrelated factors in event space that influence organizations, these being 'event origin', 'spatial direction' and 'spatial proximity'. An event's origin refers to the location from which it originates. Good & Thorpe (2019) use

'here' or 'there' dimensions to distinguish the direct or indirect relationships between events and organizations. The 'here' dimension refers to events that have direct relationships with organizations. These events could emerge from within organizations (e.g., employees, shareholders, cultures) or outwith organizations (e.g., suppliers, customers); The 'there' dimension refers to those events (e.g., Covid-19, social-political change) that have indirect relationships with organizations but constitutively determine the boundary-relations between events and organizations. The event origin provides clues as to the starting point of sensemaking[9]. As noted by Weick, Sutcliffe, & Obstfeld (2005, p. 409), "to make sense of disruption, people look first for reasons that will enable them to resume the interrupted activity and stay in action".

After identifying the origin of an event, the next question raises the issue of understanding where and how an event and its effects would move across all organizational levels, namely event spatial dispersion. Theoretically, Morgeson, Mitchell, & Liu (2015) suggest five pathways of the event spatial direction: 'single level effects', 'top-down direct effects', 'bottom-up direct effects', 'top-down moderating effects', and 'bottom-up moderating effects'. The single level effects reflect events arising and effecting changes within the same hierarchical level (e.g., individuals, organizations). The top-down direct effect emphasizes that exogenous events, such as natural disasters or man-made disasters, have a direct influence on lower-level phenomena including organizations, teams or even individuals.

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[9] Sensemaking is commonly understood as a process in which people attempt to interpret novel and ambiguous situations (Weick, 1993).

The COVID-19 pandemic, for example, has put an unprecedented strain on healthcare providers and systems (Barton, Christianson, Myers, & Sutcliffe, 2020). The bottom-up effects, as opposed to the top-down direct effect, turn the spotlight on how events happening at the lower hierarchical level (e.g., individuals, teams) cause changes or lead to subsequent events at higher organizational levels. When relationships fracture [10] or conflicts emerge between members in organizations or between employees and employer, it may result in the loss of 'strategically core' employees (Morgeson, Mitchell, & Liu, 2015) or employees resorting to industrial action (Aguzzoli & Geary, 2014; Meyer, 1982). The moderating effects of events on relationships between behaviors, features, and events also include two directions: top-down and bottom up. As an example of the top-down moderating effects, Linnenluecke (2017) found that it is likely to lead to significant consequence events where organizational processes and structures or technological systems have become increasingly complex and difficult for personnel to operate (e.g., Normal Accidents [Perrow, 1984]). The case with the bottom-up moderating effects includes tragedy events that happen significantly at the individual level (e.g., the loss of an influential leader [Expatica Communications: Leading through tragedy, 2017]).

The last element identified in event space is event spatial proximity which focuses on physical distance (Morgeson, Mitchell, & Liu, 2015). In organization settings, the structure of an organization that facilitates the flow of information and activity is a manifestation of event proximity. This is

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[10] Relationship fracture refers to a relational injury resulting from the violation of expectations in a dyadic relationship (Olekalns, Caza, & Vogus, 2020)

because the creation of a hierarchy organizes people into different divisions or groups with specified tasks in order to efficiently and effectively achieve an overall goal of the organization. Kahn, et al (2018) develop a model that shows three different pathways of how the differentiated strains emerging from a focal part of an organization (e.g., individuals, teams) trigger the movement of the focal part to adjoining parts for acquiring extra resources and capabilities that can help its adaptation. The event proximity includes two aspects: horizontal and vertical components (Morgeson, Mitchell, & Liu, 2015). For example, in the organization chart, the horizontal aspect refers to the physical distance within the same or similar hierarchical levels but probably in different geographical locations (e.g., procurement departments being in China and in the US), whilst the vertical aspect demonstrates the top-down or bottom-up hierarchy (e.g., leaders and followers, value chains). Events can occur at any hierarchical level and their effects are more likely to begin with the nearest entities (e.g., individuals, teams, organizations). The closer the distance between two entities or levels, the greater the impact there may be. Although a high level of staff turnover has an impact on organizational operations, the loss of team members is more likely to have a greater impact on the team itself or the team leader rather than on the company's CEO. Morgeson, Mitchell, & Liu (2015) pointed out that events that occur involving the top management team are likely to have a much larger organizational impact than events that occur at lower levels.

5.3 Research Method

5.3.1 Data Analysis

The data analysis process followed three steps to differentiate events through a two-by-two matrix: by the intensity of transformation: 'mounting' or 'sudden' and by the scope of impact: 'narrow' or 'broad'.

Step 1: Developing narrative accounts. From the interview data, I first conducted an intensive, fine-grained reading of each firm and then transformed interview data into discrete stories about the disruption by collating the causes and consequences, as well as responses to the disruption. Across the twenty-two cases, the collating process yielded 88 narrative accounts of disruption that break down into 137 events including the triggering event, the actual event and the subsequent event. Figure 15 illustrates how narrative accounts in Case 1 are derived and then break into events.

CASE 1 – Narrative accounts

Disruptive Event 1

External Env → Internal Emp → Internal Fin

Interval between disruption and risk

External Sup → Internal Pro → External Cus → Internal Rev

High — Risk — Low

Disruptive Event 2

Internal Mgr → Internal IPL

One year Interval from risk to disruption

External Com → Internal Rev

Disruptive Event 3

External Oth

Three Years Interval from risk to disruption

Internal Fin

Disruptive Event 4

Internal Emp ↔ External Agr

?? Interval from risk to disruption

Internal Rep ↔ Internal Rev

Internal: Internal disruption
External: External disruption
Emp: employee
Fin: Finance
Sup: Supply
Cus: Customer
Rev: Revenue
Env: Environment
Mgr: Management
Etr: Employee Turnover
IPL: Intellectual Property Leaking
Oth: Others (i.e., guarantor to other businesses which are bankrupt, ripple effect)
Com: Competitor
Rep: Reputation
Agr: Agent

Risk High/Low refers to the level of emergency of links in the system, being affected by disruptions

e.g., 'Internal Emp' means internal disruption caused by employee

Subsequent event
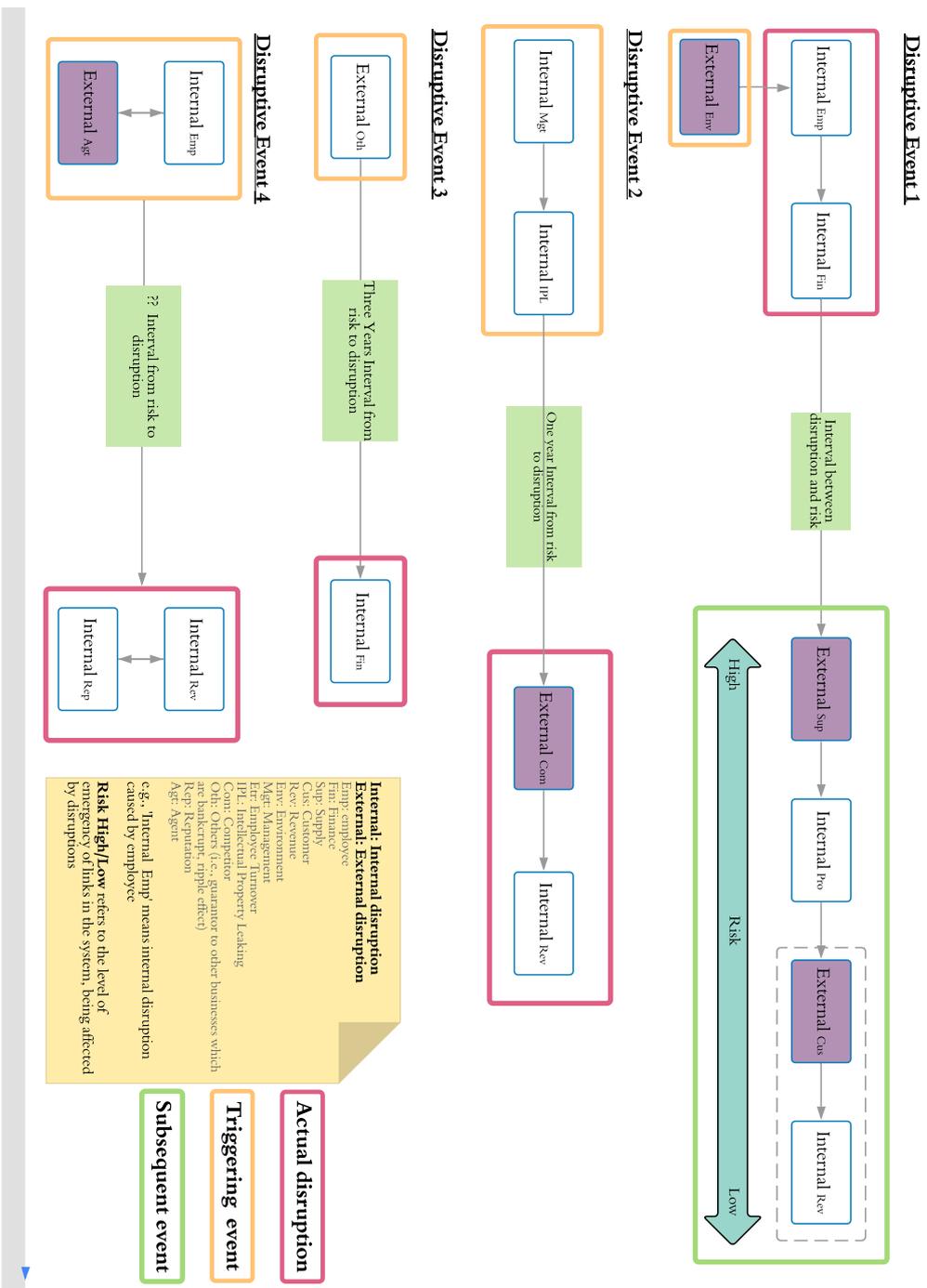
Triggering event

Actual disruption

Figure 15 Illustration Case 1 narrative accounts

Drawing upon existing methods, I developed a coding system (see Table 27) to differentiate 137 events through a two-by-two matrix: by the intensity of transformation (time): 'mounting' or 'sudden' and by the scope of impact: 'narrow' or 'broad' (space). This involved a magnitude coding (Miles, et al., 2014; Saladana, 2016), which applied a supplemental number ranging from 1 to 7 to each event based on the two-dimensional scale. To illustrate, the datum below was codified as 5 ('somewhat sudden' and 'adjoining part being affected is equal to 1') in both the scales of intensity and scope.

> *"In responding to the outbreak of SARS, the Chinese government suddenly released a policy called 'Green Channel'. This policy gives permission to other medical equipment manufacturers, which do not have the registration certificate but can manufacture and sell the similar products to the hospital. Our sales were disrupted because their prices are cheaper than us." – Case 4 and Disruption no. 25*

Although the numerical ratings added afterwards are the interpretation of this study, it was based on the informant's perceptions of disruption. This is an important practice in analyzing the data because a similar type of disruptions may have different impact on organizations depending on factors such as firm size, industrial position, ownership and geographic locations. For example, communication disruption in the case of large size-enterprise is 'moderate' in the scope of impact but it could be 'broad' in the case of a small-medium sized enterprise.

Scale (1 to 7)	Intensity	Scope
1	Extreme mounting	Narrow – only isolated part being affected
2	High mounting	Adjoining part being affected internal to organization - similar to 1
3	Somewhat mounting	Adjoining part being affected internal to organization - greater than 1
4	Moderate	Organization is affected
5	Relative sudden	Adjoining part being affected external to organization - similar to 1
6	High sudden	Adjoining part being affected external to organization - greater than 1
7	Extreme sudden	Broad - system

Table 26 A coding system for disruptive events

Step 2: Inductive coding. Following an iterative logic (Corbin & Strauss, 1990), the second analytical step was an inductive and recursive process of revisiting 137 events, which were gradually consolidated into first-order categories and then settled into second-order themes shown in Figure 17 (Gioia, Corely & Hamilton, 2013). This level of coding involved themes found in the literature (e.g., pluralistic ignorance, safety issue, terrorism) and emerging codes from data (e.g., unskillful communication). To ensure the accuracy of the emerging codes, codes that were close to the interviewees' vocabulary were used (e.g., San Zhai [triangular debt]). To illustrate this, when comparing the first order code "Abruptness of routine communication" with other first-order codes: "Unskillful communication", "No timely updated", "The insufficient communication" and "Language and geographic barriers", it was observed that these codes were concerned with disruption

caused by communication. The result was that all were structured into the second-order theme, labelled as "Communication disruption".

Step 3: Aggregate dimensions. When completing the first two steps, independent means of the twenty second-order themes based on the intensity and the scope were calculated and plotted in the scatter diagram (Stata). The juxtaposition of the average means of intensity (4.14) and scope (4.92) for all events was also calculated in Disruptive Space [11] (see Figure 16) and this helped to organize the twenty second-order themes into four analytic distinctions (see Figure 17), which are labelled as mounting-broad, mounting-narrow, sudden-broad, and sudden-narrow in disruption data structure (see Figure 18). Table 28 provides some selected quotes.

[11] Disruptive Space is a term used in STATA
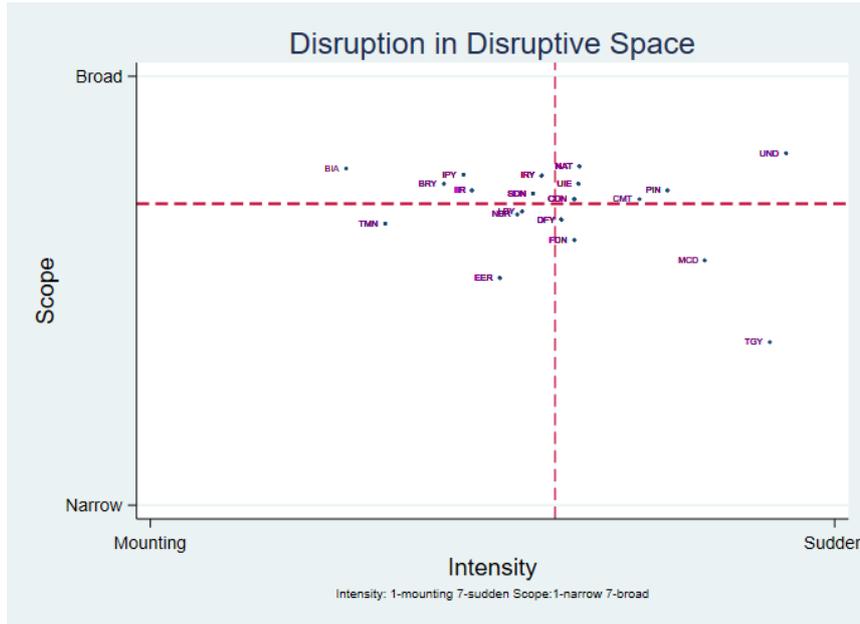
Figure 16 A scatterplot of events in Disruptive Space

Event intensity of transformation

		Mounting	**Sudden**
Event scope of impact	**Broad**	Bounded rationality Bureaucratic inertia Incompatibility Irresistibility Supply disruption	Communication disruption Complaint Non–alignment Precipitous intervention Unpredictable natural disaster Unreliable insitutional environment
	Narrow	Negligent behavior Employer-employee relationship Temptation Liability	The interruption of capital flow Tragedy The effect of social media The qualitative transofrmation of unnoticed issue

Figure 17A typology of organizational disruption

First-Order-Concepts **Second-Order-Themes** **Aggregate Theoretical Dimensions**

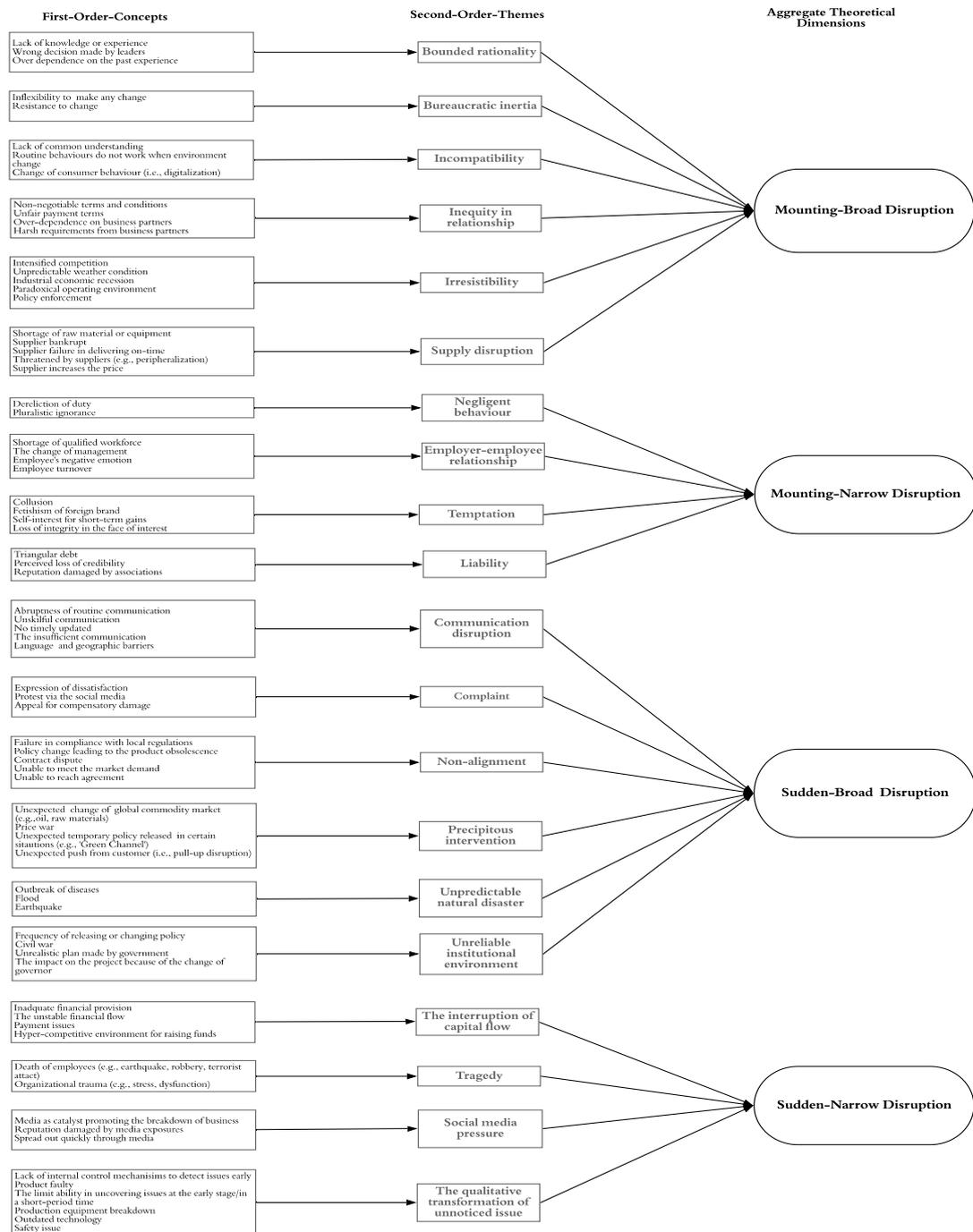| First-Order-Concepts	Second-Order-Themes	Aggregate Theoretical Dimensions
Lack of knowledge or experience Wrong decision made by leaders Over dependence on the past experience	Bounded rationality	Mounting–Broad Disruption
Inflexibility to make any change Resistance to change	Bureaucratic inertia	
Lack of common understanding Routine behaviours do not work when environment change Change of consumer behaviour (i.e., digitalization)	Incompatibility	
Non-negotiable terms and conditions Unfair payment terms Over-dependence on business partners Harsh requirements from business partners	Inequity in relationship	
Intensified competition Unpredictable weather condition Industrial economic recession Paradoxical operating environment Policy enforcement	Irresistibility	
Shortage of raw material or equipment Supplier bankrupt Supplier failure in delivering on-time Threatened by suppliers (e.g., peripheralization) Supplier increases the price	Supply disruption	
Dereliction of duty Pluralistic ignorance	Negligent behaviour	Mounting–Narrow Disruption
Shortage of qualified workforce The change of management Employee's negative emotion Employee turnover	Employer-employee relationship	
Collusion Fetishism of foreign brand Self-interest for short-term gains Loss of integrity in the face of interest	Temptation	
Triangular debt Perceived loss of credibility Reputation damaged by associations	Liability	
Abruptness of routine communication Unskilful communication No timely updated The insufficient communication Language and geographic barriers	Communication disruption	Sudden–Broad Disruption
Expression of dissatisfaction Protest via the social media Appeal for compensatory damage	Complaint	
Failure in compliance with local regulations Policy change leading to the product obsolescence Contract dispute Unable to meet the market demand Unable to reach agreement	Non-alignment	
Unexpected change of global commodity market (e.g.,oil, raw materials) Price war Unexpected temporary policy released in certain situations (e.g., 'Green Channel') Unexpected push from customer (i.e., pull-up disruption)	Precipitous intervention	
Outbreak of diseases Flood Earthquake	Unpredictable natural disaster	
Frequency of releasing or changing policy Civil war Unrealistic plan made by government The impact on the project because of the change of governor	Unreliable institutional environment	
Inadquate financial provision The unstable financial flow Payment issues Hyper-competitive environment for raising funds	The interruption of capital flow	Sudden–Narrow Disruption
Death of employees (e.g., earthquake, robbery, terrorist attact) Organizational trauma (e.g., stress, dysfunction)	Tragedy	
Media as catalyst promoting the breakdown of business Reputation damaged by media exposures Spread out quickly through media	Social media pressure	
Lack of internal control mechanisims to detect issues early Product faulty The limit ability in uncovering issues at the early stage/in a short-period time Production equipment breakdown Outdated technology Safety issue	The qualitative transformation of unnoticed issue	

Figure 18 Disruption data structure

5.4 Findings

Analyzing organizational disruption through the temporal and spatial dimensions: the intensity of transformation and the scope of impact, I identified four types of disruption: *mounting-broad, mounting-narrow, sudden-broad and sudden-narrow*, followed by its practical implication in understanding patterns of disruption by firm's ownership, size, industry and location.

5.4.1 Mounting-Broad Disruption (MBD)

Mounting-broad disruption describes a situation in which the adversity is incubated in organizations over time and its accumulated effects result in a greater impact moving beyond an organization itself. Our findings identified six themes – 'bounded rationality', 'bureaucratic inertia', 'incompatibility', 'inequity in relationship', 'irresistibility' and 'supply disruption' – that are representative of situations in which a decision-making or an action-taking in response to a task environment 12is based on heuristics by either employing routine or unjustified thinking or by deliberately ignoring certain alternatives due to self-interests. In the theme of 'bounded rationality', informant in Case 16 noted that,

> *"We have to admit that some decisions were inadequate, as they were subjective and reflected personal preference and emotions, rather than being objective." – Case 16, disruption no. 109*

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[12] The task environment has two main attributes: complexity involving a large number of external factors with which organizations have to deal and dynamism referring to the degree of unexpected change associated with those factors (Bourgeois, 1980)

This illustrates one possibility that the intertemporal choice 13 of any decision or action at one point in time particularly based on heuristics could be a starting point of the adversity in organizations and this may lead to outcomes realized at other points in time.

In a complex and dynamic environment, organizations often experience a situation, which requires to make an immediate response, even though it lacks knowledge or experience of response options (Milliken, 1987) to the pressing situation. Oftentimes, individuals who are confronted with the uncertain situation adopt the heuristic approach to speed up the process of responding to the situation. The decision made at the particular point in time can become a source of disruption later on as the consequences of the decision are influenced by the passages of time (Lumpkin & Brigham, 2011). As noted by respondent in Case 11,

> *"Our people who work at the interface with our African clients were still relatively young and they lacked of experience in sensitizing their needs and interpreting this situation well to us at that time. We missed the best time and opportunity in managing the issues emerging from the situation and now we are in a dilemma." – Case 11, disruption no. 75*

In contrast to heuristics, the findings suggest that, when making decisions in solving a complex issue, organizations, particularly in financial industry, tend to accentuate the role of empirical evidence or the past experience used in dealing with the same or similar situations. Although it

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[13] The intertemporal choice 'refers to decisions with a time dimension. The value or utility of a choice is influenced by how much time passes before the consequences of the decision are realized' (Lumpkin & Brigham, 2011: 1156)

seems to be sufficient as a satisfactory solution in a short term, it is less likely to be a guaranteed solution in a long term. Respondent in Case 16 explained that,

> *"Sometimes, disruption has occurred because of our empiricism and over-confidence on the past experiences of our success." – Case 16, disruption no. 107*

Consequently, some expected issues take unexpected shapes that lead to a surprise to organizations (Cunha, Clegg, & Kamoche, 2006) because of the accumulation of the incremental and 'unnoticed' changes.

Additionally, there are other factors emerging from internal and external to organizations. These include organizational structures and routines that have become inertia for the change of organizations, inter-organizational relationships with business partners, as well as industrial evolutions. Some evidence is provided in Table 28.

5.4.2 Sudden–Broad Disruption (SBD)

Sudden–broad disruption refers to a situation in which unexpected events or expected events occur and the effects of events impact not only on an organization itself but also its connections in business ecosystems. This include extreme events, such as extreme weather conditions and outbreak of diseases, that trigger disruptions to organizations. As noted by respondent in Case 14,

> *"The Southern China is a warm place in which it rarely snows. The suddenly snowing last year significantly damaged our power*

transmission networks and resulted in a large scale of electricity blackout."– Case 14, disruption no. 96

In Case 3, the weather condition is also mentioned by respondent as it halts its planned live music concerts. The distinction between Case 14 and Case 3 is that the former event occurs unexpectedly, whilst the latter one is an expected issue. For example, respondent in Case 3 indicated that,

> *"As our music festivals are mainly planned and held in summer, the weather condition is a key factor to determinate whether or not we could successfully carry on our projects. We often introduce some countermeasures to the weather condition". – Case 3, disruption no. 21*

Following the stream of 'expected event' in the sudden-broad context, the findings show that the sources of these expected events emanate from the socially constructed environment. The implication is that there is a high degree of direct or indirect interconnectedness amongst social actors (e.g., individuals, teams, organizations, the regulatory groups), which collectively create uncertainty of the expected event in terms of when, where and how to happen. As respondent explained in Case 11,

> *"It was a big disruption as we had to stop the project halfway through in Nigeria. This is because, at that time, it was the new government election, which poses a great challenge to our relationship with the new government if the existing government would have lost in the election. Additionally, this situation has been intensified by the fall of oil price that resulted in the government's inability to continue its service payment to us. We had to transfer our resources to other*

projects in different regions until the regional economy improves." –

Case 11, disruption no. 72.

In a relatively stable institutional environment, the policy change, sometimes, is viewed as a source of sudden–broad disruption in a sense that it requires organizations to re-configure resources and capabilities or even changes their routines in immediately responding to these changes for the legitimacy purpose in their operations. As noted in Case 5,

> *"China's FDA has introduced new policies regarding standards for the procurement of certain types of medical equipment. This change is significant because it requires our entire supply chain to respond it quickly" – Case 5, disruption no. 28*

In the worst case, the change in regulatory policy can violate employees' trust to organizational integrity and practice and the untrustworthiness could generate the ripple effects amongst employees in organizations resulting in their leaves.

> *"The most difficult situation was in 2013, when the government announced to ban the direct sales business model in China over the national press. All most all people in our sales team with an approximate 1,000 people left literally just overnight. We faced a huge economic pressure as our business completely relied on our sales." – Case 2, disruption no. 11*

The findings also suggest that, although the government interventions to industrial operations, such as by introducing new policy, do not seem to have a direct effect on organizations, such changes can be a matter of life or death to other businesses with which organizations have partnered or compete.

Thus, the bankruptcy or collapse of other businesses in the same industry can generate negative impacts on them, and sometimes, trigger a disruption, such as the loss of customers. As explained by respondent in Case 2,

> *"In 2017, there was a large scale of bankruptcies and business closing down in the financial sector. This affected the level of trust our customers have on us and the result of this was that they may not invest us, which could be a severe disruption to our business." – Case 2, disruption no. 105*

5.4.3 Mounting–Narrow Disruption (MND)

Mounting-narrow disruption describes a situation in which the adversity is incubated in organizations over time and its accumulated effects result in an impact within an organization itself. The findings show that the source of mounting-narrow disruption is embedded in the process of social interactions within or beyond organizations for a specific task. This process can gradually drift and generate relational fractures [14] contributed by 'negligent behavior', 'employer-employee relationship', 'temptation' and 'liability'. The 'negligent behavior' is perceived as mistakes or failures made by one party that has an obligation to fulfil a role in attaining an agreed goal. Olekalns, Caza, & Vogus (2020) refer it to as a form of violation on one's relational expectations. For example, respondent in Case 11 stated that,

> *"A recent disruptive event is that one of our engineering projects has been delayed over a year due to the poor management of the project*

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[14] Olekalns, Caza, & Vogus (2020:4) defined relationship fracture as ' a relational injury that results from the violation of expectations that characterized a dyadic relationship.

manager who is appointed by our client…when our client complained the slow progress of the project and he just ran away from his responsibility. We, unfortunately, have to tell the truth to our client about his failures in leading this project as we cannot afford to carry on working with him if this situation continues. The longer we stay in the project, the greater loss we face. But this resulted a great tension between us and the project manager." – Case 11, disruption no. 80

Moreover, the findings suggest that the assumption of decision-making in some organizations is established on the principle of 'the greater the risk, the greater the potential reward'. This has been part of their decision-making process and organizational culture – deliberately pursuing risk-taking strategy. Risk, however, is a dichotomy between benefit and harm (Bednarek, Chalkias, & Jarzabkowski, 2019). The risk-taking strategy, indeed, outweighs the benefit over the harm by ignoring or pluralistically ignoring other risk factors that may cause a major disruption, when institutional and regulatory environments have changed.

"In the past, the local government was less likely to interfere with businesses as long as they contributed to the local tax, payments and customs timely, even though these businesses only partially complied with the rules or the regulations. More recent years, my observation is that the law enforcement has become more and more stricter, with an increasing awareness of environmental issues (e.g., PM 2.5 and air pollutions), and many businesses have been forcibly closed down." – Case 12, disruption no. 89

The theme of employer-employee relationship identifies the people related issues that can generate constraints and strains on organizational operations. As respondent in Case 19 described,

"The lesson what I have learned is that employee changes would not completely cause interruption of our business but it could gradually drift off to our operations, possibly leading to our failures." – Case 13, disruption no. 92

It is shown that the success or failure of SMEs is heavily reliant on how well their employees perform. They, however, are confronted with challenges of attracting or retaining highly skilled workforce who can drive their business forward. As explained in Case 9,

"As our industry in general has a zero tolerance in any 'surprise' or unexpected event, we have to build a robust and rigorous control system that can precisely and timely detect any errors or deviations from the planned production machinery. Our failure in enhancing our production capacity is because of the lack of skilled workers as we can't compete with the compensation package offered by large firms."
– Case 9, disruption no. 54

Similarly, respondent in Case 12 stated that,

"This industry [management consulting] is highly dependent on people. In differing from HR's professional training programme like learning and development (LND), we are actually involved in helping to solve a real problem of businesses or contextualizing and operationalizing any new ideas and concepts, such as a new form of retailing in business ecosystems raised by Jack Ma. It is difficult for

the small firms like us to attract experienced and talent people." –
Case 12, disruption no. 86

The other two themes in the mounting–narrow disruption encompass temptation and liability that are influenced by slow variables embedded in organizations at the individual level. This includes the desire of personal gains at the expense of the primary interest of an organization. As indicated in Case 1,

"We found that our sales have colluded with our sales agent (the third party) in making a profit for their own benefits. Not only does this harm our benefits but also damages our reputation." – Case 1, disruption no. 2

Sometimes, an individual who is in a powerful position decides on behalf of an organization on the basis of the felt obligation in doing a favor for others in his/her close networks (e.g., friends and families), even though it is apparent that the decision or action can create a great level of risk to the organization and possibly lead to a major disruption.

"We have been asked by a good friend of our CEO, who is a local bank manager, to be a financial guarantor to another local business about which we have known nothing. Building on a complete trust of personal guanxi (relationship) with the bank manager, we agreed to be its financial guarantor. One year ago, we were informed that this business, unfortunately, went to bankruptcy with about £30M debt left, which have automatically become our debt. This is a significant disruption to us and it may take years for us to recover." – Case 1, disruption no. 4

5.4.4 Sudden–Narrow Disruption (SND)

*Sudden–narrow disruption r*efers to a situation in which unexpected events or expected events occur and immediately result in the impairment of an operating strategy of an organization. My findings identify four categories: the interruption of capital flow, the tragedy happening to members of an organization, the effect of social media, and the qualitative transformation of unnoticed issues. The interruption of capital flow is generally acknowledged as the most commonly disruptive event confronting organizations in the sense that its effects unambiguously pose an immediate threat to the continuity of organizational operations or even challenges the survival of an organization. Notwithstanding, the source of triggering the interruption varies depending on the different stages of organizational development. For example, Case 10, which is a start-up Fintech business, finds itself in a difficult situation in securing sufficient funding for its business development. As respondent explained,

> *"Although the scale of business funding to high-tech projects in China is enormous, there is a fierce competition as everyone keeps eyes on the same cake. All disruption we have experienced is just about the money we need to keep our project going." – Case 10, disruption no. 68*

In an established business where the capital flow is well planned and managed, the source of the sudden disruption is embedded at the boundary between inter-groups or inter-organizations. For example, in Case 1,

> *"Our financial department received an emergent request from a manager in one of business units, who asked for the double amount of*

money as we planned to pay for the same amount of production materials due to the increase of global oil price. Although we normally have some liquid assets for any emergency, this exceeded beyond our capacity and resulted in a short-term financial crisis." – Case 1, disruption no. 1

The findings show that the scrutiny of social media is seen as a primary threat to business operations as it can generate reputational risks to organizations in an unprecedent speed and scale. The loss of reputation can produce a variety of adversity to a firm's competitiveness, such as its market position, the trust of stakeholders, and the legitimacy of its operations (Pekka, 2010). In a digitalized world, social media is no long exclusive to corporations to promote and communicate as what they want to the public. Instead, it has become an open and participatory platform in which anyone can create any information about organizations (e.g., true or false). As noted in Case 21,

"One of disruptive events we have recently experienced is about reputational damage. Our client sued us because she is concerned with the security issue of our bank resulting in money stolen in her bank account, and moreover she exposed the unverified information and the unsettled case through social media and internet." – Case 21, disruption no. 131

The sudden disruption in the theme of deficiency refers to a tipping point in which the adversity of unnoticed issues or other slow variables has been accumulated into something devastating. This includes safety and quality issues in organizations emerging from different parts of organizations or outside organizations.

"There is a rare case occurred in the hospital about the faulty of our product – the surgeon found the scalpel unusable right before the operation to the patient. This requires our immediate response from not only the front-end supply chain but also the whole supply as we have to activate the traceability system to find out the root cause of this failure." – Case 5, disruption no. 29

Tragedy in organizations describes a situation in which a tragic event unexpectedly occurs outside the core activities and causes organizational trauma[15]. As an organization is constituted by individuals who perform in different functions for organizational efficiency and effectiveness in achieving its goal, our data shows that the effect of such sudden disruption to organizations is firstly experienced by individuals, who are exposed to the risk or traumatic situation, and then this can quickly permeate through the whole organization in various forms (e.g., physical or emotional stress), leading to the impairment of the operational strategy.

"We were responsible for Ariana Grande's Global Tour. One of her concerts in Manchester, UK in 2017 was attacked by terrorists with a suicide bombing, which killed about 21 people and many people were injured. This was an extremely abrupt shock not only to her, but also to us, and we had to cancel all planned concerts in other European countries as well as the ones in Asia." – Case 3, disruption no. 18

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[15] The organizational trauma is defined as 'a dysfunctional change in the behavioural patterns that exist at the organizational level' (Venugopal, 2016: 65)

Aggregate Dimension: Mounting-Broad Disruption	
Second-Order Codes	Selected Evidence on First-Order Codes
Bounded rationality	*Lack of knowledge or experience* "Our people are still relatively young and they don't have the experience in dealing with this situation. So, we are not yet suitably prepared to deal with this issue and now we are very passive." – Case 11, disruption no. 75 "There is a lack of understanding of the implications of the cultural and traditional festivals in Thailand so, we didn't appropriately plan our order and shipping schedule to recognize the implications." – Case 18, disruption no. 116 *Wrong decision made by leaders* "We have to admit that some decisions were inadequate, as they were subjective and reflected personal preference and emotions, rather than being objective." – Case 16, disruption no. 109 *Over dependence on the past experience* "Sometimes, disruption has occurred because we are empiricism and over-confident on our past experiences of success." – Case 16, disruption no. 107
Bureaucratic inertia	*Inflexibility to respond to change* "As a large global corporation, our production plans are made 6 months in advance and we tend not to respond to any sudden changes." – Case 2, disruption no. 12

	Resistance to change "We tend to be slow to respond to the need for change, including to changes in the external environment."– Case 7, disruption no. 40
Incompatibility	*Lack of common understanding* "As the boundary between brand endorsement and event sponsorship advertising is blurred in China, there is a lack of clarity an understanding regarding of 'zan zhu quan li' (sponsorship rights interests) between European and American artists and Chinese sponsors, which can result in problems." – Case 3, disruption no. 19 "As a result of differing corporate cultures, problems can arise when dealing with privately-owned enterprises." – Case 22, disruption 134 *Change of Consumer Behavior (Digitalization)* "There are fewer customers now visiting our branch because of digitalization that is gradually changing consumer's behaviors." – Case 11, disruption no. 127 *Routine behaviors do not work when environment change* "There are some cultural norms in China that are inappropriate when dealing with events occurred outside China." – Case 11, disruption no.79
Inequity	*Non-negotiable terms and conditions with our customers* "Our customer is too powerful to permit negotiating more mutually beneficial terms and conditions." – Case 12, disruption no. 12

	Unfair payment terms "Perceived unacceptable trading terms and conditions (i.e., payment, delivery) would have a negative impact on relationships with our customers." – Case 6, disruption no. 39 *Over dependence on business partners* "We, currently, have no alternative suppliers for this commodity." – Case 20, disruption no.123 "It is not good business practice but we are entirely reliant on this one supplier." – Case 20, disruption no. 125 *Harsh requirements from business partners* "Customers are becoming more and more demanding, for example, the expected OTD is always increasing, from 95% to 98% next year and then 99% the following." – Case 9, disruption no. 60
Irresistibility	*Intensified competition* "Private banks are emerging that is increasing the competition in financial products." – Case 21, disruption no.128 *Industrial economic recession* *"*Any slow-down or recession in the Industrial Economic Cycle, has a negative impact, including on our cash flow." – Case 16, disruption no. 106 *Paradoxical operating environment* "Competition in China's manufacturing industry is getting more and more fierce and as a result, our market-share is shrinking. In addition, our operating

	costs (i.e., loans, bills, tax) are rising." – Case 9, disruption no.62 *Policy enforcement* "The split of our businesses between electricity power station and power network is a result of national policy." – Case 14, disruption no.96
Supply disruption	*Shortage of raw materials or equipment* "There is a lack of test-equipment, thus inhibiting our ability to check quality and report on such standards" – Case 17, disruption no.112 "In our daily operations, we often suffer from supply shortages, as well as the issue of variable quality of raw materials." – Case 5, disruption no. 32 *Supplier bankrupt* "One of our suppliers was suddenly declared bankrupt because of their inability to comply with the regulations concerning its process of IPO. All production at their factory including our orders immediately ceased." – Case 6, disruption no. 34 *Supplier failure in delivering on time* "Sometimes, delays result from the inability of the company to which the supply has been is outsourced, such as those which supply machine parts because of their expertise in special processes, such as the hat treatment of certain surfaces." – Case 9, disruption no. 56 "Our orders were delayed because of the impact of the Songkran Festival, which is a major local event." – Case 18, disruption no.114

	Threatened by supplier (e.g., peripheralization)
	"Our supplier demanded shorter payment terms, otherwise, they would stop supplying materials to us but this situation has seriously affected our cash flow position." – Case 9, disruption no. 61
	"Our market shares reducing, lessened the willingness of the supplier to trade with us and as a result, the relationship is no less strong." – Case 20, disruption no.121
	Supplier increases the price
	"Price increases by our suppliers has a direct impact on our profits." – Case 19, disruption no. 119

Aggregate Dimension: Mounting-Narrow Disruption	
Second-Order Codes	**Selected Evidence on First-Order Codes**
Negligent behavior	*Dereliction of duty* "The potential risks we foresee relating to any reduction in our standards would relate to food safety and a drop in our standards, would damage our reputation." – Case 22, disruption 136 "The project has been delayed by over a year because of the dereliction of duty of the project manager appointed by our customer." – Case 11, disruption no. 80 *Pluralistic ignorance* "Business owners take risks (e.g., ignoring environmental regulations) in operating their business when their corporate culture is significantly profit-oriented." – Case 12, disruption no. 89
	Shortage of qualified workforce

Employer-employee relationship	"Some of our failures in achieving production capacity are because of inadequate staffing, either through staff shortages or inadequately skilled staff." – Case 9, disruption no. 54 "It is getting more difficult to attract and retain experienced staff, who like working for SMEs." – Case 13, disruption no. 86 *The change of management team* "The impact of changing a management team can be slow but it makes a big impact." – Case 13, disruption no. 92 *Employees' negative emotions* "There can be an issue, if employees bring their negative emotions into the workplace, as this can cause disruption, including when dealing with customers' complains." – Case 21, disruption no. 132 *Employee turnover* *"In the process of change, it is inevitable to lose some staff because they are not happy with the potential impact of the changes and such losses can include some of our key business partners." – Case 7, disruption no. 44*
Temptation	*Collusion* "Our project business partner colluded with the oil suppliers to increase the oil price in order to acquire our business." – Case 15, disruption no. 103 "Our internal sales and external sale agents can be involved in collusion, for illegal gains." – Case 1, disruption no. 2

	Fetishism of foreign brand "Big hospitals in China favor foreign brands rather than domestic brands even though we can offer more competitive terms, including one more year warranty. Despite this, we have been unable to penetrate the potentially lucrative market of the larger hospital." – Case 4, disruption no. 26 *Self-interest for short-term goals* "Although the Chinese government has incentives (i.e., competitive pricing) to encourage hospitals to buy the products made in China, such as ours and it has also launched a central government procurement process for hospitals, there is still the human factor, which can significantly influence purchasers. The result is that, despite our competitive pricing, this is not converting into sales." – Case 4, disruption no.27 *The loss of integrity in the face of interest* "Now that the business is growing and making profits, I am excluded from benefitting by my business partner who is greedy for wealth and power." – Case 15, disruption no. 102
Liability	*Triangular debt* "As we were a financial guarantor to a local business, which has borrowed about £50M from a local bank, when the local business went bankrupt one year ago with about £30M in debt, this had a significant negative impact on our company and the resulting debt, will probably takes years for us to repay." – Case 1, disruption no. 4 *Perceived loss of credibility*

	"My biggest concern is that we lose the trust of our customers because all of these unexpected events which have occurred, leading us not to be able to meet our commitments on time." – Case 6, disruption no. 38 *Reputation damaged by associations* "Other firms being declared bankrupt and this affects our customers' trust in financial products and services." – Case 16, disruption no.105

Aggregate Dimension: Sudden-Broad Disruption

Second-Order Codes	Selected Evidence on First-Order Codes
Communication disruption	*Abruptness of routine communication* "Our supply chain often experiences some disturbances when there is a turnover of employees. This results in short-term failures in receiving feedbacks from them." – Case 5, disruption no. 30 *Unskillful communication* "Despite generally performing well, poor communication with our customers causes significant problems." – Case 11, disruption no. 74 *No timely updated* "The market demand suddenly fell but our manufacturer did not receive a timely update." – Case 20, disruption no. 124 *The insufficient communication* "Our agent didn't communicate with us about our client to whom we were to deliver a training course and this resulted in a double booking of the same course." – Case 12, disruption no. 85

	Language and geographic barriers "Geographical location and language are barriers to our communication and this can lead to misunderstanding." – Case 18, disruption no. 11
Complaint	*Expression of dissatisfaction* "As soon as we received our customer's complaints about a consignment of toothpaste packaging that broke before completing usage, we quickly conducted an investigation and, based on the results, we decided to terminate our relationship with the current packaging suppliers." – Case 2, disruption no. 13 *Protest via the social media* "Our customer complained to the media that her bank account had been improperly used and implied an apparent weakness in the bank's of security arrangements, was to blame." – Case 21, disruption no. 129 *Appeal for compensatory damage* "We face a big lawsuit involving a claim for nearly £3.58 billions in compensatory damages because the customer believes that our company's talcum powder contributed to ovarian cancer." – Case 5, disruption 33
Non-alignment	*Failure in compliance with local regulations* "A number of concerts planned for China as part of European-American music top stars' Asia tour were cancelled because Chinese officials discovered an artist's perceived inappropriate behaviors primarily relating deemed unacceptable lyric-content, including perceived unacceptable language."–Case 3, disruption no.17

	"US government imposes sanctions on our company have caused major disruption in our supply chain because we have been forced to break a contract." – Case 20, disruption no.122

Policy change leading to the product obsolescence

"China's FDA has introduced new policies regarding standards for the procurement of certain types of medical device products. This change is significant for us, as it requires our entire supply chain to respond quickly." – Case 5, disruption no. 28

Contract dispute

"In a recent £0.5 billion project, there was a disagreement in terms of understanding the contract details, involving an apparent discrepancy of approximately £1 million gap." – Case 11, disruption no. 78

Unable to meet the market demand

"We tried very hard to enhance our productivity but we still can't meet the sudden increase in demand of medical equipment needed in hospital." – Case 4, disruption no. 24

Unable to reach agreement

"Sometime, the artists are not happy with our final offer and thus, decide not to appear." – Case 3, disruption no. 20 |
| Precipitous intervention | *Unexpected change of global commodity market*

"The 2015 global oil crisis caused a major disruption to us and if it had continued for a further 8 years, our company wouldn't have survived." – Case 9, disruption no. 59 |

	Price war "Our competitor launched a price war to attract to more customers but it has had the effect of upsetting the market balance." – Case 7, disruption no. 42 *Unexpected temporary policy released in certain situation* "To reduce air pollution in Winter, this year, the Chinese government banned the use of coal fire heating in Northern China and this had led to a sharp demand increase in demand for natural gas." – Case 8, disruption no. 45 "In responding to an outbreak of flu, the Chinese government suddenly issued a policy called the 'Green Channel'. This policy gives a permission for sales to other medical equipment manufacturers which don't have the usually required registration certificate but which produce and sell the similar products to the hospital. The result was that our sales were disrupted because their prices are cheaper than ours." – Case 4, disruption no. 25 *Unexpected push from customers* "We often encounter a situation, called 'pull up', whereby, that our customer requests delivery within a shorter lead time." – Case 9, disruption no. 58 "We were suddenly pushed by our partners to speed up the project on which we were about to commence, in order to meet the rise in immediate market demand." – Case 8, disruption 46
Unpredictable natural disaster	*Outbreak of diseases* "The outbreak of SARS in China caused a sharp increase in demand of our vitamin products but we

	were unable to meet this sudden rise in demand." – Case 2, disruption no. 10 *Flood* "A few months ago, flooding in South American had a detrimental effect on our supply chain and as a result the entire factory stopped." – Case 5, disruption no.31 *Earthquake* "The 2008 Sichuan earthquake caused major disruption to us." – Case 8, disruption no. 48 *Unpredictable weather conditions* "The impact of extreme weather conditions had a relatively large impact on our business. In winter, the conditions were such that, the build-up of ice in the South, caused significant damage to the power transmission network, resulting in losses of supply." – Case 14, disruption no. 96
Unreliable institutional environment	*Frequency of releasing or changing policy* "The frequency of policy change (i.e., to our business sales model in China from legal to illegal and then back to legal) has resulted in the loss of both staff and customer." – Case 2, disruption no. 11 "Many new regulatory policies have been issued over the last 12 months to regulate our industry." – Case 16, disruption no. 104 *Civil war* "We were forced to terminate a project because of civil war in Nigeria." – Case 11, disruption no.77

	Unrealistic plan made by government
	"As we work in less-developed countries, the government, sometimes, have developed ambitious plans that exceeds our financial capability and this results in delays inadequate fund to pay the staff and so, we have to terminate the projects." – Case 11, disruption no. 72
	The impact on the project because of the change of governor
	"The change of state governors in countries, especially when previously amenable individuals fail to be re-elected can in the election have a big impact on our projects." – Case 11, disruption no. 73

Aggregate Dimension: Suddenness-Narrow Disruption	
Second-Order Codes	**Selected Evidence on First-Order Codes**
The interruption of capital flow	*Inadequate financial provision*
	"The manager didn't provide information in a timely manner about the increase in global oil⋯thus, our finance department didn't make any provision and which caused a short-term financial crisis." – Case 1, disruption no. 1
	The unstable financial flow
	"All the disruptions or threats we have experienced have been associated with a shortage of funds, resulting in the necessity to trying to find new sources of cash." – Case 10, disruption no. 67
	Payment issues

	"Customer's delay in making payment have a negative impact on our cash flow (i.e., as we can't pay our suppliers)." – Case 1, disruption no. 8 *Hyper-competitive environment for raising funds* "The scale of business funding in China is massive but competition is fierce as everyone tries to obtain the funding for their projects: Block chain, Fintech and so on." – Case 10, disruption no. 68
Tragedy	*Death of employees* "Our marketing staff were unfortunately killed during the Sichuan earthquake." – Case 2, disruption no. 15 "When operating in Panama, initially, we experienced a number of robberies and lost a number of employees." – Case 16, disruption no. 16 *Organizational trauma* "The terrorist attack and suicide bombing which occurred during Ariana Grande's concert in Manchester was a major disruptive event in 2017." – Case 3, disruption no. 18
Social media pressure	*Media as catalyst promoting the breakdown of business* "When the CCTV news announced that our sales model was illegal and should be banned immediately, almost all employees (many thousands) left just over one night." – Case 2, disruption no. 14 *Reputation damaged by media exposures* "Our brand and reputation have suffered significantly because of negative media exposure." – Case 21, disruption no. 131

	Spread out quickly through media "Social media is a very powerful platform that can spread news of incidents quickly." – Case 22, disruption no. 137
The qualitative transformation of unnoticed issues	*Lack of internal control mechanisms to detect issues early* "As we don't have sufficient internal management control mechanisms to detect collusion early, negative issues can damage our company's reputation and also harms the interests of consumers." – Case 1, disruption no. *Product faulty* "There was an extreme example of this recently, concerning a hospital, which has raised the issue of a faculty batch, thus questioning our product quality. This not only impacted on us but also on our suppliers." – Case 5, disruption no. 29 "The failure of a small device can lead to a systematic collapse of the entire power grid, with a domino effect." – Case 14, disruption no. 97 *The limit ability in uncovering issues at the early stage/in the short-period time* "As we operate in the machinery industry, there are lengthy processes involved, making us vulnerable to accidents at any stage." – Case 9, disruption no. 50 *Production equipment breakdown* "As our equipment was damaged in that month, our production stopped and we were unable to meet our delivery dates." – Case 9, disruption no.52

	Safety issue "Safety and safety-related incidents, are the biggest factor that could disrupt our daily operation." – Case 8, disruption no. 49

Table 27 Selected evidence about disruptions in organizations
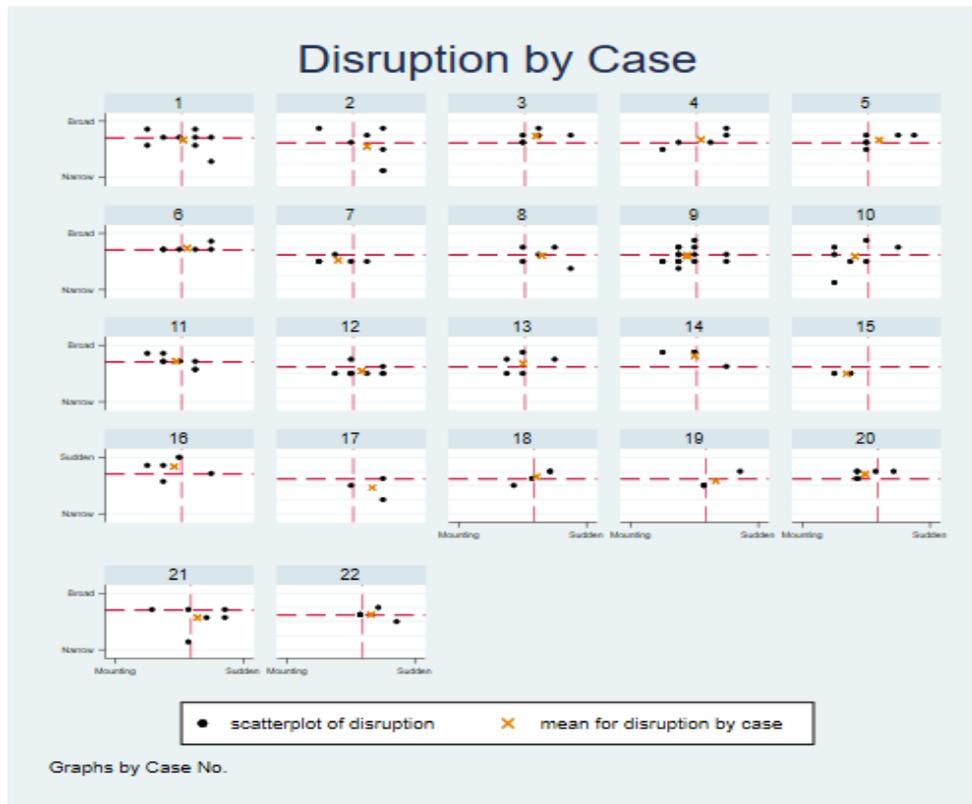
5.4.5 Organizational Disruption by Case

Figure 19 Disruptions by cases

5.4.6 Organizational Disruption by Ownership Type

These are shown in Figure 20. Disruptions experienced by non-Chinese MNEs tend to be sudden but across the entire spectrum of scope. For example, one respondent described that *"When the CCTV news announced that our sales model was illegal and banned immediately, almost all employees (over thousands) left just over one night."* (Case 2 and disruption no.14). Such sudden events disrupt not only the organization itself but also could possibly hit the entire chain: "*There is an extreme case happened recently in hospital because of the product quality issue. This does not only impact on us but also on our suppliers."* (Case 5 and disruption no. 29).

Disruptions experienced by SOEs and POEs, however, tend to be evenly distributed across the Disruptive Space (DS).
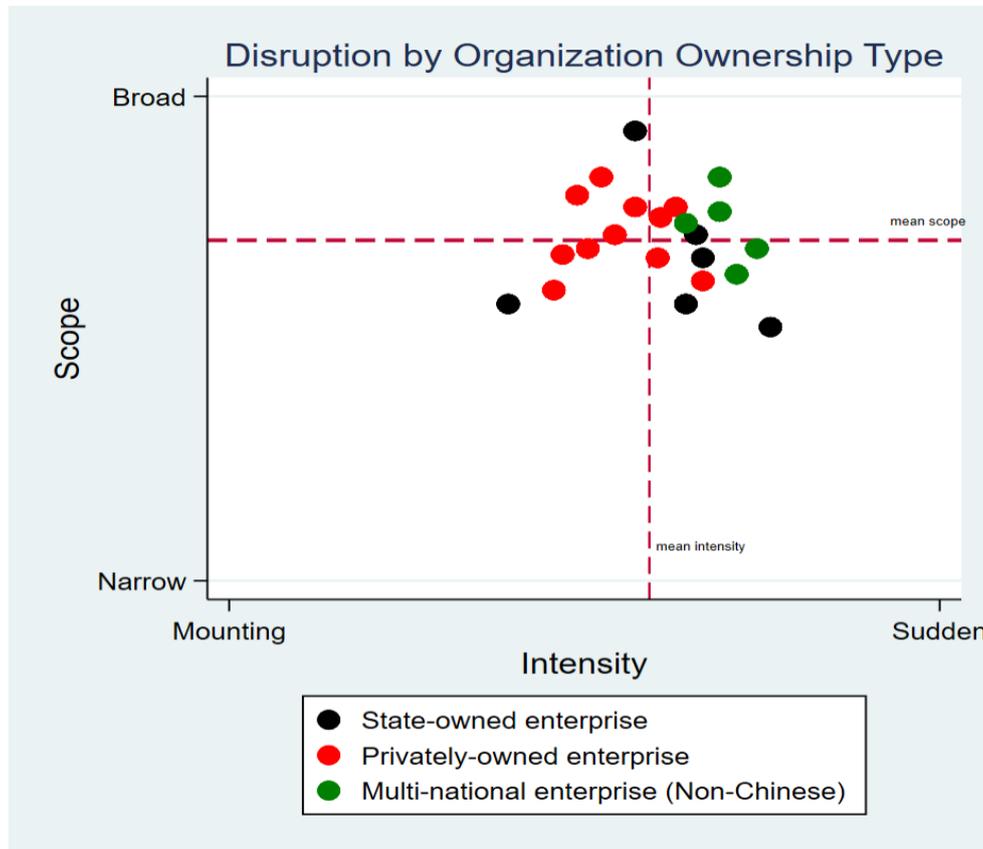
Figure 20 Organizational disruption by ownership type

5.4.7 Organizational Disruption by Size

These are shown in Figure 21. Disruptions experienced by large enterprises tends to have a broad impact in terms of the scope rather than the narrow impact. According to one respondent: *"The US government imposes sanctions on our company that causes a big disruption of our supply chain because we break the contract."* (Case 20 and disruption no. 122). Nearly seventy percent of disruption is characterized as being sudden events: *"The unexpected system crash caused the abrupt of our operation"* (Case 21 and

disruption no. 130). By contrast, disruption experienced by medium-sized enterprises tend to be mounting: *"Customers are becoming more and more demanding. For example, the OTD is from 95% to 98% next year and then 99% the following."* (Case 9 and disruption no. 60). And those experienced by small sized organizations tend to be narrow in scope.
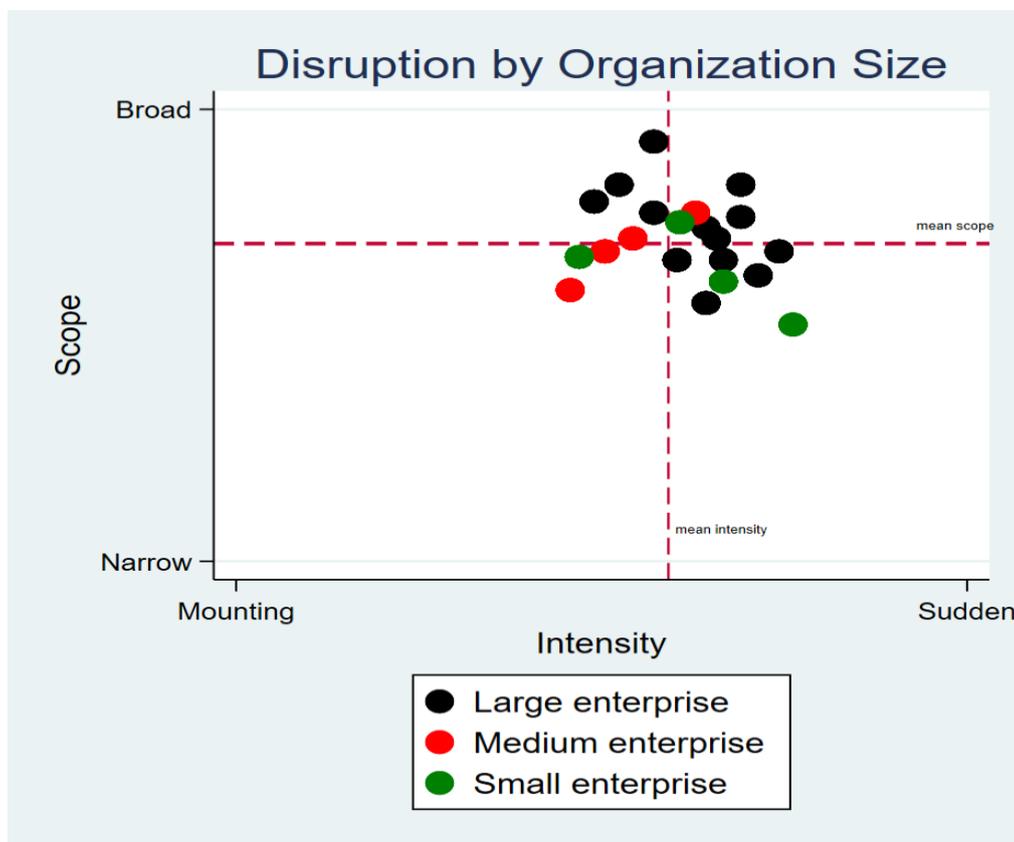

Figure 21 Organizational disruption by firm size

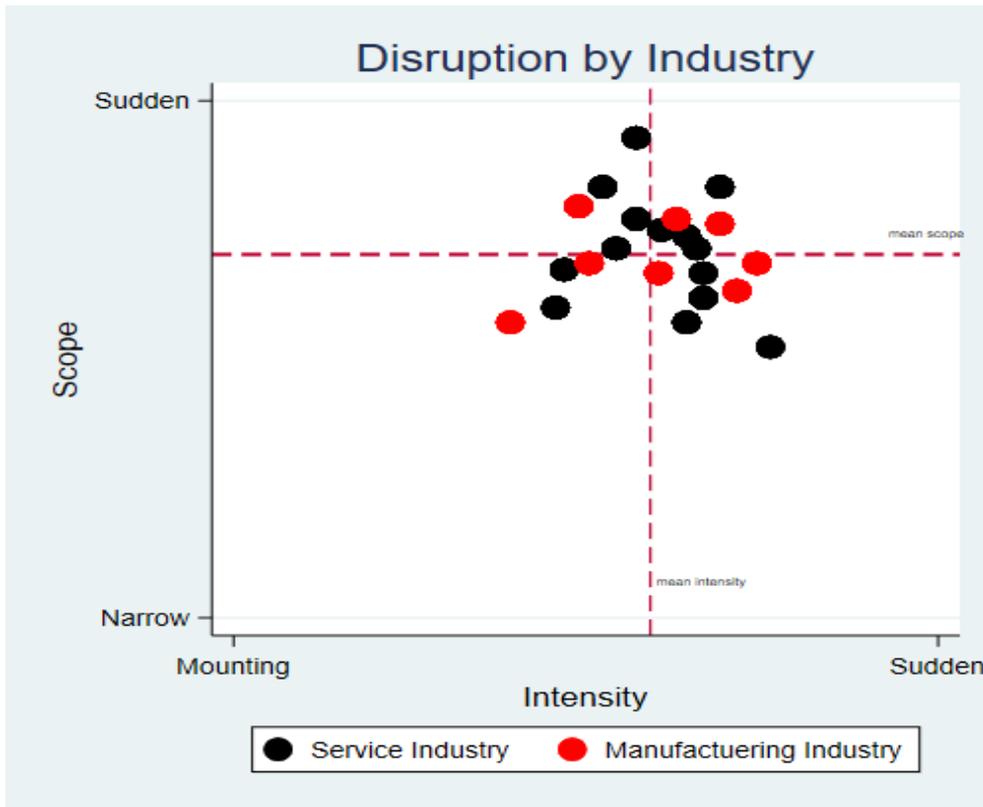As shown in Figure 22 & 23, there is no significant difference by industry and location.

Figure 22 Organizational disruption by industry

Figure 23 Organizational disruption by region

5.5 Discussion

This chapter aims to understand the nature of disruption organizations experience from the perspective of time and space and this distinguishes the present study from prior studies primarily focusing on a high impact event with a low probability of occurrence. For example, Christianson et al (2009) study the rare event that occurred at the Baltimore & Ohio Railroad Museum. Williams & Shepherd (2016) examine the aftermath of the Haiti earthquake. Compared to a wealth research in risk management, which has provided insights into how an organization prepares for and responds to disruption under similar circumstances, this study has addressed how an organization can deal with the unfamiliar or uncertain situations (Linnenluecke, 2017). More specifically, this study takes the time–space approach in studying organizational disruption in business ecosystems (discussed in Chapter 3). The advantage of doing this allows to capture a great variety of organizational disruptions in a wider context, including disruptions (1) that occur outside the core activities of individuals or organizations (Lanzara, 1983; Hallgren, Rouleau, & Rond, 2018), or (2) that occur before but that "organizations learn little from their failures" (Starbuck, 2009, p. 925). As Madsen (2009) note, organizations tend to learn from disasters but not from small disruptive events.

Through an explorative empirical study in twenty-two Chinese firms' business ecosystems, this study has identified a total of 137 events that contribute to organizational disruptions. By analyzing these events through the two–dimensional framework: time and space, all events were able to be coded into four types of disruption based on the intensity of transformation and the scope of impact: mounting-broad, mounting-narrow, sudden-broad

and sudden narrow, based on the intensity of transformation and the scope of impact. The intensity of transformation refers to the spectrum of change from 'mounting' to 'sudden', whilst the scope of impact refers to the effect and consequence of change from 'narrow' to 'broad'. An organization may suffer from disruption on the first day of operation, however, the negative consequence may emerge at the later stage of organizational development. This is because organizations at different stages of development (e.g., from small to large or from domestic-orientation to international-orientation) have different needs (e.g., profit), which lead to organizational design at a particular stage more efficiently in providing core goods and services needed at this stage. The unnoticed issues can be accumulated beyond the 'tipping point' and towards complete performance collapse (Rudolph & Repenning, 2002: 24) because of "the fundamental laws of nature energy can neither be created nor destroyed" (Shrivastava et al, 2009, p. 1377).

Moreover, as disruption is a complex interaction and evolution between process and issue, the dimension of the intensity of event transformation reflects the degree or amount of changes caused by one event to another over time, which eventually lead to discontinuity of the organization's operating strategy. Such accumulated effects of minor deviations that result in a particular catastrophe are captured in the literature, which are referred to as 'the chain of events' (Hallgren, Rouleau, & Rond, 2018), 'cosmology episode' (Weick, 1993) or 'dysfunctional momentum' (Barton & Sutcliffe, 2009). For example, Feldman & Rafaeli (2002) argue that, although routines in organizations established on the negotiated orders create a common understanding in terms of how they operate efficiently and

effectively, they are subject to change when the negotiated orders are altered. The results of the present study support this statement and also reveal that disruption is a manifestation of the root cause and its effects over time. However, the intensity of event transformation can be incremental and difficult to observe in organizations. As also discussed by Cunha, Clegg, & Kamoche (2006, p. 323), "seemingly minor changes may accumulate and lead to major changes."

The scope of impact emphasizes the spatial dimension of disruption. Incorporating a spatial dimension allows further exploration of how disruption influences organizational entities (e.g., individuals, teams, organizations) through changing or creating individual or collective behavior (e.g., employees on strike), features (e.g., temporal team or project-based team) and subsequent events (Morgeson, Mitchell, & Liu, 2015). Thus, this is complementary to the temporal dimension because it provides a trajectory of disruption where it may emanate, either inside an organization at any hierarchical level (i.e., individual, team) or outside the organization (i.e. supplier, customer and environment). Subsequently, disruption and its effects, at one level, may disperse within or between organizations over time (Abbott, 1984), this being referred to as "spatial dispersion" (Morgeson, et al, 2015, p. 525). This is important to the study of organizational resilience because it helps organizations to identify and configure their resources at the specific location in responding to disruption. However, this dimension has been often neglected in previous studies. One possible reason is that previous studies of disruption have not explicitly used the business ecosystems as the unit of

analysis, which broaden the heterogeneity of actors and activities with which

organizations engage and this also include disruptions in ecosystems.

Chapter 6 A Relational View: Organizational Resilience

6.1 Aim

The aim of this chapter is to investigate how resilience is enacted through inter-organizational relationships in responding to various types of disruption. This moves beyond the existing focus of organizational resilience research on the high impact and rare event. More specifically, this study attempts to explore how an organization copes with different types of disruption (discussed in Chapter 5) by utilizing the different characteristics of IORs (identified in Chapter 4). By fusing multifaceted attributes of IORs with the nature of disruption, it provides a deeper understanding of the relational determinants of organizational resilience than has been given in the literature to date. To achieve this, I employed the Fuzzy Cognitive Mapping (FCM) approach in the second-round data collection to investigate relational determinants of organizational resilience, which is referred to as relational resilience in this chapter. The advantage of using the FCM technique is to enable informants to build individual cognitive maps that represent views of how their organizations manage a great variety of adversity emanating from disruption. As informed by the literature stating that interview data may be subject to biases resulting from retrospective sense making and impression management, the second-round interview is critical to validate and triangulate statements in the first-round interview.

6.2 Literature Review

6.2.1 Resilience Literature

There has been a growing interest in resilience study. As shown in Figure 24 and 25, the number of resilience publications and the sum of cited resilience publications per year have consistently increased over the past years. Resilience is a multidisciplinary concept, which has been developed across different disciplines: ecology (Holling, 1973; Gunderson, 2001; Carpenter, Walker, Anderies & Abel, 2001), psychology (Reich, 2006; Stewart, Reid & Mangham, 1997), economics (Perrings, 2006; Rose, 2006), organizations (Linnenluecke, 2017; Sutcliffe & Vogus, 2003; Wildavsky, 1988;), and engineering (Hollnagel, Woods & Leveson, 2006) and community (Adger, 2000; Bruneau et al, 2003) . Although each discipline focuses on different issues on resilience (see Table 29), the conceptual similarities lie in understanding how to respond to disruptions, shocks, disturbances and other unexpected events. This study only focuses on resilience in organizations.

Key concepts	Research focus	Reference
Ecological resilience	The capacity of a system to absorb disturbances through the adaptive cycle (exploitation, conservation, destruction and reorganization) to maintain its functions and controls.	Holling (1973) Gunderson (2001) Carpenter, Walker, Anderies & Abel (2001)
Psychological resilience	The psychological principles or factors of resilience (e.g., control, coherence, connectedness) that help	Reich (2006) Stewart, Reid & Mangham (1997)

	to develop the ability of people in positively responding to stress and adversity across the life span.	
Economic resilience	The capacity of a system (e.g., microeconomics, meso-economics, macroeconomics) to withstand external shocks, including identifying and increasing the possibilities of substitutes for the damaged inputs or efficiently reallocating resources in response to market shocks.	Perrings (2006) Rose (2006)
Organizational resilience	The capability of an organization to quickly respond to and recover back from the adversity or develop novel ways while maintaining its desirable functions under challenging situations.	Linnenluecke (2017) Sutcliffe & Vogus (2003) Wildavsky (1988)
Engineering resilience	The ability of a system or material to efficiently sustain its functions and operations under both expected and unexpected conditions. It is related to the stability and safety of the system.	Hollnagel, Woods & Leveson (2006)
Community resilience	The ability of communities to withstand and recover from external shocks (e.g., natural disasters and hazards) and mitigate risks	Adger (2000) Bruneau et al (2003)

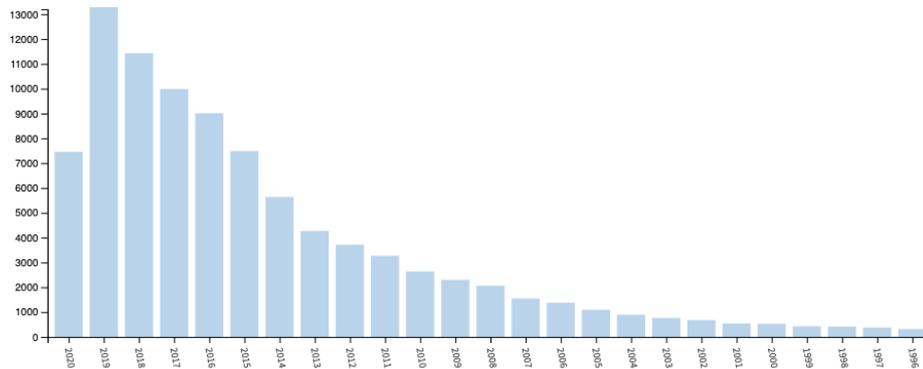Table 28 Selected definitions of resilience in different disciplines

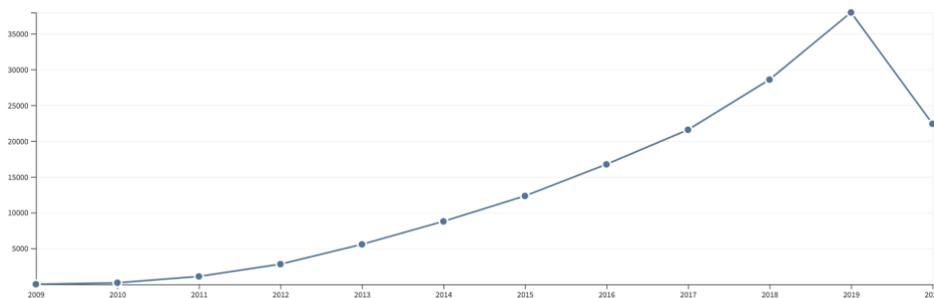Figure 24 Number of resilience publication per year, 1996-2020 [16]

Figure 25 Sum of times cited resilience publications per year, 2001-2020[17]

6.2.2 Resilience in Organization and Management

The roots of resilience originally stem from *resilire* and *resilio*, which in Latin means "jump back" or "recoil" (Merriam-Webster, 2020). The concept of resilience in the business and management literature first emerged from the seminal work of Meyer (1982), who studies organizational response

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[16] Source: Web of Science accessed on 1st August
[17] Source: Web of Science accessed on 1st August

to external threats. He uses 'resiliency' to describe an organization's ability to absorb the impact of an environmental jolt or to adapt new practices through learning. At the similar time, Staw, Sandelands, & Dutton (1981) argue that, rather than being adaptable, organizations can respond to external threats through the effects of "threat-rigidity". Since the 1980s, research on organizational resilience has shifted the focus on external threats to internal organizational reliability, partly due to large-scale industrial incidents and disasters (i.e., The Three Mile Island incident) (Linnenluecke, 2017). Research on organizational reliability focuses on investigating how organizations can avoid catastrophic failures and prepare for future unknown challenges. Wildavsky (1988, p. 77) suggests that resilience is "the capacity to cope with unanticipated dangers as they become manifest, learning to bounce back". This definition serves as an important aspect of High Reliability Organizing, which conceptualizes resilience as a mindful process, rather than an outcome (Weick, Sutcliffe, & Obstfeld, 1999). The events of 9/11 had a profound impact on resilience research, which shifts attention away from intra-organizational reliability back to external threats. Linnenluecke (2017) identifies three main research streams on organizational resilience: "managing employee strengths", "the adaptability of business models", and "supply chain resilience". What is in common across different research streams is that they explore coping mechanisms and strategies that organizations can adopt in the face of adversity.

While resilience research in management and organization has produced valuable knowledge, each research stream has been developed differently (Linnenluecke, 2017; Williams, Gruber, Sutcliffe, Shepherd, &

Zhao, 2017). Resilience at the individual level has been conceptualized as "positive psychological capacity to rebound, to bounce back from adversity, uncertainty, conflict, failure or even positive change, progress, and increased responsibility." (Luthans, Avolio, Walumbwa, & Li, 2005, p. 2002). Employee's strength in dealing with the adversity can be developed over time (Luthans, 2002; Coutu, 2002). Resilience at the organizational level emphasizes the ability of an organization to anticipate and positively adjust to disruptions while maintaining its desirable functions (e.g., Sutcliffe & Vogus, 2003). Supply chain resilience is concerned with the design principles of supply chains that improve the ability of a system to anticipate and resist disruptions and restore quickly after being disrupted (e.g., Brusset & Teller, 2017; Graighead et al, 2007; Juettner & Maklan, 2011; Rice & Caniato, 2003). Although this demonstrates a broad appeal of resilience study in organizations and management, it leads to a highly fragmented literature in this field. Linnenluecke (2017) points out that the different conceptualizations of resilience are attributed to a particular set of circumstances in which resilience studies have been conducted.

The context of resilience research varies across different studies. For example, Hallgren, Rouleau, & Rond (2018) identify three broad contexts: risky context, emergency context and disruptive context on which the majority of resilience-related studies are conducted. In risky contexts where risks are known or perceived as potential to cause a significant harm to people or organizations, resilience is concerned with how organizations can be structured or designed in order to avoid negative consequences or improve the reliability of organizations under adverse situations. Thus, organizational

culture and design (e.g., mindful organizing, flexibility, reinvention, decentralized control mechanism, human resource training) to address the coordination issues amongst stakeholders (internal and external) are essential for organizational resilience (Hallgren, Rouleau, & Rond, 2018; Linnenluecke, 2017). In emergency and disruptive contexts where the actual disruptive event occurs and interrupts the activities of business operations and strategies, scholars investigate how entities (individuals, teams, organizations) respond to and learn from disruption for future resilience provision. The empirical focus on these contexts is primarily informed by archival data or existing accounts of high-profile events (Hallgren, Rouleau, & Rond, 2018), such as The Mann Gulch (Weick, 1993) and the challenger disaster (Starbuck & Milliken, 1988).

In summary, resilience research in organization and management has been defined and operationalized differently across different research streams, which have not been unified or resolved to provide a generalizable definition of organizational resilience (Linnenluecke, 2017). However, there is a consensus amongst scholars that organizational resilience is a multiple-level and multiple-stage in nature. This means that resilience in organizations is not an addition of individual resilience but an "interaction between an organization, its stakeholders, and the environment while confronted with adversity." (Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017: p. 741). As Gittell, Cameron, Lim, & Rivas (2006) note, resilience is a "dynamic capacity of organizational adaptability that grows and develops over time." (p. 303). Lengnick-Hall & Beck (2005, p. 750) also state that resilience as "a unique blend of cognitive, behavioral, and contextual properties that increase

a firm's ability to understand its current situation and to develop customized responses that reflect that understanding." Later on, Lengnick-Hall, Beck, & Lengnick-Hall (2011, p. 244) note, organizational resilience as "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."

6.2.3 Organizational Resilience and IORs

Notable works highlight the importance of relational connections in fostering resilience (e.g., Powley, 2009; Weick & Roberts, 1993; Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017). Williams et al (2017, p. 745) point out that, in the context of adversity, "relational capabilities – the social connections that enable access to and exchange of resources – play an important role in shaping immediate actions and ultimately enabling positive functioning…[and]…provide a context in which cognitive, behavioral, and emotional capabilities can be activated." Powley (2009, p. 1294) finds that resilience is "a latent capacity, in organizations, built overtime through social interaction and relationships". Weick & Robert (1993) also observe that resilience can be enacted through "a pattern of heedful interrelations of actions in a social system" (p.357).

Although scholars have started exploring the relational dynamics in responding to the adversity, existing works "almost entirely build on cognitive and behavioral view of organizing-highlighting how members coordinate, make sense of and respond to adversity' (Barton & Kahn, 2019, p. 1410). Recently, there is an emerging research stream on relational

resilience that focuses on intra-organizational relationships, such as group or team resilience (Barton & Kahn, 2019; Kahn, Barton, & Fellows, 2013; Kahn et al., 2018; Olekalns, Caza, & Vogus, 2020). The survival of organizations does not merely rely on managing the internal organizational environment but also on how well organizations manage the external environment that involves a wide variety of stakeholders (e.g., customers, suppliers, regulators, competitors [Dill, 1958]). As Hallgren, Rouleau, & Rond (2018) note, stakeholders including governments, industry bodies and the media play an important role in the aftermath of disruptions because they are involved in the negotiating and reframing situations that can pressure organizations to act more responsibly and safely.

Since 1950s, the concept of open systems has become central to organization management theory (Bourgeois, 1980; Evan, 1993; Katz & Kahn, 1966). Organizations have been conceptualized and researched as open systems that constantly interact with the environment to acquire critical resources for their survival or growth (Pfeffer & Salancik, 1978). Following this line of research, Williams, Gruber, Sutcliffe, Shepherd, & Zhao, (2017, p. 742) describe resilience as "the process by which an actor (i.e., individual, organization, or community) builds and uses its capability endowments to interact with the environment in a way that positively adjusts and maintains functioning prior to, during, and following adversity". Oliver (1990) point out that the exchange relationship constitutes a number of long-lasting transactions, flows and linkages amongst organizations. This has fundamentally distinguished itself from the arm's-length market relationships, which primarily seek to immediate economic gains. Instead, it promotes long-

term cooperative relationships between organizations for learning and co-evolving. The importance of relational connections has been strengthened in a globalized and increasingly digitalized economic system. Notably, the relationship between resilience and IORs has been studied in collaborations between supply chain partners. However, it narrowly focuses on the roles of trust and information sharing (Christopher & Peck, 2004). Notwithstanding, IORs are a very complex organizational phenomenon, which involves a wide variety of actors across functional and geographic units working collaboratively in pursuit of shared goals that would otherwise be difficult to achieve alone (Barringer & Harrison, 2000). Resilience in this context is the ability of an organization to manage its relationships with the environment to succeed in coping with various forms of disruption while maintaining its functions. There is an increasing acknowledgement amongst scholars (e.g., Lengnick-Hall & Beck, 2005; Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017) that the process of resilience is a relational adaptation. However, research on how the multiple and complex attributes of IORs influence organizational resilience remains largely unexplored. Linnenluecke's (2017) review of the resilience field specifically calls for more research in this vein.

6.3 Research Method

6.3.1 Sample

The aim of this study is to understand how multifaceted attributes of IORs impact organizational resilience in different types of disruption. Building on the findings in Chapter 5, there are four types of disruption in

which all cases are allocated into one type of disruption based on the two-dimensional framework: event intensity of transformation and event scope of impact (see in Figure 26). For the analytical purpose, one case from each quadrant was randomly selected in the explorative study, including Case 14 in mounting-broad disruption, Case 5 in sudden-broad disruption, Case 7 in mounting-narrow and Case 1 in sudden-narrow disruption.
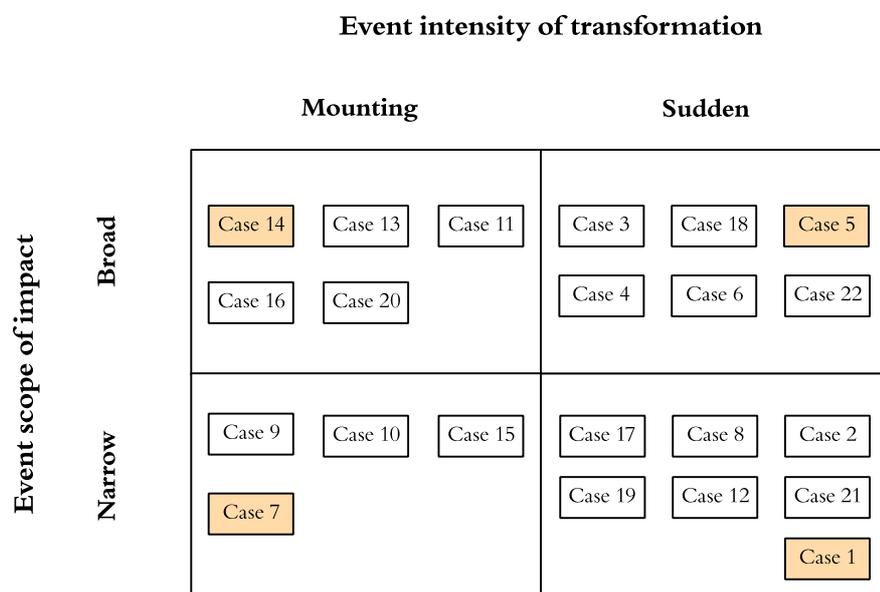
Event intensity of transformation

Figure 26 Selected sample cases in each disruptive quadrant

6.3.2 Fuzzy Cognitive Mapping (FCM) Approach

Cognitive mapping in the field of organization and strategy has been acknowledged as a useful methodological tool to investigate a wide range of organizational phenomena through actors' mental representations (e.g., Bougon, Weick, & Binkhorst, 1977; Eden, Ackerman, & Cropper, 1992; Daniels & Johnson, 2002; Hodgkinson, Maule, & Bown, 2004). The notion of fuzziness was first introduced by Kosko (1986), who suggested that the practicality of FCM allows the capturing of soft knowledge in which there is

a high degree of complexity and uncertainty (Olazabal & Pascual, 2016), such is the case in organization theory and political science. The theoretical foundations of FCM are rooted in causal cognitive mapping and the fuzzy causal function. Causal cognitive mapping, according to Eden & Ackerman (2004), demonstrates how different concepts including abstract ideas or unquantified variables are connected by links and arrows indicating the direction of influence between concepts. The fuzzy causal function is a non-linear function that transforms the weight of causes, for example, from concept A to concept B, into an in-between value [-1,1] (Jetter & Kok, 2014). A positive (negative) arrow from concept A to concept B represents that an increase (decrease) of concept A leads to the increase (decrease) of concept B and the absolute number [0,1] indicates the strength of the connections between concept A and concept B in a cognitive map (Özesmi & Özesmi, 2004). Notably, the FCM approach, as a methodological tool (Jetter & Kok, 2014), has increasingly been used in the study of resilience across different disciplines, such as social-ecological resilience (Gray, et al., 2015), urban resilience (Olazabal & Pascual, 2016) and small business resilience (Williams, You, & Joshua, 2020).

Such increasing popularity of using this approach is attributed to several properties it offers and which also makes it appropriate for the present study. First, FCM allows 'an unlimited number of concepts and reciprocal causal relationships' (Özesmi & Özesmi, 2004: 46). Concepts can be generated from interview, text analysis or group discussion (Jetter & Kok, 2014) and defined as 'things' (e.g., identity, resilience) in which the degree of influence (e.g., relations, strength) between them can be explored. Second,

FCM is particularly useful in a data poor situation because it is a participatory approach (Özesmi & Özesmi, 2004; Gray, et al., 2015) involving informants, who have a rich experience and depth of understanding about a particular phenomenon, in the process of constructing links between concepts. Third, by capturing knowledge in a graphical form, it allows respondents to focus on explanations of the causal-effect relationship between concepts occurring in the past or expected in the future (Hodgkinson, Maule, & Bown, 2004). This, in turn, produces a rich and meaningful qualitative interpretation, which is important for a theory development (Özesmi and Özesmi, 2004). Lastly, although FCM exploits the advantages of a qualitative approach (e.g., complexity and uncertainty), it also allows a quantitative analysis when aggregating individual cognitive maps into a social cognitive map through an addition of input values that weight the strength of causal relationship between concepts. As noted by Özesmi and Özesmi (2004), there are likely to be both negative and positive signs on a link between two concepts, which represents a disagreement on the causal relationship. It is argued that the aspect of the quantitative analysis in FCM, indeed, balance various perceptions from experts on the same or similar phenomenon, which, in turn, make the results more reliable (Jetter & Kok, 2014). Taken together, the FCM approach is suitable for the current study focusing on organizational resilience in the Chinese business environment that has been neglected in prior studies.

6.3.3 Data Collection

To capture executives' mental models in terms of how their organizations cope with disruptions by utilizing various IORs, a second trip was made to China for the second-round data collection by using the FCM technique. All interviews were held at the premises of each selected organizations to the same respondents who participated in the first-round interview. Following the established procedure (Özesmi & Özesmi, 2004; Williams, You, & Joshua, 2020), the interview was comprised of two parts. The first part was a warm-up discussion. This includes (1) sharing the purpose of the follow-up interview that is to understand how their organizations cope with disruption by utilizing its relationships with other organizations; (2) introducing the pre-defined attributes of IOR (see Table 30) and resilience; and (3) providing an instruction in terms of how to build the FCM. The second part involved building the FCM. In the FCM exercise, respondents were provided with cards labelled for all variables and a portable magnetic black board in which they can draw lines with arrows indicating perceived causal relationships between variables, including the positive (+) and negative (–) effects, as well as the strength of each relationship on the scale of [0,1]. Although not all variables are relevant to their organizations, respondents were still encouraged to consider all variables and select those that are relevant to their organization's resilience. When building any connection between variables, respondents were asked to provide reasons and examples for each indicated relationship. This approach was consistent across all of the

sample and all interviews lasted for 120 minutes on average. The result was four FCM maps (see in Figure 27) showing connections between IOR attributes and resilience.

To improve the validity of the data analysis, all digital versions of individual cognitive map produced were sent to each participant and follow-up calls and discussions were held. More importantly, from the perspective of sensemaking, it is equally important as any other stages of data collection. This is because sensemaking "unfolds as a sequence in which people concerned with identity in the social context of other actors engage ongoing circumstances from which they extract cues and make plausible sense retrospectively, while enacting more or less order into those ongoing circumstances." (Weick, Sutcliffe & Obstfeld, 2005, p. 409). The purpose of doing this is to provide respondents with an opportunity to comment further on the model and to provide additional thoughts on relationships between IOR attributes and resilience that may not have missed in the initial interview (Williams, You, & Joshua, 2020). Additionally, the data evaluation also involved triangulation with responses from previous interviews and materials identified in the first-round data collection in which IORs as coping mechanisms help organizations to manage disruption. This is to enhance the internal validity of the study (Eisenhardt, 1989).

First-order codes	Second-order theme
• Necessary legal or regulatory requirements • Mandates from higher authorities • Resource dependence for contingency cooperation (e.g., sole source)	Necessity
• Control of rules governing exchange • Position in industry • Organizational size • Autonomy of decision-making	Asymmetry
• Collaboration, cooperation and coordination for mutual beneficial goals or interests • Mutual support • Risk sharing	Reciprocity
• Distinctive features or characteristics (e.g., reliability, performance, dependability, maintainability, technology) • General excellence recognized by external stakeholders (e.g., Koubei)	Quality
• Assets or resources reconfiguration to change • Development of new business operation process • New products or services launched	Innovation
• Organization's members collective understanding about what their organization is (e.g., ownership tie) • Shared perception of the features and central values that distinguish the organization from other organizations	Identity
• Conduits for exchanging or obtaining information (e.g., regular meetings, travel, emails) • A speed of collective forms is constructed to address the specific goals or issues	Communication
• The degree to which organizations accept each other's claims to specific goals and functions	Consensus

|	
• A process of negotiation to reach the point of decision-making	
• Improvement of internal input/output ratio • Anticipation of increase on asset return • Reduction in unit costs and wastes • Flat-organizational structure	Efficiency
• Transaction costs • The fear of losing the relationships • The loss or unpleasant consequence • Opportunity costs	Cost
• Enhancement of reputation, image and prestige • Increase of its congruence with prevailing norms and rules • Complement to expectations of external constituents	Legitimacy
• Specific or range of dates agreed among organizations for goods and services being delivered to the designated customers or locations	On-Time-Delivery
• The terms and conditions of paying for goods or services received or delivered (e.g., frequency, speed) • The action or process of implementing the agreed terms and conditions	Payment
• Loyalty to rational principles and values in action • The moral justifiability of principles to which one is committed • The reputation for truthfulness and honest	Integrity

Table 29 Definition IOR attribute
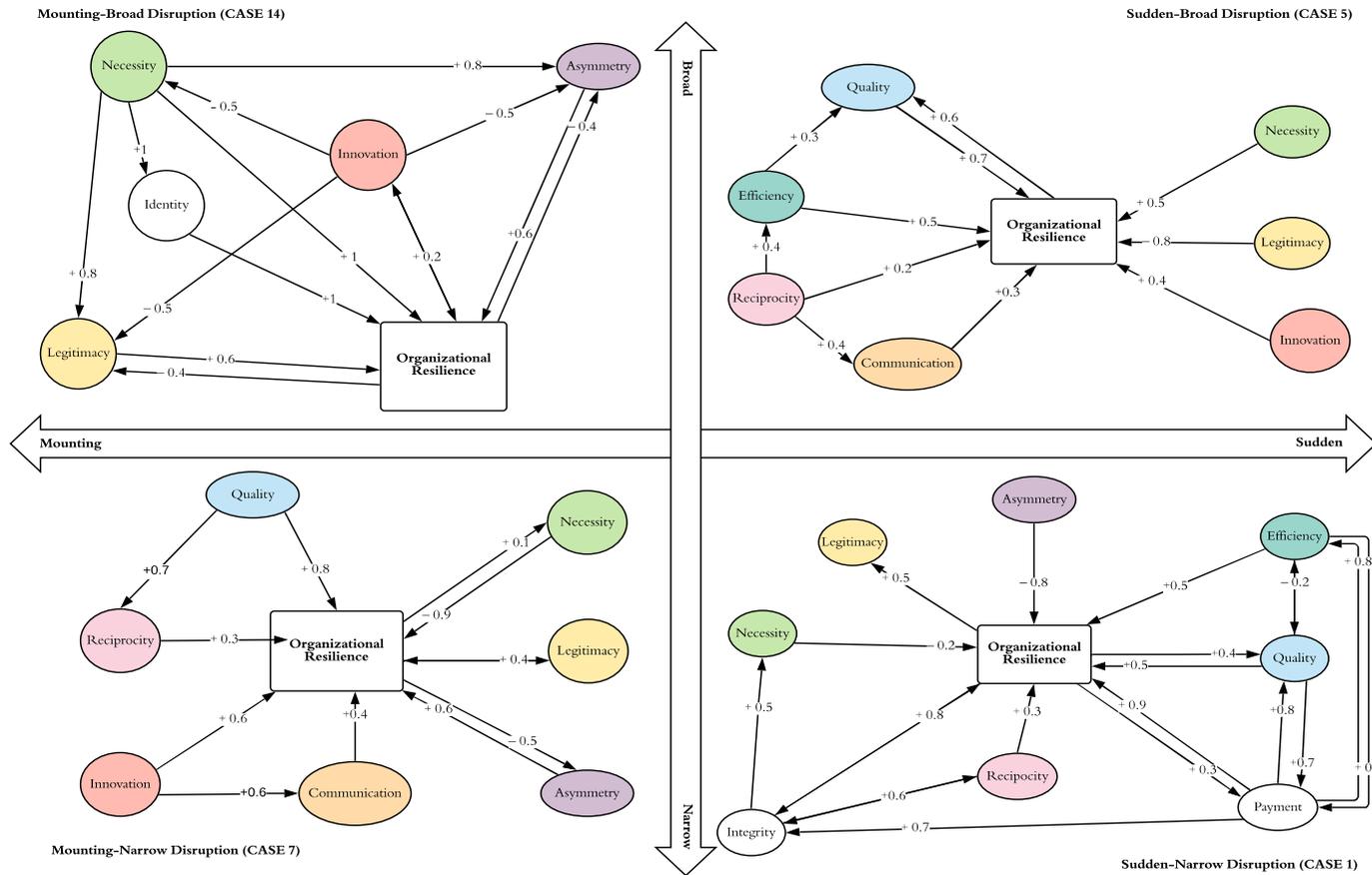
Figure 27 Relational structures by disruption

6.3.4 Data Analysis

Step 1. Coding maps into adjacency matrices. According to graph theory, cognitive maps can be transformed into adjacency matrices in the form $A(D) = [a_{ij}]$ (Harary et al., 1965), where variables in cognitive map can be listed on the vertical axis and the horizontal axis to form a square matrix. Following this, a square matrix was created including all variables from all the individual cognitive maps. When there is a connection between two variables, the value between -1 and 1 was coded into the square matrix. For example, in Case 14, 'necessity' has a positive impact on 'resilience' at the value of 1 shown in Figure 2. Thus, +1 was coded into the intersection between the 'necessity' column and the 'resilience' row. In contrast, 'resilience' doesn't have an influence to 'necessity', and therefore 0 was coded into the intersection between the 'resilience' column and the 'necessity' row. The coding method applied across all existing connections between variables. Initially, there were four matrices generated (see Table 31-34).

Step 2. Analyzing the structure of the fuzzy cognitive map. Following the Graph Theory, the structure of individual fuzzy cognitive map was further analyzed. This includes the density (clustering co-efficiency) of the cognitive map, the centrality including both indegree and outdegree, as well as the characteristics of relational structure (hierarchical vs. democratic). The density of the individual cognitive map (D) is an index of connectivity, which helps to understand how connected or scattered the maps are. This is calculated based on the number of connections divided by the maximum number of connections between N variables (Hage & Harary, 1983). If the

density of a map is high then the interviewee sees a large number of causal relationships among the variables. Stakeholders can be compared to see which groups have more relationships among variables. If more groups perceive more relationships, they will have more options available to change things. Thus, these groups may be a catalyst for change.

$$D = \frac{C}{N(N-1)}$$

The centrality demonstrates the overall contribution of a variable in the fuzzy cognitive map in terms of the connectivity of the variable with other variables and the accumulative strength of these connections. It is represented by the summation of its outdegree (out-arrows) and indegree (in-arrows).

$$Ci = \text{td}\,(\mathcal{V}i) = \text{od}\,(\mathcal{V}i) + \text{id}\,(\mathcal{V}i)$$

The outdegree refers to the accumulative strengths of a variable that influences other variables A_{ij} where N is the total number of variables:

$$\text{od}\,(\mathcal{V}i) = \sum_{k=1}^{N} A_{ik}$$

As opposed to the outdegree, the indegree is the sum of absolute values of other variables that affect the variable:

$$\text{id}\,(\mathcal{V}i) = \sum_{k=1}^{N} A_{ki}$$

In addition, the hierarchy index (h) (MacDonald, 1983) of the fuzzy cognitive map was calculated to understand the level of adaptation of the map.

$$h = \frac{12}{(N-1)N(N+1)} \sum_i \left[\frac{\text{od}(v_i) - \left(\sum \text{od}(v_i) \right)}{N} \right]^2$$

When h is equal to 1, the map is fully hierarchical and when h is equal to 0, the map is fully democratic. The implication is that the more democratic the map is and the more adaptable it is perceived in responding to change (Özesmi & Özesmi, 2004). All individual maps were analyzed (see Table 31-34).

Step 3: Aggregating individual cognitive maps into a social cognitive map. As suggested by Özesmi & Özesmi (2004, p. 49), "individual cognitive maps of interviewees can be augmented, and additively superimposed". To aggregate four matrices into a social cognitive map, the first stage was to create an augmented (see Table 35) by adding up the subjective weights between variables assigned by interviewees. The structure of the social cognitive map was measured by the density, the centrality and the hierarchy. Notably, when a variable carries a larger weight, it is likely to be in a more central position even though it has fewer connections in the fuzzy cognitive map. For instance, the centrality of 'legitimacy' with four connections is higher than that of 'necessity', which has seven connections. Following completion of the augmented matrix, an aggregated relational structure was created in Figure 28.

	Resilience	Necessity	Legitimacy	Innovation	Quality	Efficiency	Reciprocity	Communication
Resilience	0	+0.5	+0.6	+0.4	+0.7	+0.5	+0.2	+0.3
Necessity	0	0	0	0	0	0	0	0
Legitimacy	0	0	0	0	0	0	0	0
Innovation	0	0	0	0	0	0	0	0
Quality	+0.6	0	0	0	0	+0.3	0	0
Efficiency	0	0	0	0	0	0	+0.4	0
Reciprocity	0	0	0	0	0	0	0	0
Communication	0	0	0	0	0	0	0	0
No. of connections	1	1	1	1	1	2	2	1
Outdegree	0.6	0.5	0.8	0.4	0.7	0.8	0.6	0.3
Indegree	3.4	0	0	0	0.9	0.4	0	0
Centrality	4	0.5	0.8	0.4	1.6	1.2	0.6	0.3
Density	0.18							
Hierarchy index, h	0.05							

Table 30 Case 14 in mounting-broad disruption

	Resilience	Necessity	Legitimacy	Identity	Innovation	Asymmetry
Resilience	0	+1	+0.6	+1	+0.2	+0.6
Necessity	0	0	0	0	–0.5	0
Legitimacy	0	+0.8	0	0	–0.5	0
Identity	0	+1	0	0	0	0
Innovation	+0.2	0	0	0	0	0
Asymmetry	–0.4	+0.8	0	0	–0.5	0
No. of connections	2	4	1	1	4	1
Outdegree	0.6	3.6	0.6	1	1.7	0.6
Indegree	3.4	0.5	1.3	1	0.2	1.7
Centrality	4	4.1	1.9	2	1.9	2.3
Density	0.43					
Hierarchy index, h	0.45					

Table 31 Case 5 in sudden-broad disruption

	Resilience	Necessity	Legitimacy	Innovation	Asymmetry	Quality	Reciprocity	Communication
Resilience	0	–0.9	+0.4	+0.6	+0.6	+0.8	+0.3	+0.4
Necessity	+0.1	0	0	0	0	0	0	0
Legitimacy	+0.4	0	0	0	0	0	0	0
Innovation	0	0	0	0	0	0	0	0
Asymmetry	–0.5	0	0	0	0	0	0	0
Quality	0	0	0	0	0	0	0	0
Reciprocity	0	0	0	0	0	0	0	0
Communication	0	0	0	0	+0.6	0	0	0
No. of connections	3	1	1	1	2	1	1	1
Outdegree	1	0.9	0.4	0.6	1.2	0.8	0.3	0.4
Indegree	4	0.1	0.4	0	0.5	0	0	0.6
Centrality	5	1	0.8	0.6	1.7	0.8	0.3	1
Density	0.2							
Hierarchy index, h	0.07							

Table 32 Case 7 in mounting-narrow disruption

	Resilience	Necessity	Legitimacy	Asymmetry	Quality	Efficiency	Reciprocity	Integrity	Payment
Resilience	0	+0.2	0	–0.8	+0.5	+0.5	+0.3	+0.8	+0.9
Necessity	0	0	0	0	0	0	0	+0.5	0
Legitimacy	+0.5	0	0	0	0	0	0	0	0
Asymmetry	0	0	0	0	0	0	0	0	0
Qaulity	+0.4	0	0	0	0	–0.2	0	0	+0.8
Efficiency	0	0	0	0	–0.2	0	0	0	+0.8
Reciprocity	0	0	0	0	0	0	0	+0.6	0
Integrity	+0.8	0	0	0	0	0	+0.6	0	+0.7
Payment	+0.3	0	0	0	+0.7	+0.7	0	0	0
No. of connections	4	1	0	1	3	3	2	3	4
Outdegree	2	0.2	0	0.8	1.4	1.4	0.9	1.9	3.2
Indegree	4	0.5	0.5	0	1.4	1	0.6	2.1	1.7
Centrality	6	0.7	0.5	0.8	2.8	2.4	1.5	4	4.9
Density	0.29								
Hierarchy index, _h_	0.21								

Table 33 Case 1 in sudden-narrow disruption

	Resilience	Necessity	Legitimacy	Identity	Innovation	Asymmetry	Quality	Efficiency	Reciprocity	Communication	Integrity	Payment
Resilience	0	+0.8	+0.2	+1	+1.2	+0.4	+2	+1	+0.8	+0.7	+0.8	+0.9
Necessity	+0.1	0	0	0	-0.5	0	0	0	0	0	+0.5	0
Legitimacy	+0.9	+0.8	0	0	-0.5	0	0	0	0	0	0	0
Identity	0	+1	0	0	0	0	0	0	0	0	0	0
Innovation	+0.2	0	0	0	0	0	0	0	0	0	0	0
Asymmetry	-0.9	+0.8	0	0	-0.5	0	0	0	0	0	0	0
Quality	+1	0	0	0	0	0	0	+0.1	0	0	0	+0.8
Efficiency	0	0	0	0	0	0	-0.2	0	+0.4	0	0	+0.8
Reciprocity	0	0	0	0	0	0	0	0	0	0	+0.6	0
Communication	0	0	0	0	0	+0.6	0	0	0	0	0	0
Integrity	+0.8	0	0	0	0	0	0	0	+0.6	0	0	+0.7
Payment	+0.3	0	0	0	0	0	+0.7	+0.7	0	0	0	0
No. of connections	7	4	1	1	4	2	3	3	3	1	3	4
Outdegree	4.2	3.4	0.2	1	2.7	1	2.9	1.8	1.8	0.7	1.9	3.2
Indegree	9.8	1.1	2.2	1	0.2	2.2	1.9	1.4	0.6	0.6	2.1	1.7
Centrality	14	4.5	2.4	2	2.9	3.2	4.8	3.2	2.4	1.3	4	4.9
Density	0.27											
Hierarchy index, h	0.3											

Table 34 Augmented matrix
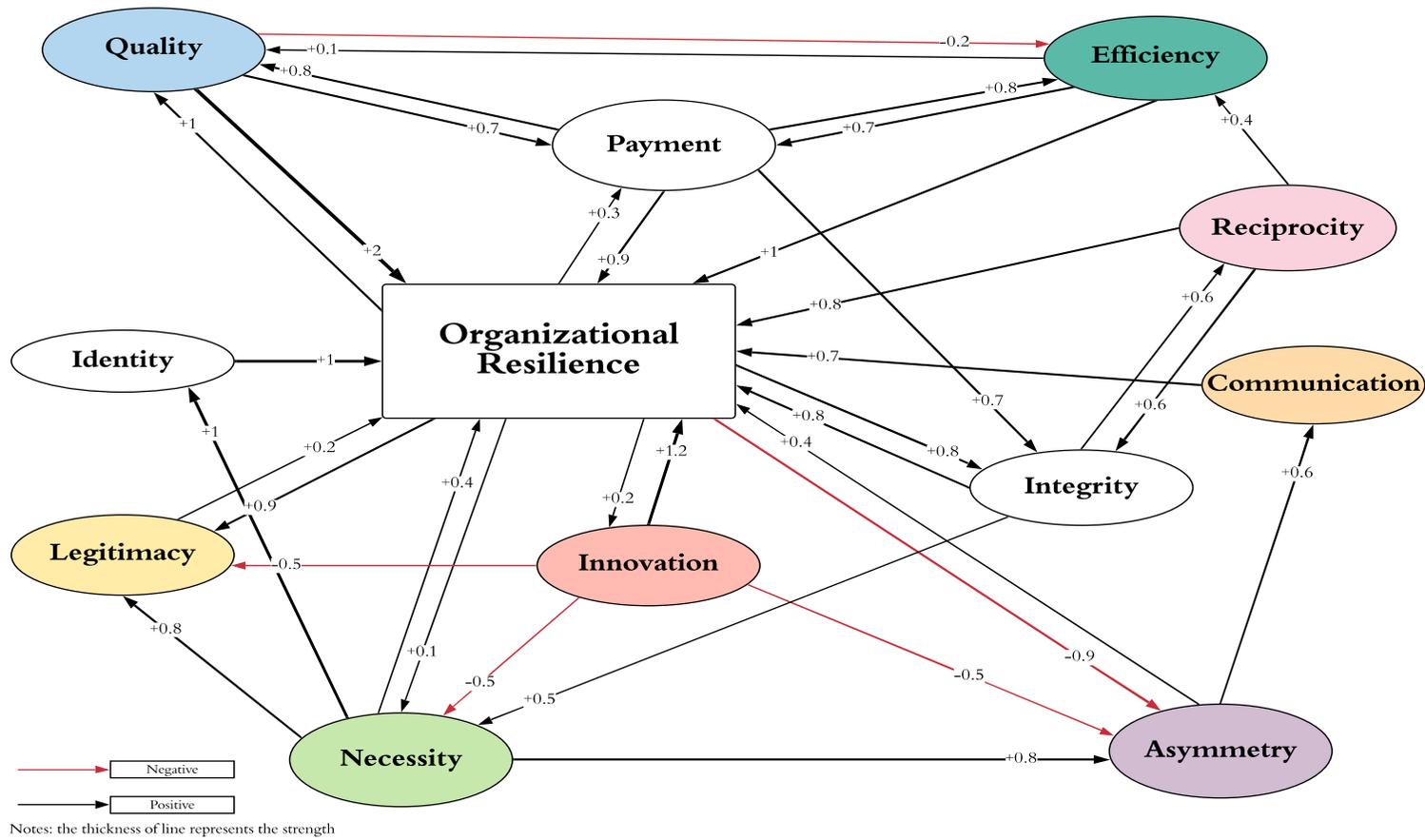
Figure 28 A social cognitive map

6.4 Findings

6.4.1 Contingency of IORs in Disruption

By incorporating four types of disruption identified in the Chapter 5, it initially reveals four relational structures (see Figure 27), which demonstrate the differential and interactive connections between IOR attributes and resilience in responding to different disruptive situations organizations face. The findings suggest a contingency logic of IORs in influencing organizational resilience that can be viewed from three aspects of relational structure: *centrality, density, and hierarchy* (See Table 36).

Centrality refers to the contribution of a variable to the fuzzy cognitive map which is measured by the summation of accumulative strengths of both in-degree and out-degree connections of the variable. The results show that the centrality of individual variable varies in different situations. For instance, while necessity IOR appears in all disruptive situations, it played in different roles in each of the fuzzy cognitive maps. In Case 14 – which tended to face the mounting-broad disruption, the necessity IOR is in a central position of the fuzzy cognitive map and has four positive connections with resilience and other IORs: legitimacy, identity, and asymmetry. The findings show that organizational resilience in Case 14 rests on its prestigious status in being a centrally state-owned enterprise, gaining the benefit of favorable policies (e.g., monopolistic competition) and receiving direct financial support from the government. As noted by the respondent,

"As we are in one of the national strategic industries that are controlled by the national state, our survival is closely related to the fate of our country." – Case 14

Thus, the necessity attribute of IOR in Case 14 with the central government has a positive contribution to resilience in organizations. Moreover, the necessity IOR seems to provide a solid ground of trust amongst stakeholders, which then leads to a strong positive impact on other IOR attributes: 'asymmetry', 'legitimacy' and 'identity' in the map. This is, in part, because of Case 14's strategic and national positions in ostensibly fulfilling a government function in the provision of public services. The crossover effect of stakeholders' trust to the central government has been transformed to Case 14, which then has become a driver to perform well in satisfying the needs from multiple stakeholders. As mentioned,

"Although we are driven by economic needs, we are not 100% a profit-oriented business because we are the only one providing a public energy service. So, we have a greater level of social responsibility expected by the people." – Case 14

In other 3 cases (Case 5, Case 7 and Case 1), the 'necessity' IOR, however, has only one connection with 'resilience', of which it negatively affects 'resilience' when the scope of disruption is categorized as narrow in Case 7 and Case 1. As respondent indicated in Case 1,

"As we operate in a three-day inventory model, one of sudden disruptions was that we were unable to pay for production material for next three days because our financial department didn't prepare the sufficient fund for

the sudden and significant change of global oil price that

would have to be paid to our supplier. In our case, it is

impossible to negotiate with our supplier on any flexible

terms, like delaying payment, because they are a very

powerful state-owned enterprise and also the only supplier

we have." – Case 1

In similar to Case 7, the 'necessity' IOR reflects that a critical resource needed by an organization is possessed by an external organization and this raises a question of sustainability and continuality of the resource to which the organization could access in a long-term. As explained in Case 7,

"Our product development exclusively depends on the

Android OS, which is now an open source for everyone to

access. However, we worry that Google might close the

open operating system one day and we then lose our base

of product development." – Case 7

Uncertainty emerging from IOR itself is perceived as a threat to an organization's survival and this is why the necessity IOR in Case 1 and Case 7 demonstrates negative influences on organizational resilience. Oppositely, the necessity IOR in Case 5 emphasizes its dominant position in industry that brings the power to an organization in buffering itself against disruption, and this, in turn, has a positive impact on organizational resilience.

"Although there is an increasing number of local

competitors in the Chinese market, we are still in

dominant and leading position in the industry because of

the legacy of our brand built over the past 100 years and

this gives confidences." – Case 5

Relatedly, the second aspect of the contingency logic is *density*, which is a manifestation of how various attributes of IOR are engaged in shaping organizational resilience in different disruptive situations. The results show that the density of the fuzzy cognitive map varies ranging from the highest one at 0.43 in the mounting-broad disruption to the lowest one at 0.18 in the sudden-broad disruption, in which the densities of other two fuzzy cognitive maps in the mounting-narrow (0.2) and sudden-narrow disruptions (0.21) reside in the middle. As noted by Özesmi & Özesmi, 2004, the greater the density of a map, the more would be the causal relationships amongst the variables. The implication of this is that an organization with a higher density perceives more causal relationships in its connections, which, in turn, provide more options for organizational change. In differing from the centrality that focuses on the individual contribution of variables to the map, the density is an index of connectivity or a clustering coefficient to understand how connected or disperse the fuzzy cognitive map is. In comparing to these maps, the findings suggest that it is a non-linear relationship between the number of variables and the number of connections amongst these variables in the map. For instance, Case 14 in the mounting-broad disruption has 6 variables in which it generates 13 connections, whilst Case 5 in the sudden-broad disruption and Case 7 in the mounting-narrow disruption have 8 variables in each map in which there are 10 and 11 connections respectively amongst these variables. One possible explanation from the contingency theory of management (Luthans & Steward, 1977, p.182) is that "the most effective

management approach depends on the set of circumstances". Notwithstanding, this further reinforces the contingency logic of IORs in different situations.

In Case 1, IOR attributes – payment and integrity – emerge as important mechanisms in shaping organizational resilience and this reflects not only on their individual contributions (centrality) to the map but also on the number connections generated with other variables in the map. The finding suggests that the integrity IOR, which is characterized as a combination of loyalty and morality in the relationships at the organization level, provides not only a foundation of developing the mutual trust between organizations but also develops reciprocal norms in the exchange relationship. The reciprocal norms, in turn, contribute to reducing uncertainty through which obligations between the partners are created in maintaining the relationship, even though the reciprocity is not immediately realized. The bi-directional relationship between integrity and reciprocity IORs, indeed, deepens the form of trust in the relationship and this can become more critical to organizational resilience in the face of sudden-narrow disruption. As explained in Case 1,

> *"In such critical and urgent situation, our CEO and the lead of financial department made a trip to the local bank with which we have established a good guanxi (relationship) through our CEO's personal relationship with the bank governor and our mutual trust built over time in our collaboration. We then successfully secured the emergency grant from the bank for this disruption." – Case 1*

Organizations oftentimes experience high levels of time pressure in responding to the pressing situation, particularly when the disruption occurs at the level of organizational operations, such as cash flow interruption. This further explains why Case 1 tends to experience the sudden disruption that impacts the partial or the whole organization. The findings show more IOR attributes that are activated in coping with this situation, of which the payment IOR in a central position amongst all IOR attributes generates the most positive connections with other four variables: resilience, efficiency, quality and integrity in the map. This allows organizations to access to resources (e.g., financial endowment and information), which can be made use of efficiently and effectively responding to the situation. Interestingly, IORs – efficiency and quality – are perceived as negatively associated in times of disruption. As noted by respondent in Case 1,

> *"In a chaotic situation, our short-term or primary goal is to resolve the crisis as quickly as possible. There is a trade-off between efficiency and quality because we cannot afford to wait and delay in responding to the disruption even though we don't have a full-picture or information of the situation. Otherwise, the situation may be getting worse."*

When disruption occurs, it creates a great level of ambiguity and uncertainty due to the lack of information on the particular circumstance. To quickly respond to this situation, decision-making is likely to be based on prior experiences and knowledge gained in a similar situation. This may help to alleviate or solve a problem in a short-term but the problem is unlikely to be eradicated.

The third aspect of the contingency logic reflects a hierarchy of relational structure, which varies in different disruptive situations. It ranges on the spectrum from the fully hierarchy (when h is equal to 1) to the fully democracy (when h is equal to 0). The relational structure of Case 14 in the mounting-broad disruption is the most hierarchical one at 0.45, followed by Case 1 in the sudden-broad disruption as the second one in terms of hierarchy at 0.21, whilst Case 7 in the mounting-narrow disruption and Case 5 in the sudden-broad disruption are inclined towards the democratic structures at 0.07 and 0.05 respectively. Özesmi & Özesmi (2004) suggest that the democratic structure is more adaptable to environmental changes than the hierarchical structure due to the high level of integration and dependence. The results show the contingency of IOR attributes that are enacted in responding to different disruptive situations, which could be a more adaptive (see in Case 5) or be a more robust (see in Case 14).

Event intensity of transformation

	Mounting	Sudden
Broad	**Case 14** Density: 0.43 Hierarchical index: 0.45 Centrality: Necessity (4.1) Resilience (4) Asymmetry (2.3) Identity (2) Legitimacy (1.9) Innovation (1.9)	**Case 5** Density: 0.18 Hierarchical index: 0.05 Centrality: Resilience (4) Quality (1.6) Efficiency (1.2) Legitimacy (0.8) Reciprocity (0.6) Necessity (0.5) Innovation (0.4) Communication (0.3)
Narrow	**Case 7** Density: 0.2 Hierarchical index: 0.07 Centrality: Resilience (5) Asymmetry (1.7) Necessity (1) Communication (1) Legitimacy (0.8) Quality (0.8) Innovation (0.6) Reciprocity (0.3)	**Case 1** Density: 0.29 Hierarchical index: 0.21 Centrality: Resilience (6) Payment (4.9) Integrity (4) Quality (2.8) Asymmetry (0.8) Necessity (0.7) Legitimacy (0.5)

(Left axis: **Event scope of impact**)

Table 35 A summary of individual cognitive map by disruption

6.4.2 Relational Resilience: A Social Cognitive Map

As suggested in the literature (Eden, Jones, Sims, & Smithin, 1981; Özesmi & Özesmi, 2004; Nakamura, Iwai, & Sawaragi, 1982), aggregating individual cognitive maps yield a more comprehensive view on the phenomenon from different perspectives, which can generate great insights into how organizations cope with disruption by utilizing various attributes of IOR. As a result, the social cognitive map is constituted by all IOR attributes (11 in total) and resilience, which form 36 connections amongst them in the map. The findings show that quality IOR is the most influential factor on organizational resilience. For example, the quality IOR in Case 7 consists of both the R&D capability of the organization and its operational capability in terms of quickly responding to technological changes, which attract business

partners in the first place. This is because these two capabilities are coined with the economic value, which can be a unique form of currency commonly being traded in a particular industry. As explained by the respondent,

> *"Our business relationship is likely to be on the wane*
>
> *when the economic value decreases, even although we*
>
> *have a good personal relationship." – Case 7*

Through the growing interactions between organizations over time, the relational ties gradually shift towards a trust and long-term oriented relationship. This provides partner organizations with a cushion against disruption by sharing the empathy to each other and forming a joint action in responding to the adverse situation. In Case 5, the joint action was taken with clients in responding to an extreme case occurred at the hospital when a surgeon discovered the deficient scalpel before the surgery and then with suppliers to investigate the root cause of the disruption through the traceability system of production life-cycle. This could be a strategic decision of firms' internationalization, when disruption is mounting.

> *"Over last decade, the mobile phone industry in China has*
>
> *been increasingly concentrated into five major players,*
>
> *which is threatening our survival. In the face of these*
>
> *challenges, we eventually decided to 'go global', together*
>
> *with our customers who are mobile phone manufacturers".*
>
> *– Case 7*

The second group of IOR attributes influencing resilience in organization consists of innovation, identity and efficiency IORs. Innovation IOR in the context of disruption demonstrates the capability of an

organization in working with its business partners to initiate and implement a novel approach in responding to the changing situation. The findings suggest three forms of innovation IOR. First, there is a 'push' form of innovation driven by suppliers (e.g., operating system providers). As indicated by the respondent,

"When Google changes, we change." – Case 7

Similarly, innovation IOR in Case 14 seems to be driven by a greater sense of accountability to a wide variety of stakeholders (e.g., suppliers, customers, the government). Thus, the outcome of innovation is likely to improve the satisfaction of stakeholders, which contribute to healthier relationships between the organization and its environment constituted a great variety of stakeholders. Such healthier relationships matter to organizational resilience because they provide the organization with a relatively stable business environment, which, in turn, helps to hedge against disruption.

"Over the last decade, we have been dedicated to innovating the Ultrahigh-voltage (UHV) electricity transmission technology in order to achieve the timeless electricity transmission from our power generation suppliers to our customers – commercial and residential – regardless of distances, and to meet the consumption demand for national economic growth." – Case 14

The second aspect is a 'pull' form of innovation initiated by the organization in order to receive inflows of knowledge from a wide range of stakeholders (e.g., customers, suppliers). As explained in Case 5,

"We have launched a new programme by encouraging our qualified suppliers to submit their innovative ideas and we then evaluate these ideas in terms of alignment with our long-term strategy. In addition, we would collaborate with the award winner to further develop and invest the concept. " – Case 5

Consequently, these two aspects of innovation IOR not only accelerate an organization's internal innovation in responding to external changes, but also help organizations to identify niche markets where their strengths and specialties can fit in a competitive environment. This matters to organizational resilience because it is viewed as organization's proactive capability in preparing for and responding to an increasingly changing environment. The third aspect of innovation is to reconfigure and restructure the existing resources for a new business model and process. This is closely related to the first two forms of innovation in the way of improvising the information flow between organizations. This includes adopting a new technological system or upgrading the existing technical system.

Identity IOR in the social cognitive map stands alone in strongly influencing organizational resilience. The sources of identity IOR emerge from the managerial cognition and organizational identity (Santos & Eisenhardt, 2005). For example, respondent in Case 14 used the term of 'a centrally stated-owned enterprise', which, on the one hand, highlights the tightly coupled relationship with the central government, and on the other hand, implies the needed coherence between its activities and the unique identity of the organization because of its relationship with the central

government. This seems to provide a foundation of collectively sense-making of organizational members when faced with a complex and ambiguous situation. Resilience is enacted through emotional coherence and deep commitment (Kogut, 2000) to the shared values and norms between organizations because this helps to reduce uncertainty and ambiguity, particularly when other guidance is not available.

Efficiency IOR, which focuses on how interactions between organizations can be efficiently governed, demonstrates three pathways that can positively impact organizational resilience in the map. First, efficiency IOR facilitates the flow of information amongst organizations, which has a direct influence on organizational resilience. As explained in Case 7,

> *"As we operate in a fast-changing market, our capability of quickly responding to technological and market changes…is because we have established an information network between suppliers and clients where we can receive feedbacks timely from either the upstream market or downstream market" – Case 7*

Second, the finding shows that the efficiency IOR influencing organizational resilience can be mediated by the payment IOR, which is particularly associated with the capital flow of transactions between organizations. There is a cost attached to manage the capital flow between organizations, such as coordination costs (Corner & Prahalad, 1996). The more efficiency the governing structure of the cost, the healthier would be the capital flow between organizations. This is critical for organizational resilience in the sense of maintaining or improving productivity. The third pathway shows that the efficiency IOR can affect resilience through the

quality IOR. In Case 5, its influence on resilience is reflected by its agility of responding to the policy change that would otherwise cause a loss of the company.

> *"When any new regulation is issued, we have to quickly respond to it by firstly evaluating whether or not our current products or practices are in compliance with the new standard. We then immediately take action (e.g., purge or emergency treatment) on those that are obsolete in order to remedy the situation." – Case 5*

Despite that there is a positive influence from the efficiency IOR to the quality IOR in the map, the finding shows that it is not necessarily true that the quality IOR, conversely, has a positive influence on the efficiency IOR, which has been discussed in the section of the quality IOR.

The third group of influencing resilience comprises integrity, reciprocity, payment and communication, amongst which they all have positive contributions to organizational resilience. The integrity IOR demonstrates a high level of mutual trust between organizations, which has a positive influence on organizational resilience. As noted by Olekalns, Caza, & Vogus (2020), high mutual trust between organizations can increase the chance of withstanding disruption because, in the sense-making process, partners are inclined to make generous interpretations on the adverse situation and then demonstrate the high level of willingness to make positive contributions. Notably, the mutual trust at the organizational level can be influenced by the trust at the individual level. For example, respondent in Case 1 indicated that,

"In such critical and urgent situation, our CEO and the lead of financial department made a trip to the local bank with which our CEO has a good relationship with the bank governor not only because of our business relationship built over time but also the fact that they have been friends since the school. This helped us to successfully secure the emergency grant from the bank for this disruption." – Case 1

The findings show that the integrity IOR positively interacts with the reciprocity IOR, which also has a positive contribution to organizational resilience. The reciprocity IOR reflects social orders or norms of relationship exchanges for mutual benefits between organizations. As described by Das & Teng (2002), the contingency of the relationship between organization A and organization B is based on what organization A receives from organization B being contingent on what organization A offers to organization B. Thus, following the norms and rules of reciprocity, on the one hand, reduces uncertainties in the relationships, which, therefore, has a positive influence on organizational resilience. On the other hand, it is a manifestation of trust-building process because acting in accordance with the accepted principle of reciprocity demonstrates the mutual commitments to the long-term relationship between organizations. Hence, the findings suggest that the greater the reciprocity IOR, the greater would be the integrity IOR due to the increasing level of the mutual trust during the interaction. Conversely, the integrity IOR also shows a positive impact on the reciprocity IOR because high mutual trust embedded in the integrity IOR generates a sense of moral obligations in helping others in the relationship. This may explain why,

sometimes, an organization is willing to take a risk to reciprocate the favor from its trusted organizations, even though there are no immediate returns in the exchange relationship. As respondent in Case 1 explained,

> *"Becoming the guarantor of the firm's bank loan (5 billion RMB) is not because we know this firm very well. It's simply because we were asked for a favor by the local bank with which we have a good and trusted relationship." – Case 1*

The payment IOR highlights a series of actions in implementing either written or spoken arrangements on a particular interaction, which is associated with the payment. It is shown that the payment IOR has a strongly direct impact on organizational resilience. As explained in Case 1, a delay in receiving the payment from the business partners negatively affects the liquidity of business operations and this sometimes causes a chain of disruptive events. Thus, keeping a stable and healthy cash flow is critical for organizational resilience. Beyond this, the payment IOR also positively influence on the quality and efficiency IORs in a sense of minimizing the cost of managing activities between organizations, which, in turn, improve the liquidity of business buffering against disruption. Moreover, the finding also suggests that the payment IOR can influence resilience indirectly through the integrity IOR. From the perspective of institutional trust, which is developed through the interactions of institutional arrangements (e.g., routines, professional codes of conduct, and legal regulations) (Sward, 2016), the actions of consistently executing the agreement on the payment are used as one of indicators to evaluate the other party's integrity.

The communication IOR stresses on a means of information sharing between organizations, which matters to organizational resilience, particularly in responding the adverse situation. For example, respondent in Case 5 mentioned the 'escalation path' in times of emergency.

"We have an escalation path, which is a contact matrix, and this was jointly created with our suppliers. In times of disruption, this mechanism will be activated in helping us to seek to more information from a wide variety of our business partners (e.g., cross functions, and higher-level contacts) for a better solution." – Case 5

Similarly, respondent in Case 7 also highlighted the communicative structure established together with business partners (e.g., suppliers, customers) is crucial for organizational resilience. This is because it enhances the sensitivity of organizations to external environment, which leads to either quickly respond to the change or gains more time in preparing for the anticipated change. Moreover, the communication IOR demonstrates a collective sense-making process through which informal or formal meetings are held in discussing issues and identifying possible solutions. By drawing organizational attentions on emerging risks, this improves the ability of an organization to anticipate and prepare for disruption. As indicated by respondent in Case 5,

"We have a regular meeting with suppliers at different levels (e.g., criticality, business impact) and sectors on the topics ranging from operational to strategic level. The supplier relationship manager acts as an interface

between supplier and us is responsible for detailing and

implementing the agreed action plan." – Case 5

From the perspective of organizational learning, the reflexive process improves the capacity of the organization to absorb the adversity emanating from disruption by purposefully allocating controlled cognitive resources to non-routine activities (You, Vu & Williams, 2020) and building a strategic mind-set in dealing with the adverse situation. For example, in Case 7, respondent explained that,

"When disruption occurs, we, of course, would have an

emergency meeting with core teams including our

business partners and openly discuss the issues and find

solutions together, which will then be quickly implemented.

But the first and the most vital option is to face it because

nothing is important than how we adjust ourselves into the

new situation emotionally and cognitively." – Case 7

The fourth group of IORs influencing organizational resilience consists of legitimacy, necessity, and asymmetry IORs. In responding to institutional pressures, the legitimacy IOR demonstrates a process of institutionalization of an organization to adopt the prevailing norms, rules or expectations of other organizations or industries. Failures in compliance with these institutional norms and rules can threaten the survival of an organization. In Case 7, the legitimacy IOR reflects a pragmatic alignment with the collective interest of the industry, which is critical for its survival. As noted by the respondent,

"In a fast-changing industry, we are convinced that keeping up with the pace of change is a determining factor in our success. This includes our 'go global' strategy, which is naturally born with the industrial globalization."

– Case 7

In addition, increasing the legitimacy has contributed to the public trust to its brand and reputation in a way of preventing disruptions. In Case 5, respondent indicated that,

"It is a disruption from the perspective of our supply chain when the China Drug Administration (CDA) releases any new standards or regulations on the equipment of medical devices supply. Sometimes our suppliers or our own manufacturers still hold a high level of production stock that may no longer be valid because of the sudden change. But we have to quickly adapt into it that would otherwise lead to a greater disruption at the firm level." – Case 5

Thus, increasing the legitimacy of the organization in Case 5 has contributed to the public trust to its brand and reputation in a way of preventing disruptions. The greater the legitimacy IOR, the greater resilience organizations demonstrate for its long-term survival.

Notably, the legitimacy IOR is strongly influenced by the necessity IOR in the map. This is because the necessity IOR demonstrates a dual attribute of exchange relations with the one characterized as the mandated relation and the other one referring to the voluntary relation (Oliver, 1990). When establishing links with the higher authority such as the government in

Case 14 or the government agents in Case 5, the mandated aspect of necessity IOR is likely to emerge as a form of institutional pressures on the organization to conform certain requirements for its legitimacy and recognition. Thus, the greater the necessity IOR, the greater would be the legitimacy IOR. The voluntary aspect of necessity IOR, such as the relationship between Case 7 and its platform provider, sometimes, raises a concern in terms of the sustainability and continuality of the critical resource to which the organization could access.

> *"Our product development exclusively depends on the Android OS, which is now an open source for everyone to access. However, we worry that Google might close the open operating system one day and we then lose our base of product development." Case 7*

Such uncertainty, on the one hand, is perceived as a threat to the organization's survival in Case 7, and on the other hand, it enhances its capability of innovation in the sense that Case 7 makes efforts to find a novel way in managing risks. This is why the necessity IOR overall has a positive impact on organizational resilience.

Moreover, the finding also shows that the necessity IOR has a positive influence on the asymmetry IOR because by unilaterally setting up rules and norms that govern the IORs, it is a manifestation of that one organization exercises the power over other organizations. The higher of the necessity IOR could lead to the higher asymmetry IOR. The asymmetry IOR in the social cognitive map demonstrates a positive influence on organizational resilience because possessing critical resources (e.g., people, technology and

knowledge) is viewed as a form of power an organization can exert over other organizations in order to sustain its competitive advantages. As explained in Case 7,

> *"We actually create an entry barrier to our competitors because of our talented people (e.g., software engineers and seasoned professionals) and technology. As there are fewer competitors, this enhances our bargaining power with our clients and enables us to build a trust and close relationship over time." – Case 7*

Conversely, the finding shows that an increase in organizational resilience, indeed, decreases the asymmetry IOR. Such aversion reflects a common concern in IORs relating to the lack of equity or equivalence, which imposes threats to an organization for its long-term survival. Case 7 has exemplified the paradox relationship between organizational resilience and the asymmetry IOR, when managing its relationships with upstream suppliers (the platform provider) and downstream clients (manufacturers). When an organization has an opportunity to exert the power either intentionally or unintentionally in IORs for a greater benefit, this is why the asymmetry IOR is perceived to have a positive contribute to organizational resilience. As opposed to this, when the organization feels the loss of autonomy or control in IORs, it is often perceived as uncertainty or risk. Additionally, the asymmetry IOR can affect resilience through the communication IOR. As discussed in previous section, the communication IOR is a powerful mean that determinates how the information is transmitted from one to another. When the attribute of IOR is an asymmetrical relationship, the unbalanced power reflects the way or medium adopted in exchanging information.

6.5 Discussion

The departure point for the present study is to investigate the relationship between resilience and IORs in the context of disruption. This study is built on the findings in Chapter 4 which identified different characteristics of IORs and those in Chapter 5 which identified different types of disruption. By employing the FCM approach in the second-round data collection, it initially identified four relational structures in each disruption, which then are aggregated into a social cognitive map. The advantage of doing this is to obtain a more comprehensive view in terms of how organizations utilize their external connections with other organizations in managing a great variety of adversity emanating from disruption. In addition, the second-round interview is critical to validate and triangulate statements in the first-round interview.

This study presents new insights into organizational resilience by incorporating the perspectives of IORs and disruption in the context of China. The key over-arching finding is that there is no 'one size fits all' solution for resilience in organizations. This is similar to the findings in ecology that resilience in the system has multiple equilibriums (Holling, 1973; Xu, Marinova, & Guo, 2015). As organizations are embedded in a constellation of relationships with other organizations through which coordination on different activities helps to achieve the tasks and goals, the multiple equilibriums in organizational settings are shaped by the dynamic interactions amongst organizations in responding to different situations.

The FCM approach sets the study apart from previous case-based approach in the field of resilience and disruption (Powley, 2009; Weick, 1993;

Christianson, Farkas, Sutcliffe, & Weick, 2009) that focus on low-probability and high-impact events occurring in particular organizations. However, as noted by Kahn, et al (2018), such extreme events are not common and even though they unfortunately occur, Hallgren, Rouleau, & Rond (2018) argue that it is likely to happen outside the core activities of organizations because organizations are structured in the way of efficiently and effectively supporting their core business. This implies that existing research on organizational resilience offers limited insights into how organizations manage the adversity in an uncertain and dynamic environment. As the environment varies across geographies, languages, economies, and social-political contexts, the FCM is a useful methodological tool in studying a data poor situation because it is a participatory approach (Özesmi & Özesmi, 2004; Gray, et al., 2015) involving informants who have a rich experience and depth of understanding about the particular phenomenon. By capturing knowledge in a graphical form, it allows respondents to focus on explanations of the causal-effect relationship between various attributes of IOR and resilience, which, in turn, provides a meaningful qualitative interpretation. In the initial relational structures, the findings show that various aspects of IOR can either positively or negatively affect organizational resilience and the same IOR has different degrees of influencing organizational resilience depending on situations. The aggregated social cognitive map provides a more comprehensive and balanced view because it allows the cancellation of the strength on the same causal relationship when respondents hold in opposite views. The findings show that *how* these different aspects of IORs matter and

how resilience can have feedback effects on various attributes of IORs, which

lead to the discussion in Chapter 7.

Chapter 7 Discussion and Conclusion

7.1 Research Summary

This study explores organizational resilience in business ecosystems from the perspective of IORs. Resilience in organizations generally refers to the ability of entities (individuals, teams, organizations, systems) to prepare for, respond to and recover from disruption in an integrative manner (Linnenluecke, 2017; Sutcliffe & Vogus, 2003). Prior research on organizational resilience has primarily focused on high-profile and high impact events in particular organizations (e.g., Powley, 2009; Christianson, Farkas, Sutcliffe, & Weick, 2009). It is, however, increasingly acknowledged that such extreme events are rare and the existing research on organizational resilience does not align with a certain reality of the environment in which organizations operate (e.g., Kahn et al, 2018). In the field of strategy and management, the environment commonly refers to the task environment that consists of a wide variety of stakeholders (suppliers, customers, regulators and competitors [Dill, 1958]).

Since the 1950s, the concept of open systems (Bourgeois, 1980; Evan, 1993; Katz & Kahn, 1966) has become a useful framework of understanding how an organization manages its relationships with the environment. The theoretical portrait of the relationship is that an organization acquires inputs from other organizations of which these inputs are transformed into outputs through its system and then are exported to the environment in exchange for

a fresh round of inputs (e.g., value chains, ecosystems). The inter-organizational relationships (IORs) that facilitate the continuous flow of resource and information amongst organizations are essential for organizational survival.

In the open systems tradition, notable works in the literature of organizational resilience highlight the importance of relational connections and adaptation in fostering resilience (e.g., Powley, 2009; Weick & Roberts, 1993; Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017). Williams and colleagues (2017, p. 745) point out that, in the context of adversity, "relational capabilities – the social connections that enable access to and exchange of resources – play an important role in shaping immediate actions and ultimately enabling positive functioning…[and]…provide a context in which cognitive, behavioral, and emotional capabilities can be activated." Powley (2009, p. 1294) finds that resilience is "a latent capacity, in organizations, built overtime through social interaction and relationships". Weick & Robert (1993) also observe that resilience can be enacted through "a pattern of heedful interrelations of actions in a social system" (p.357). More recently, scholars (Barton & Kahn, 2019; Olekalns, Barker, & Vogus, 2019; Olekalns, Caza, & Vogus, 2020) have made efforts in explicitly exploring the concept of relational resilience. They, however, focus on intra-organizational collaborations within groups or teams rather than inter-organizational collaborations with external stakeholders.

There have been important literature reviews in the field of organizational resilience (e.g., Bhamra, Dani, & Burnard, 2011;

Linnenluecke, 2017), suggesting that, given that "all formal organizations are embedded in an environment of other organizations" (Evan, 1965, p. B-218), organizational survival does not merely rely on managing the internal organizational environment but also on how well organizations manage the external environment that involves a wide variety of stakeholders. As Hallgren, Rouleau, & Rond (2018) note, stakeholders, such as governments, industry bodies and the media, can play an important role in the aftermath of disruptions because they are involved in the negotiating and reframing of situations that can pressure organizations to act more responsibly and safely. Due to an increasing awareness of today's social-political, economic and technological uncertainties, there is a surging interest in understanding how an organization copes with disruptions by working together with other organizations. Notably, Williams and colleagues (2017, p. 742) have provided a revised definition of resilience, which is "the process by which an actor (i.e., individual, organization, or community) builds and uses its capability endowments to interact with the environment in a way that positively adjusts and maintains functioning prior to, during, and following adversity". In the literature of strategy and management, there has been an impressive accumulation of studies on how an organization defines and manages its external relationships with other organizations in the pursuit of goals, which is commonly referred to as inter-organizational relationships (IORs) (e.g., strategic alliances, inter-organizational networks) (e.g., Barringer & Harrison, 2000; Provan, Fish & Sydow, 2007). Thus, it seems to

be a strong argument to explore organizational resilience from the perspective of IORs.

The literature of IORs is extensive but it is fragmented. This is, in part, because existing studies on IORs are rooted in several theoretical paradigms ranging from economic theories (e.g., TCEs) to behavioral theories (e.g., Institutional Theory). Each theoretical paradigm only offers a partial account of complex IOR phenomena that involves various types of motives, commitments, and investments from a wide variety of partners pursuing shared goals (Albers, Wohlgezogen & Zajac, 2016; Barringer & Harrison, 2000). As Provan, Fish & Sydow (2007) note, most IOR studies based on these theories tend to focus on a dyadic relationship (e.g., buyer-supplier). This does not reflect the reality that organizations develop and maintain multiple kinds of relationships with one another (Shipilov, Gulati, Kilduff, Li & Tai, 2014). From the perspective of a focal organization, it is a web of relationships with other actors that the organization has to manage and this is referred to as 'relational pluralism' (Shipilov, Gulati, Kilduff, Li, & Tsai, 2014). The relational pluralism has become increasingly important due to the technological and information changes that have caused a profound impact on how organizations are coordinated and collaborated. For instance, the emergence of open innovation strategy promotes the concept of ecosystems in which value creation is "beyond immediate firm boundaries" (He et al, 2020, p. 14). This means that, unlike the traditional view on IORs, any actor in the ecosystems, such as customers, competitors and regulators, contribute to the process of value creation (Bogers, Chesbrough, & Moedas, 2018)

through links (Adner, 2017) and retain residual control (Jacobides, Cennamo, & Gawer, 2018).

Moreover, research on IORs acknowledges that the success of managing IORs depends not only on how IORs are initially structured (e.g., contractual coordination) but also on how IORs are managed over time (e.g., procedural coordination) (Brattstrom & Faems, 2019). As noted by Doz, Hamel, & Prahalad (1989, p. 136), "top management puts together strategic alliances and sets the legal parameters for exchange. But what actually gets traded is determined by day-to-day interactions of engineers, marketers, and product developers". In reviewing 22 longitudinal cases, Majchrzak, Jarvenpaa, & Bagherzadeh (2015) find six distinct patterns of interorganizational collaboration dynamics, which lead to either successful or unsuccessful IOR outcomes, and more importantly, they conclude that instability is a mechanism of the successful IOR outcomes. These findings are important because they provide a theoretical common ground to explore how the dynamics of IOR attributes influence organizational resilience in the context of different types of disruption.

7.2 Main Findings

My thesis employs an inductive qualitative approach to explore organizational resilience from the perspective of IORs in business ecosystems based in China. Through a two-staged data collection process and analysis in four empirical studies, it progressively leads to new insights of an answer of the central research question: *how an organization copes with disruption*

through its external relationships with other organizations in its business ecosystem.

The first study (Chapter 3) is to gain a comprehensive understanding of the ecosystems in which organizations are embedded. More specifically, it attempts to understand the multiple exchange activities of the focal organization engaging with other organizations in the services of achieving certain tasks and goals necessary for its survival or growth. The activity containing the flow of information and resource amongst or between organizations (Van de Ven, 1976) plays an important role in understanding characteristics of IOR because "it is in activity that relations are created, and it is relations that constitute such activity" (Good & Thorpe, 2019, p.6). Drawing upon the perspective of ecosystems (Adner, 2017; Jacobides, Cennamo, & Gawer, 2018), the first study inductively identifies six distinct *between organization boundary* (BOB) activities, each of which specifies the discrete actions of value creation and value capture with six different types of actor in business ecosystems, including goods supplier, service provider, regulatory actor, financial actor, man-power actor and customer actor. The empirical study on business ecosystems does not only contribute to the emerging literature on ecosystems but also provides a foundation for the following three studies.

Given that the characteristics of activity affect how IORs are structured and coordinated (Sobrero & Schrader, 1998), the second study (Chapter 4) has drawn on the findings in the Study one and then explored attributes of IORs between the focal organization and other actors and

patterns of these IOR attributes within activity-based between-organization boundaries (BOBs). Through an 'abductive' process of the data analysis, 14 IOR attributes are derived from the open coding and the axial coding, which are *necessity, asymmetry, reciprocity, quality, innovation, identity, communication, consensus, legitimacy, cost, efficiency, on-time-delivery, payment and integrity.* Following the Gioia, Corley, & Hamilton (2013) method, all 14 IOR attributes are further consolidated by combining closely related codes into the higher-level aggregate dimensions: *controlling, energizing, aligning, internalizing* and *committing*. To explore the association between the aggregate dimensions of IOR attributes and BOBs, the 14 IOR attributes are coded by applying a dichotomous variable (1= present in BOB, 0= not-present in BOB) for each case and then the mean values of each aggregate IOR dimensions are calculated. The results show that although all IORs appear in BOBs, the patterns of IOR occurrence in BOBs vary. These empirical findings support those IOR attributes identified by Oliver (1990) but extend them by shifting the traditional focus on a dyadic relationship between organizations to a web of relationships in business ecosystems. An examination of associations between these IOR attributes and the activity-based BOBs reveals five contingent patterns of IOR attributes across various BOBs. This, in part, addresses an ongoing call for explaining why IORs with the same characteristics perform differently (Das & Teng, 2000; de Rond & Bouchikhi, 2004; Greve, Baum, Mitsuhashi, & Rowley, 2010). More importantly, the findings in this study provide relational mechanisms (namely IOR attributes) that need to be further explored in the context of disruption in

order to understand how the dynamics of these IOR attributes affect organizational resilience.

The third study (Chapter 5) is a dedicated chapter with the aim of understanding the characteristics of disruption organizations experience or face in business ecosystems. Understanding the nature of organizational disruption from temporal and spatial dimensions is essential to study organizational resilience because it provides conditions under which organizational resilience is enacted. This, however, has been largely overlooked in previous studies. As Morgeson, Mitchell & Liu (2015) note, existing studies on event-related research tend to focus on the severity of event by using an adjective word (unprecedented, unexpected, novel, negative) to describe the disruption. Organizational disruption generally refers to an adverse situation in which organizations find it difficult to continue in normal ways. From the perspective of sensemaking, disruption is the experience of cognition, behavior and emotion in which entities (e.g., individuals, teams, organizations) tend to understand what the plausible stories are in adverse situations (Weick, Sutcliffe, & Obstfeld, 2005). In making sense of the experience or the phenomenon, it is suggested that understanding relations between time and space of the experience is a common tool (e.g., Nadkarni & Chen, 2014; Morgeson, Mitchell, & Liu, 2015) because temporal and spatial relations "are mutually constituted aspects of experience" (Good & Thorpe, 2019, p. 11). Thus, drawing upon the temporal and spatial dimensions of event (Ancona, Okhuysen, & Perlow, 2001; Morgeson, Mitchell, & Liu, 2015), this study first reveals four types of disruption: *mounting-broad,*

mounting-narrow, sudden-broad, and *sudden-narrow.* By unpacking

narrative accounts of disruption, 137 events are identified including the actual

event, the triggering event and the consequence of event. These are then

coded into the two-by-two matrix: the intensity of transformation (time):

'mounting' or 'sudden' and the scope of impact (space): 'narrow' or 'broad'.

In doing so, it enables to allocate all twenty-two cases in each quadrant of

disruption. The results show that there are 5 cases in mounting-broad quadrant,

4 cases in mounting-narrow quadrant, 6 cases in sudden-broad quadrant, and

7 cases in sudden-narrow quadrant. One case from each quadrant is randomly

selected in the study 4. Moreover, following the abductive process of data

analysis, 137 events are consolidated into first-order categories and then

settled into 20 second-order themes (Gioia, Corley, & Hamilton, 2013), which

are also organized into the four types of disruption. This has empirically

contextualized the four types of disruption from the perspective of time and

space.

The final study (Chapter 6) is a synthesis study, based on the findings

in Study 2 relating to 14 IOR attributes and in Study 3 relating to the four

types of disruption, to explore relational determinants of organizational

resilience. This answers the main research question: how an organization

copes with different types of disruption by utilizing or managing the different

attributes of IORs. To achieve this, the study employs a Fuzzy Cognitive

Mapping (FCM) approach in A second-round data collection, which involves

respondents as participants in the co-creation of individual cognitive maps

that represent views of how their organizations manage disruption using IORs.

The data shows four individual cognitive maps, which represent different types of relational structure between IOR attributes and organizational resilience in different contexts of disruption. Guided by the FCM method, all individual cognitive maps are aggregated into a social cognitive map, which generates a more comprehensive view. By comparing different cognitive maps, results suggest the contingency logic of the interaction between IOR attributes and organizational resilience in different disruptive situations and this reflects in three aspects of relational structure: *centrality, density,* and *hierarchy*. The centrality of IOR attributes varies in different situations, which support the contingency logic of IORs. In terms of the hierarchical index of the relational structure, Case 14 in the mounting-broad disruption is the most hierarchical structure, whilst Case 5 in the sudden-broad disruption is more democratic structure. Similarly, the density of relational structure in Case 14 is the highest one and the one in Case 5 is the lowest one. In the aggregated map, it shows that the quality IOR is the most influential factor on organizational resilience, followed by the second influential group of IOR attributes: innovation, identity and efficiency IORs. The third group of IOR attributes influencing resilience includes integrity, reciprocity, payment and communication. The fourth group of IOR attributes are legitimacy, necessity and asymmetry.

7.3 Understanding Relational Resilience within DS

The empirical findings suggest four types of organizational resilience that are enacted through inter-organizational relationships (IORs) in response to disruption, ranging from passive adaptation to increasingly active

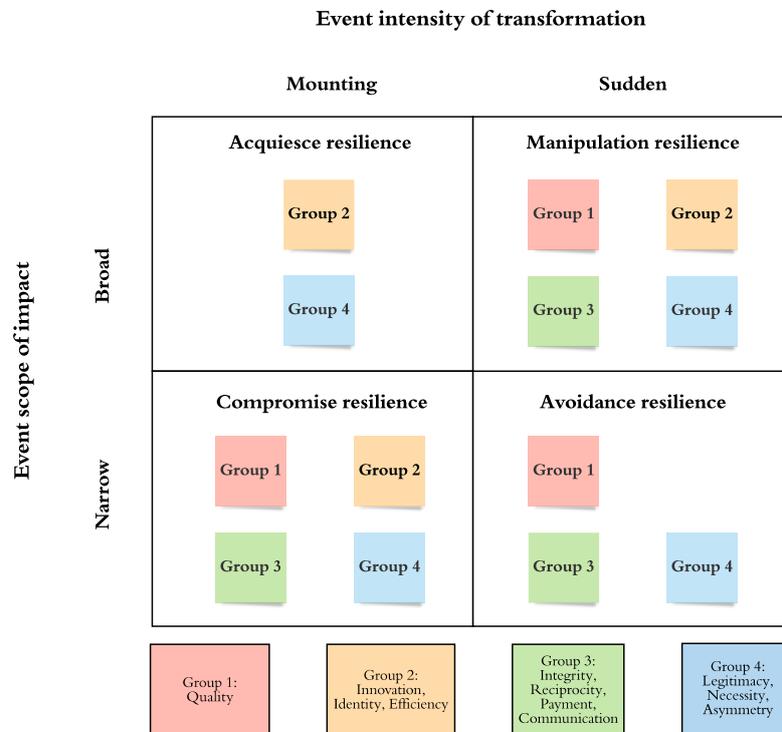adaptation: *acquiescence, compromise, avoidance, and manipulation* (see Figure 29)

Event intensity of transformation

Figure 29 A typology of resilience strategy

Acquiescence resilience. Organizations as open systems operate "in an environment of other organizations as well as a complex of norms and values" (Evan, 1965, p. B-218), where institutional constituents (e.g., the state, professions, interest groups, and public opinions) often exert pressure and expectations on organizations through regulatory structures, governments or government actors, laws and professions (Scott, 1987). The findings show that disruptions, emerging from either introducing new regulation or policy (e.g., industry) or making a change of existing policy, have a broad impact on organizations in the sense that the new released policies or regulations result

in the impairment of organizational operations and management. In the face of these disruptions, *acquiescence* aiming to adjust to and align with these institutional changes is a common strategy adopted by organizations. Partially, this is because adopting *acquiescence* strategies can protect organizations from public criticisms and the financial penalties for non-obedience. This can provide them with a relatively stable environment necessary for conducting its core businesses and activities in a good faith (e.g., Oliver, 1991). Following this logic, acquiescence resilience supports statements made by institutional theorists (e.g., DiMaggio & Powell, 1983; Meyer & Rowan, 1977) that the conformity with collective normative orders and expectations is essential for organization's survival.

Additionally, it is observed that *acquiescence* involves both an unconscious response and a conscious response to disruption and this depends on the degree of an organization's awareness and willingness to conform with institutional requirements and expectations. For example, Case 14 complies with the institutional requirements resulting from the industrial reform of 'plant-grid' separation in order for the approbation of external constituents or society. This amounts to a 'taken-for-granted expectation' of an organization as being a centrally state-owned enterprise. Conversely, although Case 5 takes an immediate action to evaluate the implications of the new standards and rules issued by the China Drug Administration, the results of the evaluation serves as a foundation for organizations to make a strategic decision in terms of the level of alignment to new institutional requirements and expectations at their own interests (e.g., minimal cost). Oliver (1991) used 'habit' and

'compliance' to distinguish organizational response to institutional pressures. The 'habit' form of response refers to a blind obedience to the institutional requirements (we see this in Case 14), while the 'compliance' form of response stresses deliberate adherence to institutional orders and expectations with a specific anticipation of self-serving benefits (e.g., in Case 5).

From the perspective of IORs, the difference between the unconscious response and the conscious response to disruptions may result from the degree to which the organizations are coupled with other organizations ranging from tightly coupled forms to loosely coupled forms (Barringer & Harrison, 2000). Case 14 being as a centrally state-owned enterprise demonstrates a tightly coupled relationship with the central government, whereas Case 5, as a non-Chinese multinational enterprise, by comparison, has a loosely coupled relationship with the government. In the face of similar disruptions (e.g., policy and regulatory change), Case 5 seems to be more active reflecting the fact that the loosely coupled relationship with the government has given more freedom to the organization in consciously and strategically making decision in terms of the level conformity with the institutional requirements and expectations on a basis of self-interest.

Moreover, acquiescence resilience, to some extent, reflects on the concept of mimetic isomorphism (DiMaggio & Powell, 1983) in the sense that accepts innovative ideas or advices from external organizations (e.g., suppliers, customers) for becoming more resilience. Case 5 is an example that invests and develops innovative ideas provided by its qualified suppliers. Similarly, the internal innovation in Case 7 is accelerated by the 'push' form

of innovation from suppliers (e.g., Google) and the 'pull' form of innovation from customers (e.g., external users). Moreover, our findings show that a dynamic and competitive environment (e.g., mobile phone industry) creates a great level of uncertainty, which poses challenges for organization's survival. Being resilience in this situation is to climb aboard the bandwagon of other organizations, especially those whom they know and trust, that would otherwise be difficult to survive alone. This is what we see the Case 7's internationalization strategy driven by the collective interests of a 'go global' strategy.

Avoidance resilience. Hypercompetitive environments create transient perturbations that are perceived as disruptions in ways that place constraints and pressures on organizational operations or threaten their strategic decision-making. *Avoidance* as a strategy is employed by an organization to preclude itself from disruptions by actively adapting to an environmental change. The environment refers to a task environment of an organization (Dill, 1958), which is formed by a large number of stakeholders (e.g., customers, suppliers, competitors, regulatory groups) influencing organization's decision-making and operations. Thus, avoidance resilience reveals the ability of an organization to manage the complexity of external factors and the degree of change exhibited by these factors. As is evidenced in Case 7, "keeping up with the pace of change is a determining factor in its success in the fast-changing environment". Lengnick-Hall & Beck (2005, p. 742) referred it to as a 'robust transformation' as it improves an organization's

capacity to absorb the adversity emanating from a complex and turbulent environment.

To circumvent these constraints and pressures emerging from the task environment, organizations tend to use buffering and escaping tactics, which are similar to those strategies adopted in response to institutional pressures (e.g., Oliver, 1990; Scott, 1987b; Powell, 1988). In terms of buffering tactics, organizations attempt to build a great variety of relationships with other organizations from which they hope to gain access to various resources and knowledge in times of disruption. In addition, these connections constantly shape the task environment perceived by the organization. It is important in a sense that serves as a basis for organizations to decide in terms of how to reconfigure these resources and capabilities and then to deploy repertories of action that are better able to manage these constraints and pressures before adverse consequences occur. As postulated by Williams et al (2017), "the difference between triumph and tragedy hinges on an organization's ability to make sense of the dynamic contexts in which it is embedded" (p. 744).

The escaping tactic is a strategy an organization adopts to abandon some existing activities or practices on which constraints and pressures are exerted. The essence of the tactic is to overcome organizational commitments to failing strategies for organizational resilience. This is because, for example, in a hypercompetitive environment (e.g., Case 7), it produces an economic adversity (e.g., resource scarcity and shrinking market) that threatens organizational survival. Under such circumstances, existing activities or practices guided by the former strategy become problematic and this leads to

an abandonment decision especially when alternative solutions emerge. Our finding is in line with the statement made by Greve (1995) that the abandonment "occurs as part of replacement decisions in which one strategy is abandoned and another adopted." (p. 445). Moreover, our study shows that adopting an escaping tactic can also be driven by the action of other organizations, which sometimes is referred to as the contagious effect of inter-organizational learning (Greve, 1995).

Compromise resilience. When organizations are confronted with a conflict between institutional expectations associated with non-economic rationale and internal organizational objectives related to economic rationale, the conflict sometimes is perceived as a sudden disruption depending on the timing of its occurrence. For example, in Case 5, the result is a discontinuity of the production of some products where the inventory level is still high at the time of the announcing of the new regulatory policy. Under such circumstances, organizations attempt to manage the adversity through a compromise strategy. Oliver (1991) also pointed out that the compromise strategy, indeed, rests on the spirit of conformity but leaning on "the thin edge of the wedge in organizational resistance to institutional pressures" (p. 153). Partially, this is because the level of compliance to institutional requirements is determined by organizational self-interests, which, in turn, lead to various tactics in responding to disruption. The findings show that balancing, bargaining, and waiting and seeing tactics are commonly used.

In terms of balancing tactics, organizations make a compromise to partially or minimally conform to newly released requirements when dealing

with the conflict between institutional demands (e.g., new regulations) and internal objectives (e.g., organization's egocentric profit motives). As noted in Case 5, the balance tactic sometimes involves innovation by substituting or redesigning an existing product in order to find a remedy to adverse situations. However, by focusing on the minimal standards or requirements, it enables organizations to prioritize and concentrate on a specific set of tasks required at the time in order to cope with disruption. In doing so, not only does it improve the speed of organizational response but also it intensifies organizational selective attention (Ocasio, 2011) on critical resources and capabilities needed in response to the change.

Compared to balancing tactics, bargaining is seen as a more active tactic in a sense that an organization exacts some concessions from other organizations by offering some of its own resources and knowledge. The findings show that this tactic commonly used by the non-Chinese MNEs offering technological advancement and know-how when negotiating with the Chinese government to reduce the frequency or scope of its compliance with the institutional requirements and expectations. Furthermore, the bargaining tactic has a theoretical grounding in bargaining power (Emerson, 1962) and the resource dependence perspective (Pfeffer & Salancik, 1978). For example, Case 7 shows that the software company withheld specific resources (e.g., talented engineers, knowledge) and capabilities (e.g., R&D, Operations) that were attractive to its partners (e.g., hardware manufacturers). With the increased bargaining power for Case 7, the cooperative relationship became more tightly coupled in a way that enabled Case 7 to gain timely

access to market information through its partners' networks. This was critical to its innovation (e.g., a 'pull' form of innovation).

The third compromise tactic emerging from the data is a wait-and-see approach when changes in law and policy are perceived as a severe threat to organizational survival. The wait-and-see tactic involves a sense-making process, which is "promoted by violated expectations that involves attending to and bracketing cues in the environment, creating inter subjective meaning through cycles of interpretation and action, and thereby enacting a more ordered environment from which further cues can be drawn" (Maitlis & Christianson, 2014, p. 67). Although organizations adopt the same tactic, our findings show different motives held by organizations for doing so. For instance, Chinese state-owned enterprises tend to actively wait for an emerging strategy because they believe that "more favorable outcomes are possible in the future" (Reuer & Leiblein, 2000, p. 205), whereas the motivation of non-Chinese MNEs is inclined to gain more time in cognitively processing information and preparing for the tactical response that involves non-routine resources and arrangements. Sandberg & Tsouka (2020) refer the former response to as an immanent sense-making because it involves a habitual and non-deliberate reaction and the latter one as a 'second order' sense-making since organizations deliberately detach from organizational routines for a solution.

Manipulation resilience. As an organization often is structured and organized to provide an efficient operation for its core businesses, disruptions, for example, in the quadrant of sudden-narrow are often portrayed as

"unprecedented, or even uncategorizable" (Christianson, Farkas, Sutcliffe, & Weick, 2009, p. 846). This is primarily because the occurrence of disruptions is unrelated to core activities but nevertheless can still have a detrimental effect on organizations (see in Case 1). Prior studies indicate that forming temporary teams or organizations is a common method in response to disruption in extreme research contexts (ERCs) (Hallgren, Rouleau, & Rond, 2018). This acknowledges the importance of relational connections and interaction that fosters resilience in the context of adversity. Similarly, Williams et al (2017, p. 745) postulated relational capabilities that "play an important role in shaping immediate actions and ultimately enabling positive functioning in the face of adversity." Although our findings are similar to those found in ECRs, such as that organizations apply "non-routine organizational arrangements" (Majchrzak et al., 2007, p. 150) in order to build or maintain the essentials of social interactions, we observed that an immediate response adopted by organizations, rather than building or exploring new connections, is to exploit existing relationships with other organizations, in particular with those whom they have already built trust. The more enduring the relationships are, the more likely organizations are to them exploit in the first place. Compared to exploring new connections, this enables organizations to quickly gain access to critical resources and information directly or indirectly in order to cope with disruptions.

A strategy revealed in our study in dealing with disruptions in the sudden-narrow quadrant is *manipulation*, which involves strategically exploiting trust-related relationships to influence or control the process of a

decision-making of other organizations in order to obtain critical resources needed to cope with disruptions. The main mechanisms underpinning manipulation strategy are 'guanxi' relations, which are embedded in Chinese society where we see that personalized aspects of inter-personal relationships such as *renqing* (doing favors) or *lian* (credibility) are translated into inter-organizational relationships in order to build a foundation for "mutual trust and emotional engagement" (Bedford, 2011, p. 153). In a Confucian-influenced society (e.g., China), decision-making, to a large extent, relies on affective factors of trust (Tan & Chee, 2005). By manipulating these components of inter-personal relationships into business relationships in times of disruption, this boost both cognitive and affective types of trust (McAllister, 1995) in existing relationships, which, in turn, put pressures on other organizations being manipulated due to a moral obligation to help. As such, this enhances 'relational capability endowments' (Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017) in helping to acquire the critical or non-substitutable resources needed for organizing resilience.

Oliver (1991, p. 157) point out that "manipulation is the most active response to these pressures because it is intended to actively change or exert power over the content of the expectations themselves or the sources that seek to express or enforce them". In a similar vein, we also see this manipulation tactic used by organizations. For instance, an organization often cultivates its associations or affiliations with an influential foundation such as the Chinese government or a central state-owned enterprise in ways that exert its power on other organizations in gaining critical resources or enhancing its

legitimacy in obtaining support from other organizations in times of disruption. Bedford (2011) refers this to as 'backdoor guanxi', which is defined as the "use of one's guanxi networks to negotiate business solutions" (p.153).

7.4 Theoretical Contributions

This present study makes contributions to the literature of organizational resilience in a number of ways. First, the present study distinguishes itself from prior studies on organizational resilience beginning with two underlying assumptions. The first assumption is that resilience in organizations is embedded in a web of relationships amongst other entities (e.g., individuals, teams, and organizations) in which they collaborate or coordinate with each other in achieving shared tasks and goals. The theoretical rationale behind the assumption is grounded in Resource Dependency Theory (Pfeffer & Salancik, 1978) and Open System Theory (Katz & Kahn, 1966). Organizations are not self-sufficient to generate all necessary resources and capabilities for their survival and growth, and therefore this leads to the inevitability of interacting with other organizations that possess the critical resources or capabilities; Even though organizations possess these resources and capabilities, none of them can create values on their own. Thus, organizations as open systems need to persistently interact with the environment constituting a variety of entities. Building and maintaining inter-organizational relationships are critical for organizational resilience. As described by Kahn & Barton (2013, p. 378), the web of relationships is "the nervous system of the organization the source of

complex social interactions, rapid coordination of systems, and integrated processing of concurrent signals."

The second assumption is that the attributes of collaboration between the focal organization and other organizations, which is referred to as inter-organizational relationships (IORs) in this study, are not static but dynamics in nature. For instance, Hardy, Phillips, & Lawrence (2013, p. 323) point out that collaboration as "a cooperative, interorganizational relationships that is negotiated in an ongoing communicative process, and which relies on neither market or hierarchical mechanisms of control". Majchrzak, Jarvenpaa, & Bagherzadeh (2015) find six dynamic characteristics of inter-organizational collaborations in which changes occur at some point after the initial stage of formation. This includes changes in goals, changes in how formal or informal contracts are framed, changes in the ways of interactions amongst or between organizations, changes in organizational structures, changes in control mechanisms of decision making, and changes in the composition of actors in the relationships.

Building on these two assumptions, the second contribution is that this study employed an ecosystem approach to inductively capture multiple relationships the focal organization has simultaneously with its partners. This has set up the level of analysis in this study focusing on *the focal organization with its connections*, which has shifted the focus of studying IORs away from a dyadic relationship between two organizations to a web of relationships. Although there are some similarities with the study of inter-organizational networks that also focuses on multiple connections, the main difference is

that, from the perspective of ecosystems, ties or linkages between actors are non-linear and non-hierarchical, whereas the inter-organizational networks focus on the hierarchical relationships in the networks. The implication of this is that adopting the ecosystem approach enables to capture a great variety of relationships necessary for organizational survival or growth. For example, this may include arm-length relationships that are neglected in the study of IOR networks. Moreover, much of empirical studies on inter-organizational networks adopt a deductive theorizing approach by using the secondary data (Shipilov & Gawer, 2020), rather than an inductive approach used in the current study. Thus, it offers limited explanations about the dynamic nature of IORs from the perspective of the focal organization.

Third, much of research on organizational resilience primarily focuses on a particular organization in which high impact and high-profile events occur emerging from either internally or externally. It has been increasingly acknowledged that such full-blown events are rare, which do not reflect a certain reality of what organizations often experience (Kahn, et al., 2018). This implies that knowledge gained from a particular case or situation may not be able to apply for other cases or situations or may be outdated. As noted in Crisis-response (2020), 'our visions of risks and crises always lag one war behind…our previous visions have been configured for isolated, specific and known situations. Today, however, we have to face the hybrid, the systemic and the unknown'. The research context of the present study is set in an uncharted Chinese business environment in which organizations have to continually respond to unpredictable but frequent disruptions emerging from

a fast changing and unknown environment. Through theoretical and purposive sampling techniques, twenty-two heterogeneous organizations were selected in this study across different industries, ranging from the largest firm with turnover approximately US$300 billion and nearly 90,000 employees and the smallest firm with turnover less than US$2 million and less than 10 employees. As stated by Patton (2002), the heterogeneous approach can significantly amplify the value of research, which is useful for theory development and elaboration (Siggelkow, 2007).

7.5 Methodological Contributions

This study has introduced the ecological modeling: Fuzzy Cognitive Mapping approach (FCM) in the study of relational resilience. Given that the study of relational resilience is still relatively nascent, this approach is particularly useful in a data poor situation, such as in the uncharted Chinese context. First, it allows researcher to explore causal relationships within an unlimited number of unquantifiable concepts emerging from data. Second, this is a participatory approach, which involve informants who have a rich experience and depth of understanding about the role of inter-organizational relationships in organizational resilience. By capturing their knowledge in a graphical form, it allows them to focus on explanations of the causal-effect relationship between concepts. The fuzzy causal function that transforms the weight of causes into the number between -1 and 1 allows the quantitative analysis not only to compare and contrast the individual cognitive maps (centrality, density, hierarchy). It also enables to aggregate the individual

cognitive maps into a social cognitive map, which provides a more comprehensive view.

7.6 Implications for Practice

Organizational resilience is seen as a crucial capability of an organization to have in order to sustain its competence and survive in an uncertain environment. When viewing organizational resilience from the perspective of inter-organizational relationships, it raises a number of challenges for managers because organizations are embedded in a web of relationships simultaneously involving a great variety of stakeholders: customers, suppliers, regulators and employees, amongst others. For organizations to be resilient, it is essential to manage these multiple relationships with other organizations or stakeholders, each of which has its potential to help organizations in managing the adversity at the particular point of time and space. This study has three important normative implications.

First, in contrast to the traditional view where managers focus on managing a dyadic relationship between two organizations (e.g., buyer-supplier relationship or coopetition), resilience requires managers to allocate their attentions to manage other relationships with different stakeholders existing in the ecosystems. This is because being able to be aware of or manage multiple relationships provides the conditions under which managers can quickly identify resources (e.g., emotional, financial, cognitive) necessary for the organization. This study has identified different patterns of IORs and explained why IORs with the same characteristics perform

differently and this provide a conceptual idea to managers who design and manage external relationships with other organizations. The structuralist approach of ecosystems (Adner, 2017) is a useful tool in understanding the dynamics of IORs through the activities occurring between or amongst actors. This is complementary to the traditional views on IORs based on the cost/benefit analysis.

Second, organizational resilience depends not only on the availability and accessibility of resources, but also on how to organize or re-configure these resources in formulating resilience strategies at the different stages of disruption. The findings show that disruption occur at particular point of time and space and its effects can travel across multiple levels in different directions. The relational mechanisms that drive the formation of relationships with other organizations in a stable environment may not be sufficient in the face of a disruptive situation that can produce a great level of ambiguity and complexity. For example, relational mechanisms relating to the centralization of decision-making control may delay in responding to the adverse situation and lead to even a worse situation. Resilience requires organizations to be more flexible to the emerging disruptive contexts. To respond to the adverse situation, there is a differentiated need for managers to consider the different relational mechanisms that are more relevant in solving problems.

By incorporating temporal and spatial dimensions, the two-dimensional framework – *Disruptive Space* (DS) – can be used be managers of organizations to understand the nature of the disruptions that the

organization has become exposed to. Often managers deal with 'just the next disruption', particularly if the disruption is sudden or high in scope. This framework can be used to take more of a strategic view of the nature of disruptions and by assessing where a focal organization sits on the disruptive space (DS) – and how it sits on the DS (concentrated or dispersed) – managers will be able to ask some fundamental questions about the vulnerabilities faced by the organization. The DS can also be used to benchmark a focal organization against competitors or other actors in the ecosystems, allowing an appreciation of why the organization has faced downward pressures on its operational strategy vis-à-vis others. Moreover, the DS can be used by managers at regular intervals over time to assess how the organization's vulnerabilities themselves evolve. It will be possible to plot the organization on the DS at a period of time following a given managerial intervention (e.g., re-configuration of the BE) in order to assess the effects on the organization's vulnerabilities.

Third, amongst all relational mechanisms identified in this study, the 'quality' relationship demonstrates the most influential factor on organizational resilience. In differing from the absolute sense of quality such as 'best', the quality relationship refers to a perceived value or reputation by stakeholders. This could be the firm's ability to resist unexpected shocks, the ability of innovation, or the ability of consistently delivering its commitments or meeting or exceeding their customer expectations even in an environment replete with difficulties. All of this contribute to a tightly coupled relationship because of an increasingly mutual trust over interactions between

organizations, which can buffer against disruption. This also highlights the importance of boundary-spanning roles in organizations in actively coordinating and managing the activity at boundary relationships external to the organization. As part of investment on manpower, resilience suggests that it is useful to develop dedicated teams in organizations that are fully engaged in responding to disruption through identifying resources, timely sharing the information and limiting routines in responding to unfamiliar disruptions or threats.

7.7 Future Research Agenda

To further expand the development of a relational perspective on organizational resilience, it is suggested to delve deeper into the variety of implications inter-organizational relationships can have for condition building within organizational resilience.

The role of boundary-spanning person and team. In organization and management, boundary-spanning is concerned with the process of how information emerging from the environment enter organizations upon which decision makers can draw in order to make appropriate decisions (Leifer & Delbecq, 1977). The boundary-spanning person, as a gatekeeper of an organization, acts at the interface between the organization and its environment in monitoring crucial environmental contingencies (Thompson, 1967). Although environment in general comprises everything (objective or perceived) outside the organization, scholars in the field of organization and management particularly focus on the task environment (Bourgeois, 1980; Dill, 1958; Duncan, 1972;) in which it comprises customers, suppliers,

competitors, regulatory groups and technology. In responding to a fast changing and complex environment, there is a dedicated team in organizations, which is commonly referred to as team boundary spanning (Marrone, 2010), in managing external relationships with a variety of the environmental constituents in order to cope with uncertainty (Thompson, 1967). Thus, the role of boundary-spanning is central to the ability of the organization in acquiring, processing and communicating relevant information, particularly when disruption occurs and that can generate a great level of uncertainty and ambiguity. As noted by Speckman (1979), the more turbulent the environment, the more central the role of boundary spanning in organizations. This is because the environment becomes known through the perceptions (Weick, 1979) on what we see, what we think and what we say. The microprocess information on disruption by the boundary-spanning person or team can have a profound influence on organizational resilience. For example, Maitlis & Sonenshein (2010) observed that a positive evaluation or interpretation can generate a powerful effect on organizations in the context of disruption through shared meaning and emtion to energize restorative action amongst their members. In contrast, when individuals negatively frame situations or events, it is likely to lead to negative outcomes on an organizational level (e.g., Staw, Sandelands, & Dutton, 1981; Luthans, Avey, Avolio, & Peterson, 2010). Notably, different organizations may take different approaches in responding to disruption, which could lead to either successful or unsuccessful outcomes. Yet, little insights have been offered

into the role of boundary-spanning in times of disruption and its power that affects the decision making of resilience strategy at the organizational level.

Relational boundary work in digital transformation. The open-systems perspective suggests that organizational boundary performs a key function in terms of controlling the degree of openness between the organization and its environment. As defined by Leifer & Delbecq (1977:41), organizational boundary refers to 'the demarcation line or region between one system and another, that protects the members of the system from extrasystemic influences and that regulates the flow of information, material, and people into or out of the system'. From the perspective of resilience, boundary work is important because it constitutes both barriers that can buffer against disruption and mechanisms that can facilitate the flow of a particular type of resource necessary for resilience in times of disruption. Katz & Kahn (1971) pointed out that boundaries in organizations include both pyshcial (e.g., geographical location) and psychological (e.g., visible symbols) boundaries (Katz & Kahn, 1971). Driven by existing theories, such as TCE and resource dependency theory, there is a fruitful research on competitive boundary that primarily focuses on how to improve firms' performance. This includes, for example, how economic activities between organizations are structured through hierarchical mechanisms (e.g., acquisition) or market mechanisms (e.g., outsourcing agreements) and how organizations can exercise power to control over crucial strategic relationships so as to manage uncertainty emerging from the interdependence.

However, the emerging technologies (e.g., Industry 4.0) driven by digital transformation have a profound impact on the way of how organizations operate. He, Meadows, Angwin, Gomes, & Child (2020) pointed out that such rapid technological changes have been re-shaped new industrial structures in which actors in the value chains are seamlessly interconnected with middle parties on the fasting decrease. Jacobides, Cennamo, & Gawer (2018: 2258) referred this to as 'new structures of economic relationships.' The phenomenon of interdependence and interconnection amongst actors in non-linear and non-hierarchical patterns challenge the assumptions of existing theories on how organizations create value or capture value. For example, all actors including peripheral actors equally retain residual control of the value in the ecosystems, even though they are not equally essential (Jacobides, Cennamo, & Gawer, 2018). Boundaries amongst organizations become more permeable and blur because of digital transformation. On the one hand, organizations become more integrated into the environment, and on the other hand, they are more vulnerable because of more external influences that raise a greater level of uncertainty. Future research can build on the findings of relational mechanisms in this study and further explore how they shape boundaries that lead to resilience, especially those adopting the technology of non-physical labors (robots and automation).

Methodology in studying organizational resilience. A case-based approach is a common method in studying organizational resilience in a particular situation (disasters or accidents, which has raised a question of the

transferability of insights (Linnenluecke, 2017) because such fully blown events are not common. This study has attempted to address this issue by studying organizational resilience in the context of a general business environment. This study did not directly observe firms' behaviors in terms of preparing for, responding to and recovering from disruptions in real time. As is well documented in the literature, interview data may be subject to biases resulting from retrospective sense-making and impression management (Eisenhardt & Graebner, 2007). To avoid these biases, this study employed the Fuzzy Cognitive Mapping methods in the second round of interview and this allows to validate and triangulate statements in the first round of interview. Surprisingly, the results are consistent when respondents spoke about how their organizations manage disruptions and I believe that this study paints an accurate picture of organizational resilience in Chinese business environment. It is suggested that, building on the findings, future study should investigate whether or not these findings are applicable in different cultural and national contexts through survey or experiments. To further explore how these mechanisms work, future studies should employ a longitudinal and ethnographic technique to observe how firms develop or reinforce their external relationships with other organizations in building resilience in their organizations over time

The Chinese perception of and responses to relationship. Rooted in Confucian philosophy, relationships in the Chinese society are governed by 'ren' （仁） – benevolence or humanity. The Chinese character of benevolence (仁, ren) is comprised of two morphemes: 'two' (二, liang or er) and 'human' (人, ren), with its pronunciation being the same as the character of 'human' (人: ren). Thus, the basic unit of the Chinese society is the family (家: jia) rather than a single human being. As interpreted by Chen (2014), 'ren' as humanity is a manifestation of the ideas of duality and relativity emphasizing that "no person exists except in relationship to another" (p. 123). Not only does the family provide the foundation of the society (Grayling, 2020), but it also provides the context where to learn filial piety in terms of how to treat one's parents and ancestors and brotherly and sisterly kindness within the family members, which help to develop one's emotional attitude toward benevolence in the first place.

The conception of benevolence provides conditions under which virtues originate, including righteousness (义: yi), ritual propriety (礼: li), wisdom (智: zhi), trustworthiness (信: xin) and filial piety (孝: xiao). The first two virtues refer to moral principles in terms of how humans should act, such as "altruistically as opposed to selfishly, according to social obligations and duties as opposed to individual instincts, morally as opposed to instrumentally to seek material benefits" (Yang, Peng, & Lee, 2008, p. 34). Wisdom, indeed, highlights the learning ability of humans that helps to understand the abstract knowledge (benevolence, righteousness and ritual propriety) and then apply

them in real situations. As explained by Fei, who is the Chinese anthropologist and sociologist,

"Most forms of human behavior are not predetermined by innate physiological reactions [⋯] learning is exactly that process by which human beings, from the time of their birth, reshape their instincts, making them fit man-made behavioral moulds" (Fei, Gary, & Wang, 1992, p.53).

Trustworthiness is regarded as a reflexive benevolence in reality or an outcome of benevolence, which can be achieved by practice. Practice is often referred to as training (Fei, Gary, & Wang, 1992) in a sense that repetitively applies these moral principles on one's daily life until a new routine has been ingrained. The quality of trustworthiness is often judged by the adherence and consistency between what people say and what people do (言行一致: yan xing yi zhi) that are loyal to moral principles.

The logic of being benevolent to be human （仁者人也：ren zhe ren ye）and to love human (仁者爱人: ren zhe ai ren) in the Confucian society differs from the logic of wealth maximization (Friedman, 2007; Jensen, 2002) that deeply influences the way of how the capitalist society is structured and operates. For instance, the governance system in the capitalist society relies on the economic and legal institutions that put restrictions on the behaviour of economic actors, such as profit-oriented businesses, to ensure their contributions to the well-being of society (Scherer & Voegtlin, 2020), whereas, in the Confucian society, the guiding principle of all activities regardless of politics, economics or military defence is based on the priority

and superiority of humans who are viewed as the foundation of governance (民本, min ben) (Yang, Peng, & Lee, 2008).

Collectively, it forms a foundation of guanxi or interpersonal relationships, which play a bigger role in coordinating commercial activities before formal institutions (e.g., legal systems) introduced in China. There is a body of literature that examines the impact of top managers' social ties (guanxi) on organizational performance (Luo, 2003). As Park and Luo (2001) note, Chinese firms develop guanxi as a strategic mechanism to overcome competitive and resource disadvantages by cooperating and exchanging favours with competitive forces and government authorities. Compared with Chinese firms, foreign-controlled firms have a competitive disadvantage when utilizing managerial ties at a similar level (Li, Poppo & Zhou, 2008). In the face of intense competition, the utilization of guanxi is less effective for fostering organizational performance (Li, Poppo & Zhou, 2008; Park & Luo, 2001).

Following China's economic and institutional reform, economic-based mechanisms (e.g., contracts, legal systems) have emerged governing the inter-organizational transactions. The role of guanxi in business has gradually shifted from a necessary and determining factor in relationships to a complementary role coexisting with contractual governance mechanisms (Zhang & Keh, 2009). As noted by Luo (2006), economic-based mechanisms provide a legal and institutional framework within which social-based forces proceed, while social-based mechanisms (e.g., guanxi) redress the deficiency of economic-based ordering in a socially confined economic structure.

Despite the acknowledgement of two broad types of mechanism– economic– and social–based mechanisms – that coexist in China facilitating the inter-organizational exchanges, the study of IORs in Chinese context, to date, has remained largely unexplored, such as attributes and dynamics of IORs in addition to coordination mechanisms. For example, Meuer (2014) finds different types of interdependency (e.g., organic coalitions, bureaucratic foundations, intense coalitions and reciprocal foundations) in the study of China's biopharmaceutical industry.

The Chinese perception on disruption and resilience. Disruption in the Chinese context is largely viewed as situations that, on the one hand, give rise to risk and uncertainty threatening organizational survival, and on the other hand, provides an opportunity. The situational variation in organizations reflects on the fragmented literature in organizational disruption. As noted in my thesis, there are many different terms (e.g., 'environmental jolt', 'surprise', 'extreme contexts', 'threat') used to describe a situation that leads to a discontinuity or impairment of operational strategies of the organization either temporarily or permanently.

To cope with situational variations, it has promoted the dialectic perspective to encourage a holistic thinking of the full reality. For example, thinking positively while you are in a difficult situation and considering your weakness while you are in a strong position, and vice versa (Lee, Yang, & Wang, 2009). This is consistent with the prominent theme in the resilience literature emphasizing the cognitive capability endowment that can shape the capacity for positive adjustment in the face of adversity (Williams, Gruber,

Sutcliffe, Shepherd, & Zhao, 2017). Moreover, applying the dialectic perspective also provides a useful tool to boil down a complex situation into actionable items, which is one of core capabilities to build skilful resilience in organizations amid unceratinty (You, Vu, & Williams, 2020).

The holistic thinking suggests that, on the one hand, organizations need to have the rigidity of organizational structure and discipline, and on the other hand, organizations need to be flexible like water because of the dynamic and evolutionary nature of situations. More specifically, such flexiblity can be achieved by fully empowering people in attending the situation and acting in accordance with the 'Way' or 'Dao'. In extremely disrupted contexts (e.g., war, natural disasters), research shows that, compared to the bureaucractic organizaiton, temporary groups or organizations are more efficient in responding to needs on the ground and improvising the situation in the short-term (Hallgren, Rouleau, & Rond, 2018). As noted by Hallgren, Rouleau, & Rond (2018), a catastrophic event results from a chain of small events preceding the acute stage, such as erronesous assumption, optimistic evaluation and unnoticed. One possible cause, according to Konig, Graf-vlachy, Bundy, & Little (2020), is a frequent over-action of leaders in the organization that leads to members' insensitive to true crises. Thus, leader's self-cultivation through reflexive learning and continuous practice is key to find the right balance between management control and empowerment. In doing so, it enables members in organizations

to become more engaged in sharing and interpreting the emerging situations

so as to construct meanings for effectively responding to disruption.

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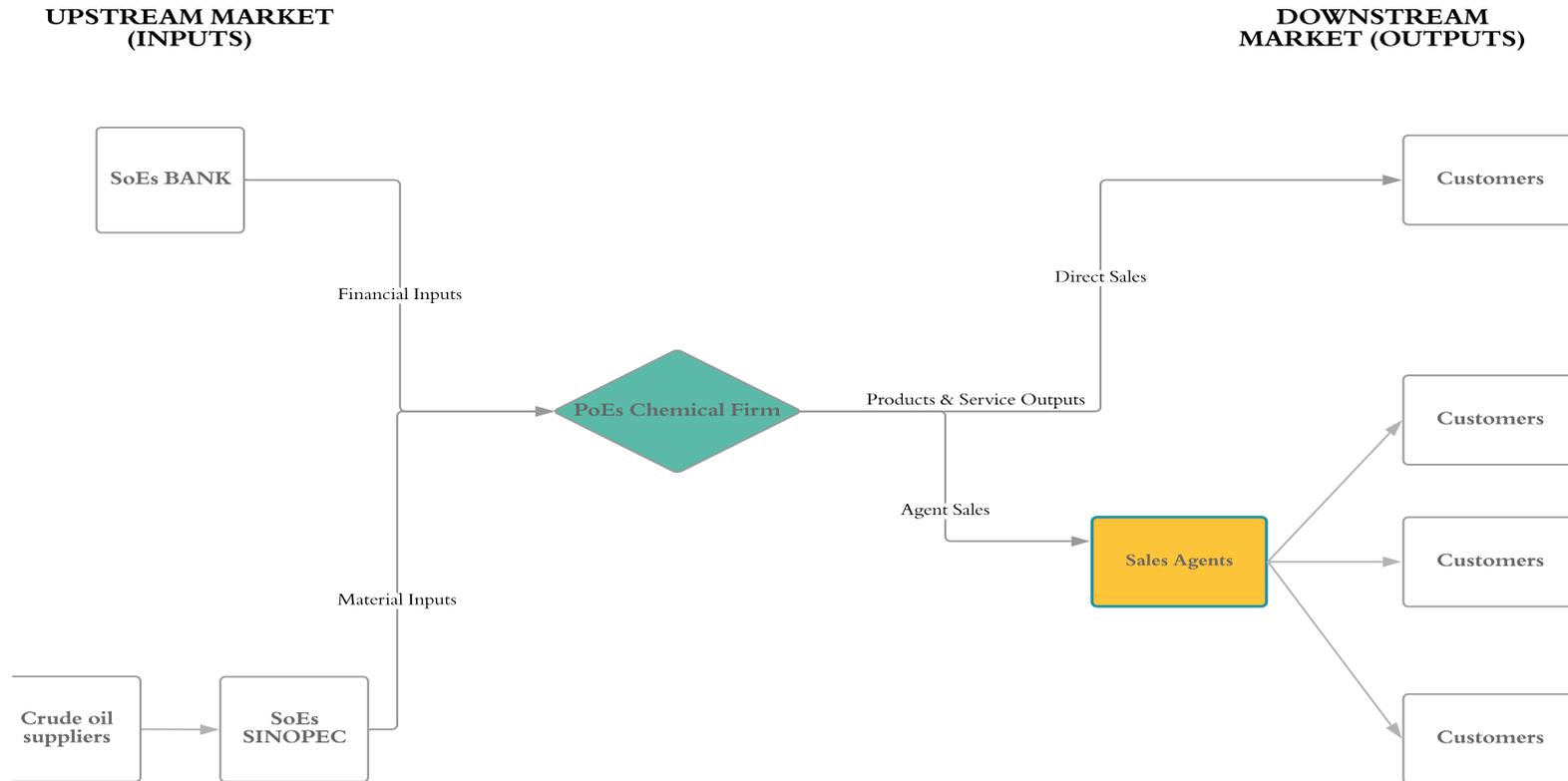
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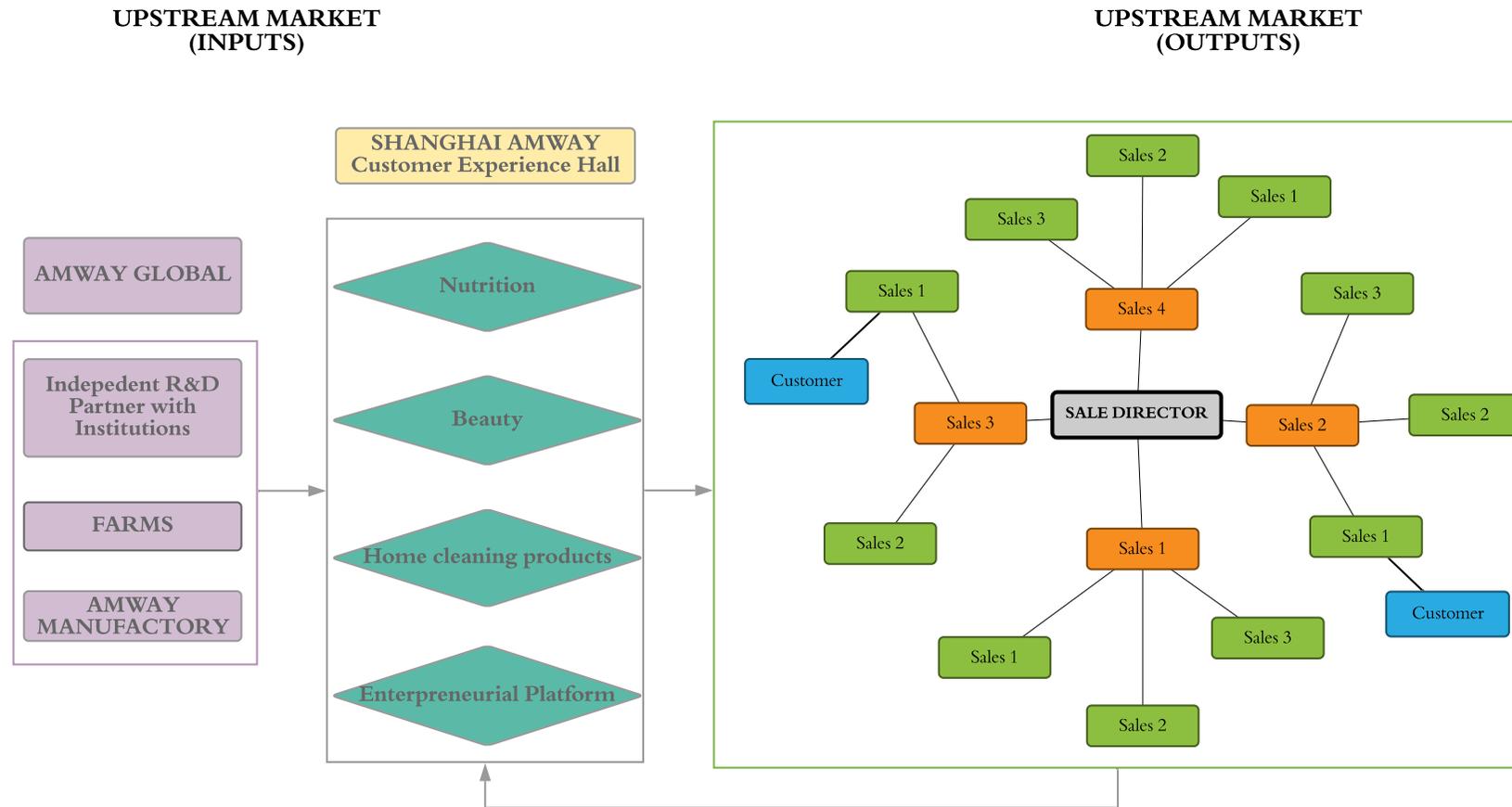
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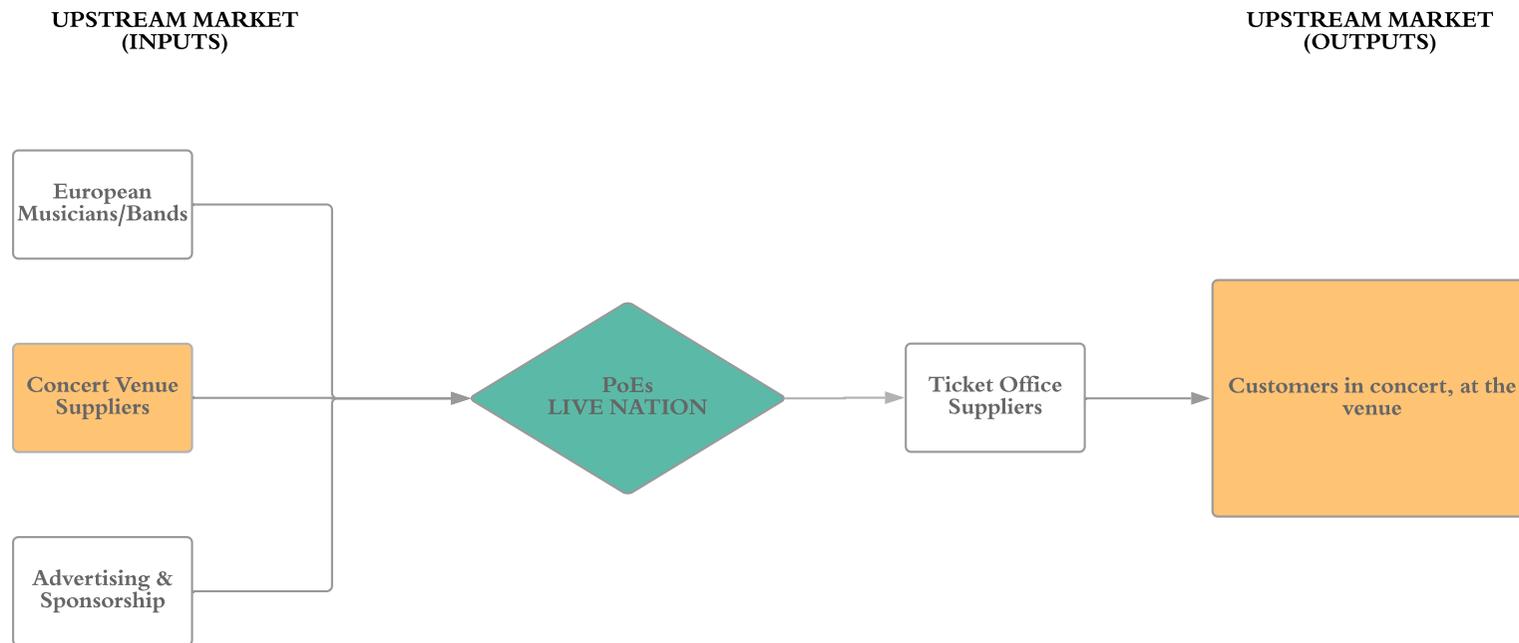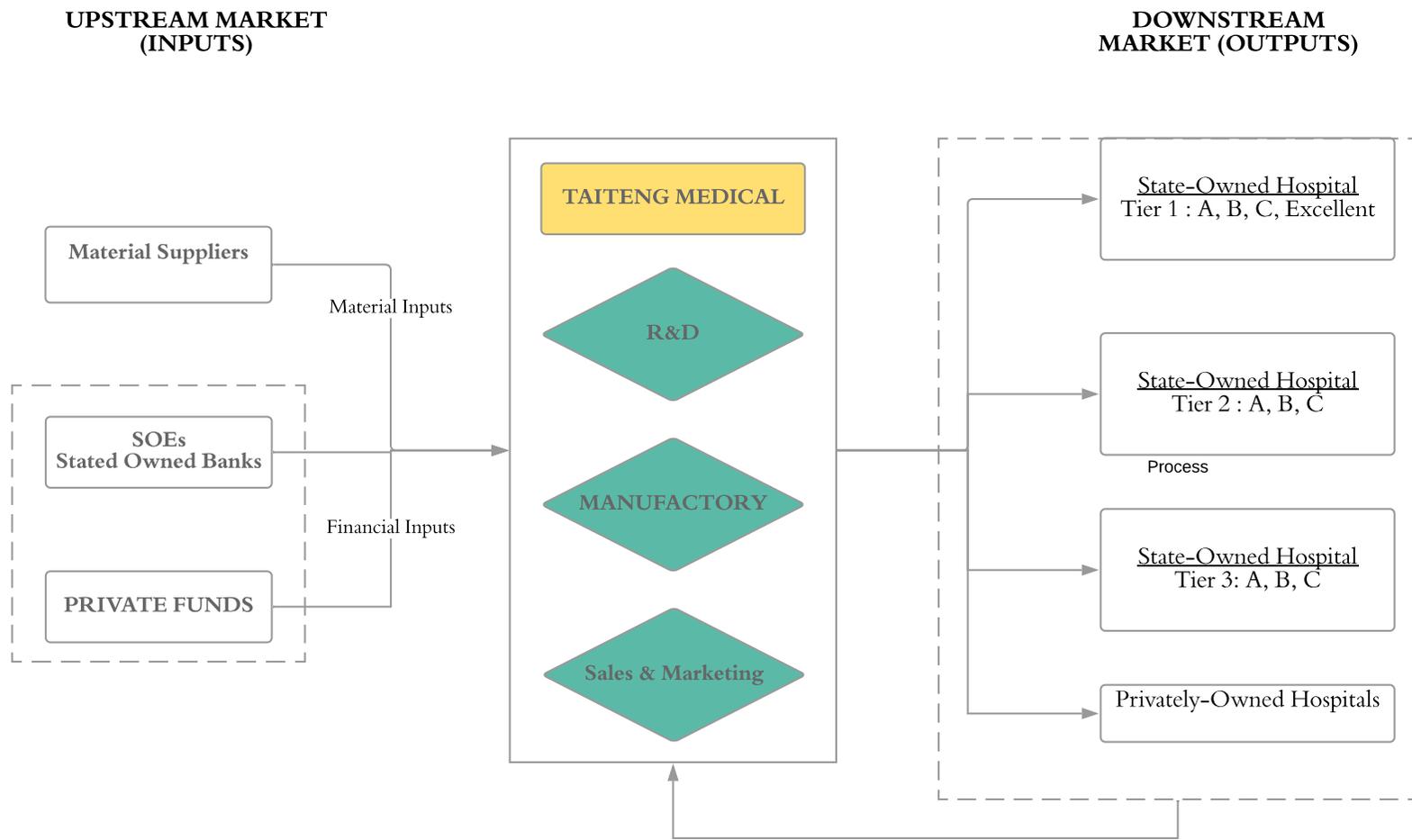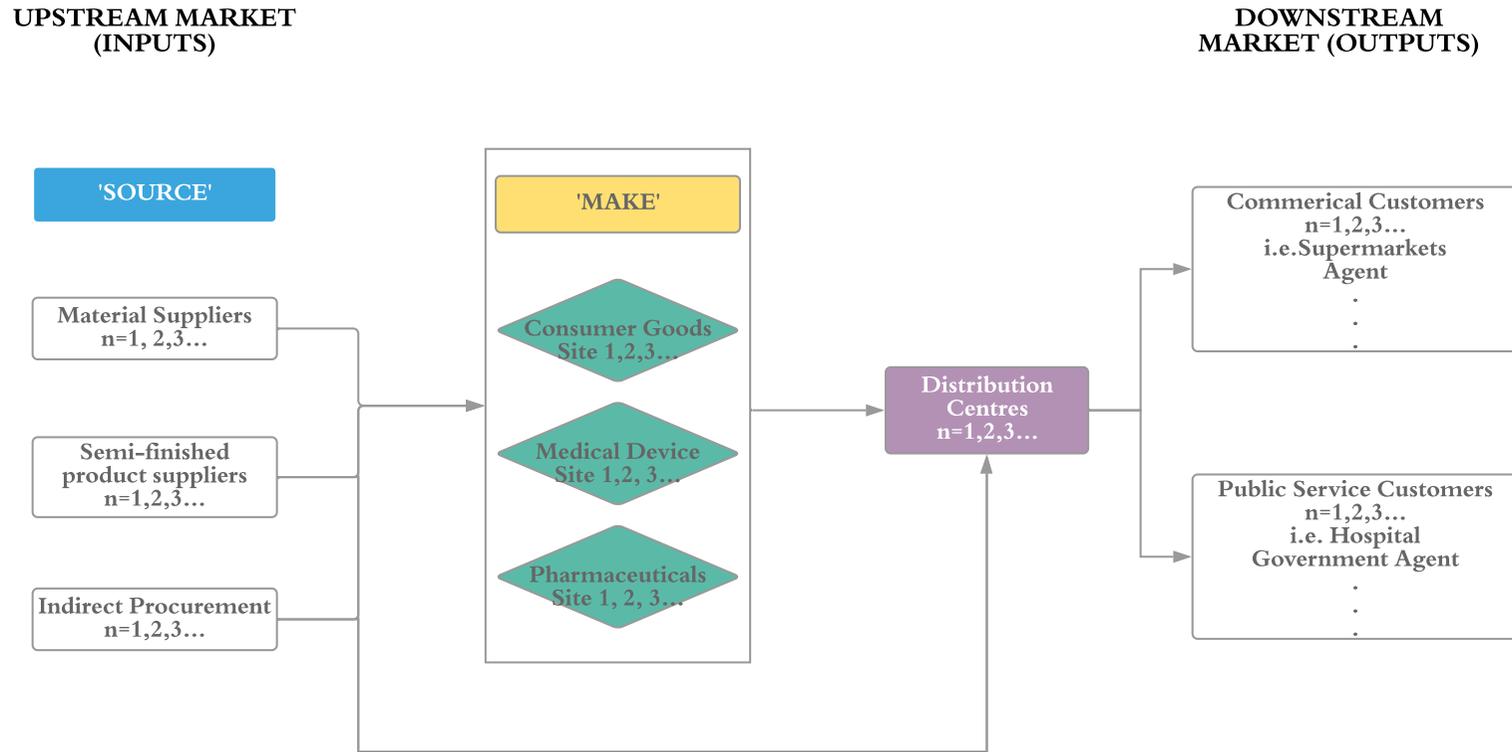
APPENDICES

UPSTREAM MARKET
(INPUTS)

DOWNSTREAM
MARKET (OUTPUTS)

SoEs BANK

Financial Inputs

PoEs Chemical Firm

Crude oil suppliers

SoEs SINOPEC

Material Inputs

Products & Service Outputs

Direct Sales

Agent Sales

Sales Agents

Customers

Customers

Customers

Customers

Appendix 1 Case 1 system map

**UPSTREAM MARKET
(INPUTS)**

**UPSTREAM MARKET
(OUTPUTS)**

SHANGHAI AMWAY
Customer Experience Hall

AMWAY GLOBAL

Indepedent R&D
Partner with
Institutions

FARMS

AMWAY
MANUFACTORY

Nutrition

Beauty

Home cleaning products

Enterpreneurial Platform

Sales 2
Sales 1
Sales 3
Sales 1
Sales 3
Sales 4
Sales 3
Customer
Sales 3
SALE DIRECTOR
Sales 2
Sales 2
Sales 2
Sales 1
Sales 1
Customer
Sales 3
Sales 1
Sales 2

Appendix 2 Case 2 system map

Appendix 3 Case 3 system map

UPSTREAM MARKET
(INPUTS)

DOWNSTREAM
MARKET (OUTPUTS)

TAITENG MEDICAL

Material Suppliers

Material Inputs

R&D

MANUFACTORY

Sales & Marketing

SOEs
Stated Owned Banks

Financial Inputs

PRIVATE FUNDS

State-Owned Hospital
Tier 1 : A, B, C, Excellent

State-Owned Hospital
Tier 2 : A, B, C

Process

State-Owned Hospital
Tier 3: A, B, C

Privately-Owned Hospitals

Appendix 4: Case 4 system map

UPSTREAM MARKET
(INPUTS)

DOWNSTREAM
MARKET (OUTPUTS)

'SOURCE'

'MAKE'

Material Suppliers
n=1, 2,3…

Semi–finished
product suppliers
n=1,2,3…

Indirect Procurement
n=1,2,3…

Consumer Goods
Site 1,2,3…

Medical Device
Site 1,2, 3…

Pharmaceuticals
Site 1, 2, 3…

Distribution
Centres
n=1,2,3…

Commerical Customers
n=1,2,3…
i.e.Supermarkets
Agent
.
.
.

Public Service Customers
n=1,2,3…
i.e. Hospital
Government Agent
.
.
.

Appendix 5: Case 5 system map
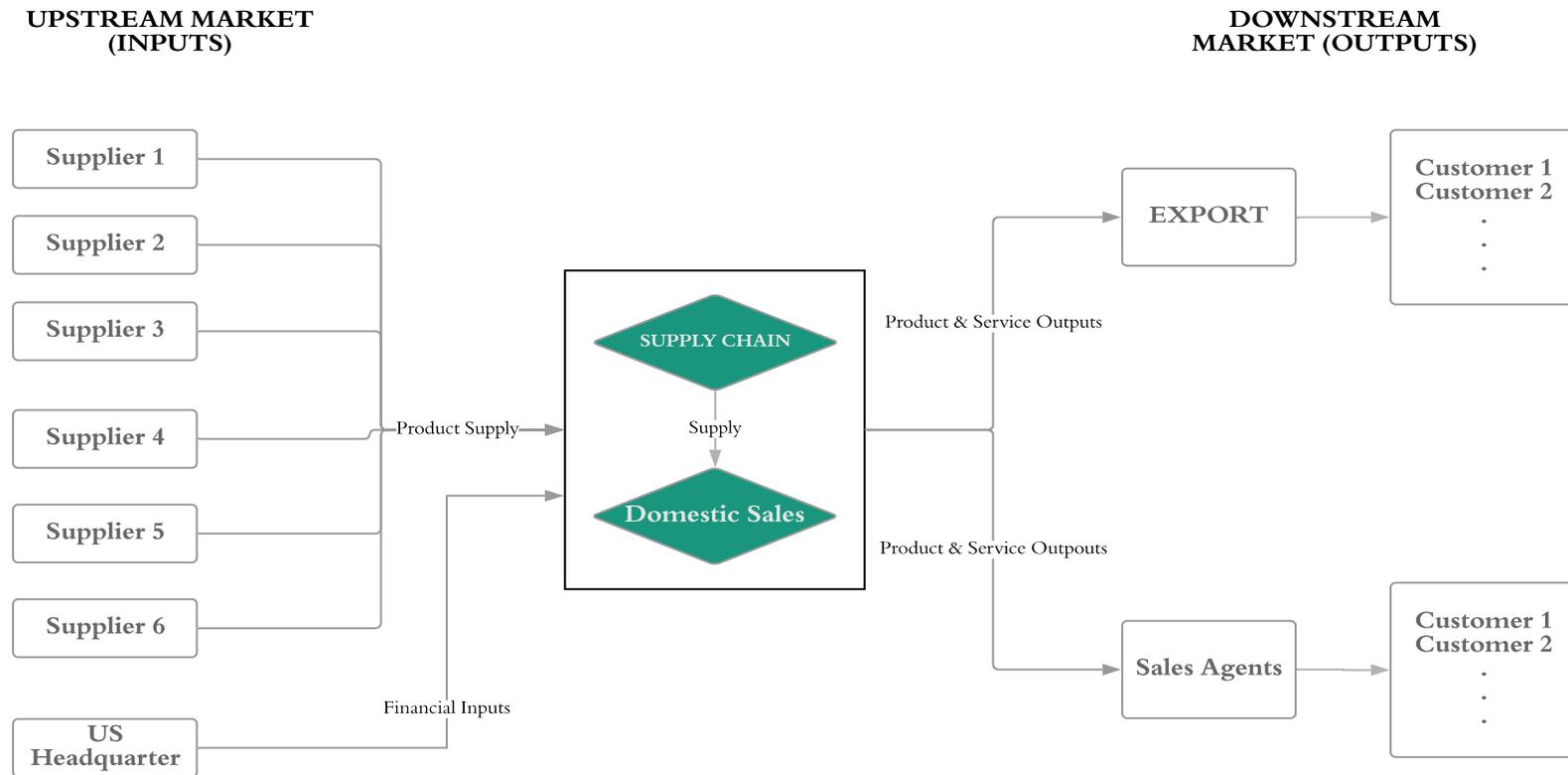
Appendix 6: Case 6 system map

UPSTREAM MARKET
(INPUTS)

DOWNSTREAM MARKET
(OUTPUTS)

Customer clusters

Google Andriod Open Source

LOCAL LABOUR MARKET

Ventural Captial

Technology

Labor

Financial Inputs

PoEs Software Developer

PoEs Mobile Device Manufactories

SoEs China Mobile China Unicom

PoEs Sales Agents
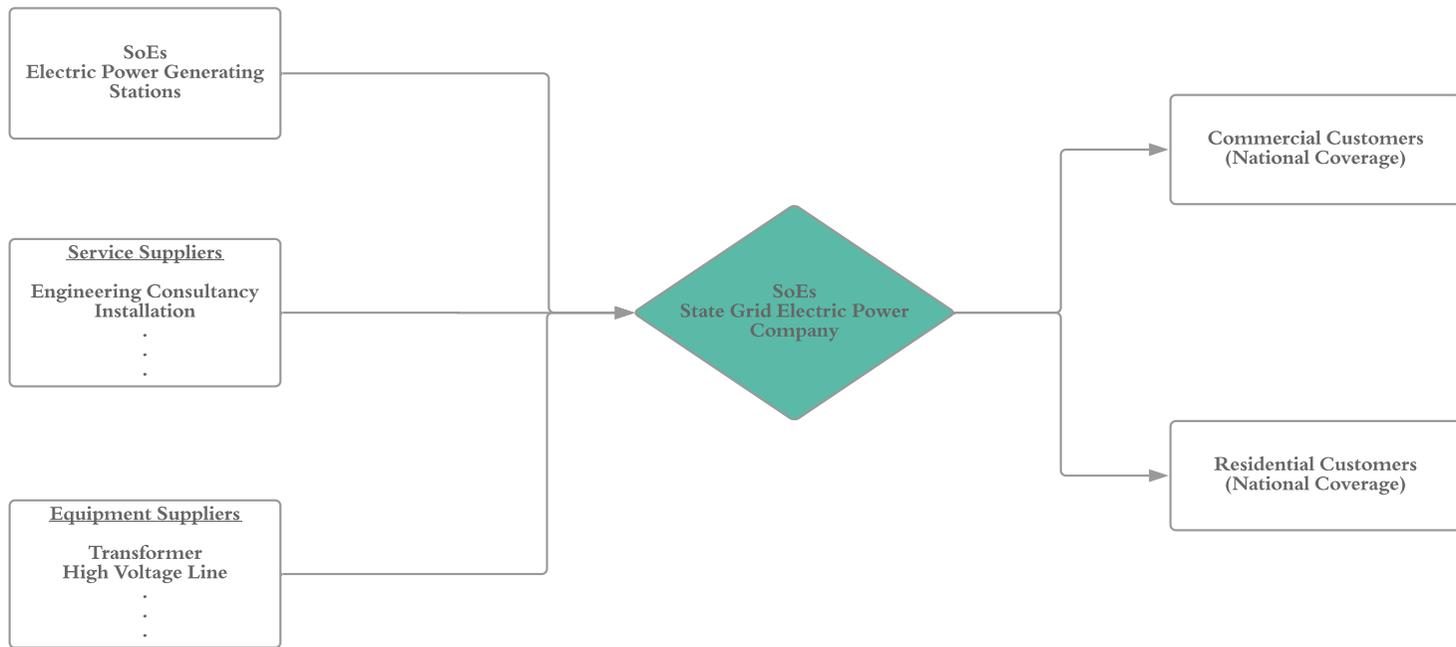
Direct Sales

Export

Online Sales

Offline Sales
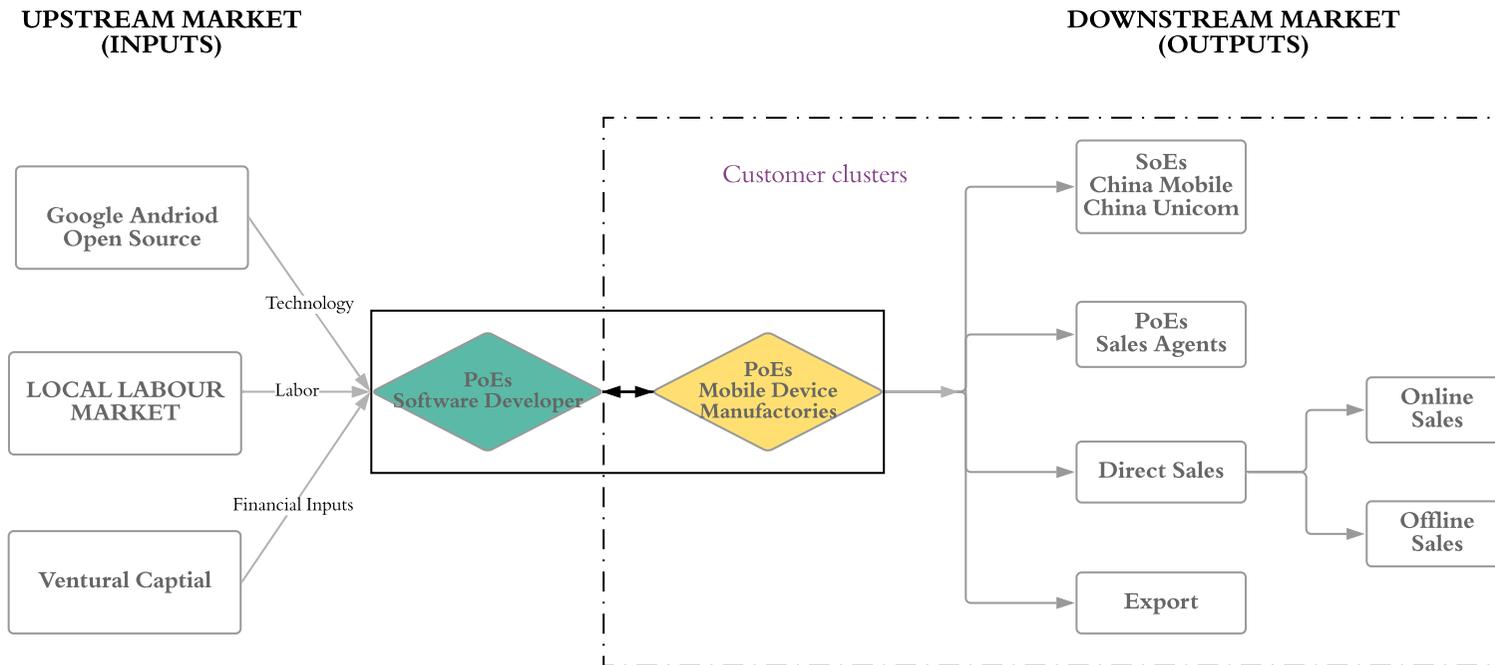
Appendix 7: Case 7 system map
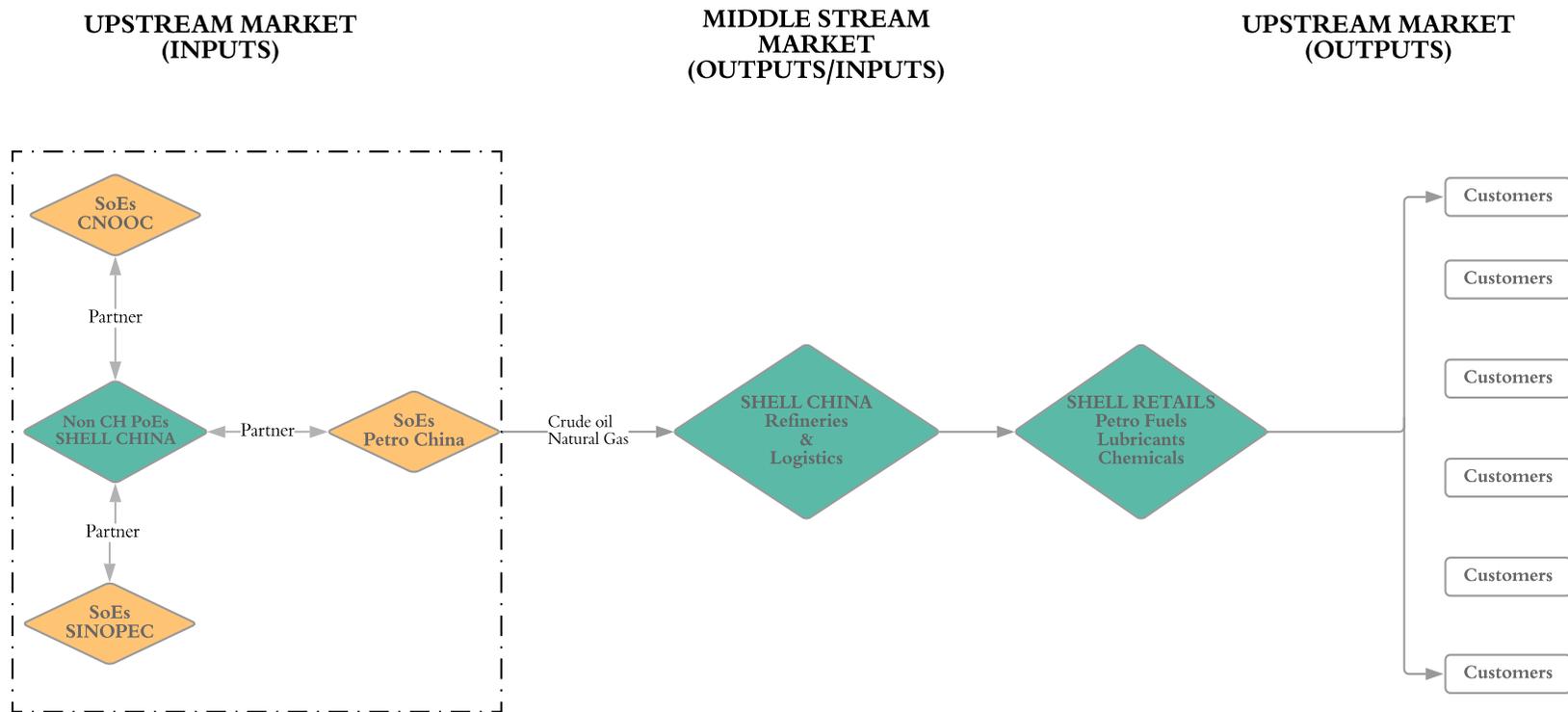
Appendix 8: Case 8 system map

**UPSTREAM MARKET
(INPUTS)**

**DOWNSTREAM
MARKET (OUTPUTS)**

Material Suppliers

Labour Force

SOEs
Stated Owned Banks

PRIVATE FUNDS

Material Inputs

Financial Inputs

PoEs
ROCK PRECISION
MANUFACTORY

MP
Pettroleum Equipment

MP
Aero Engine

MP
Nuclear Power

Export

Export/Domestics

Halliburton U.S.A

Process

Others

Feedback
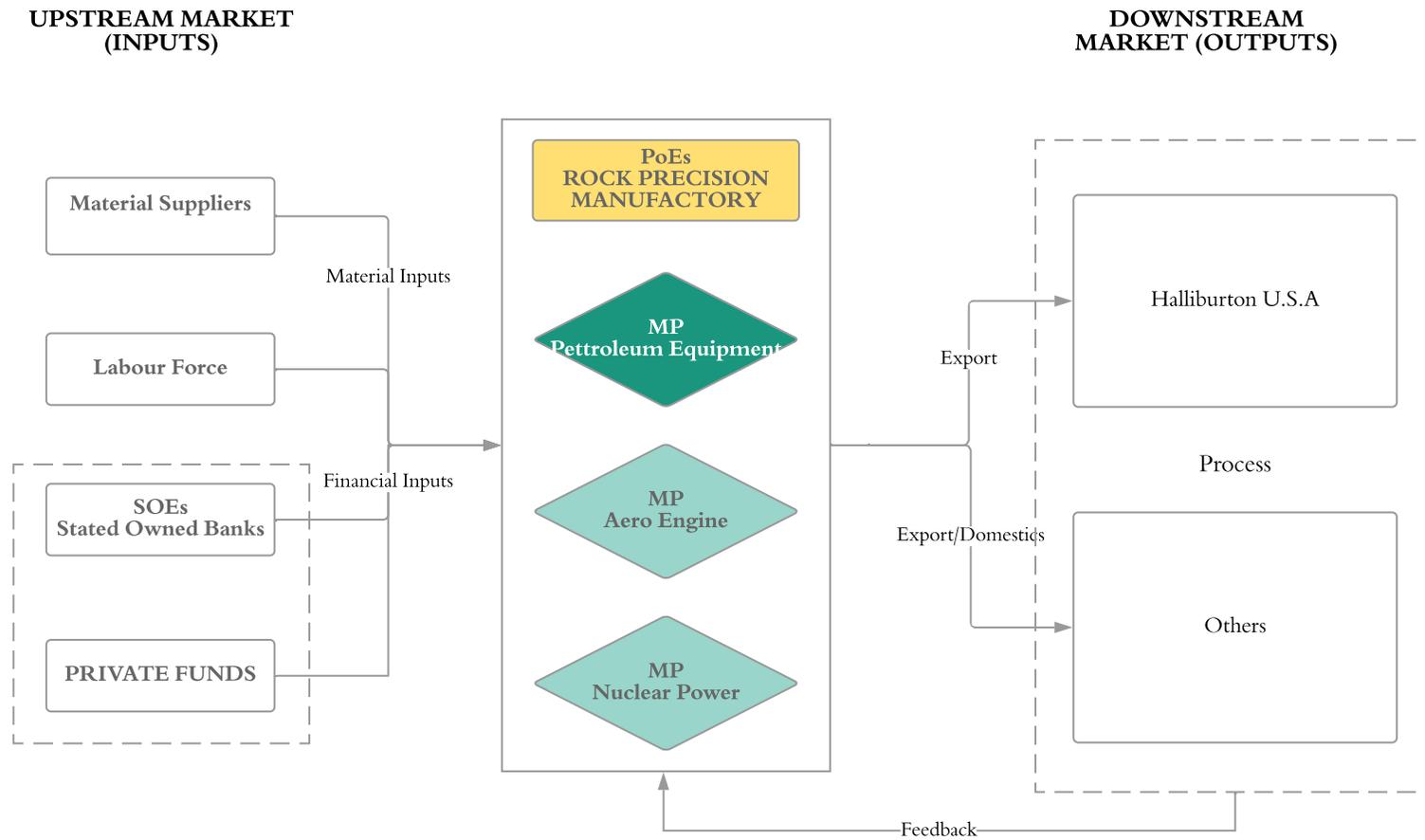
Appendix 9: Case 9 system map
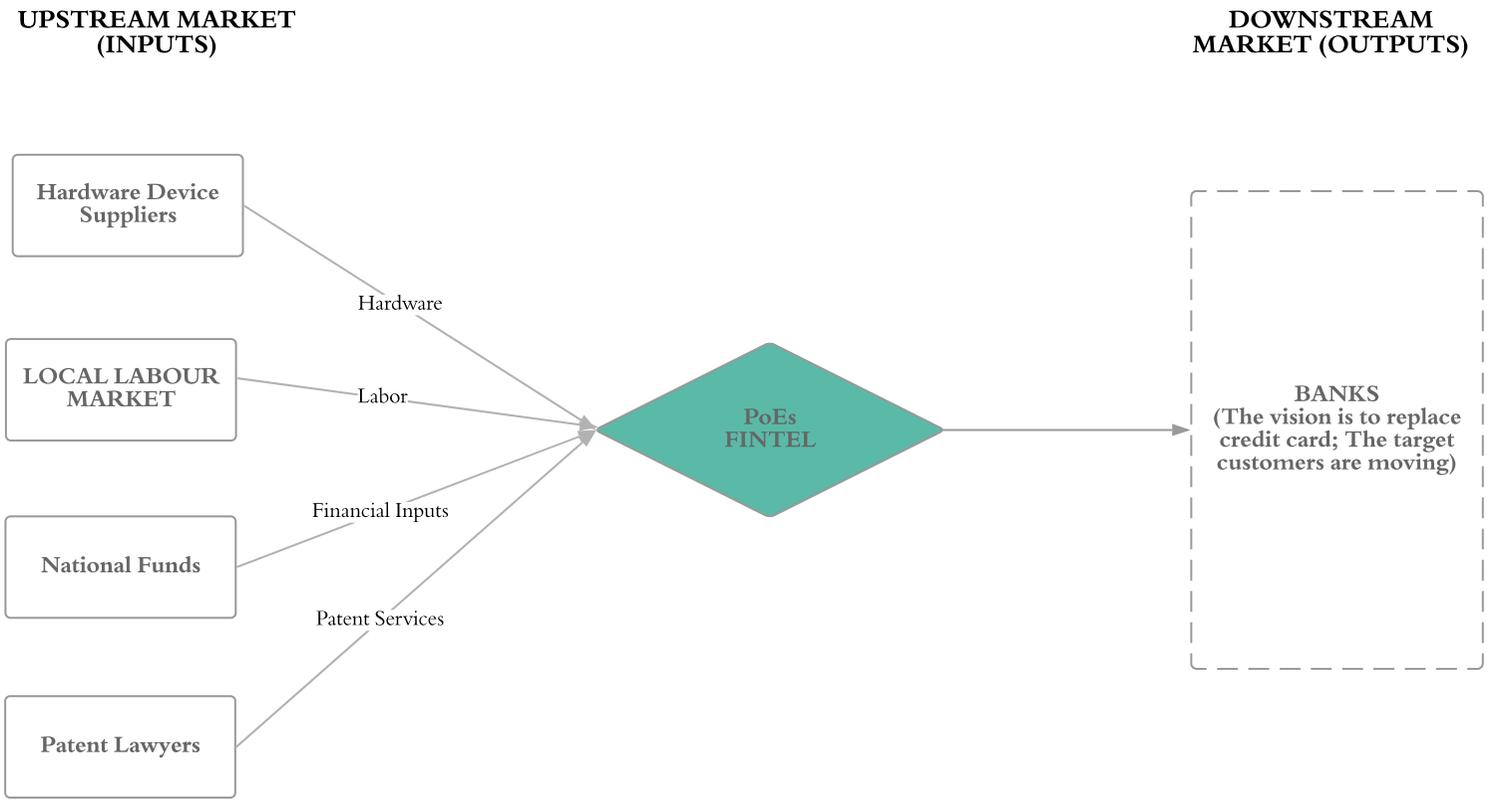
Appendix 10: Case 10 system map
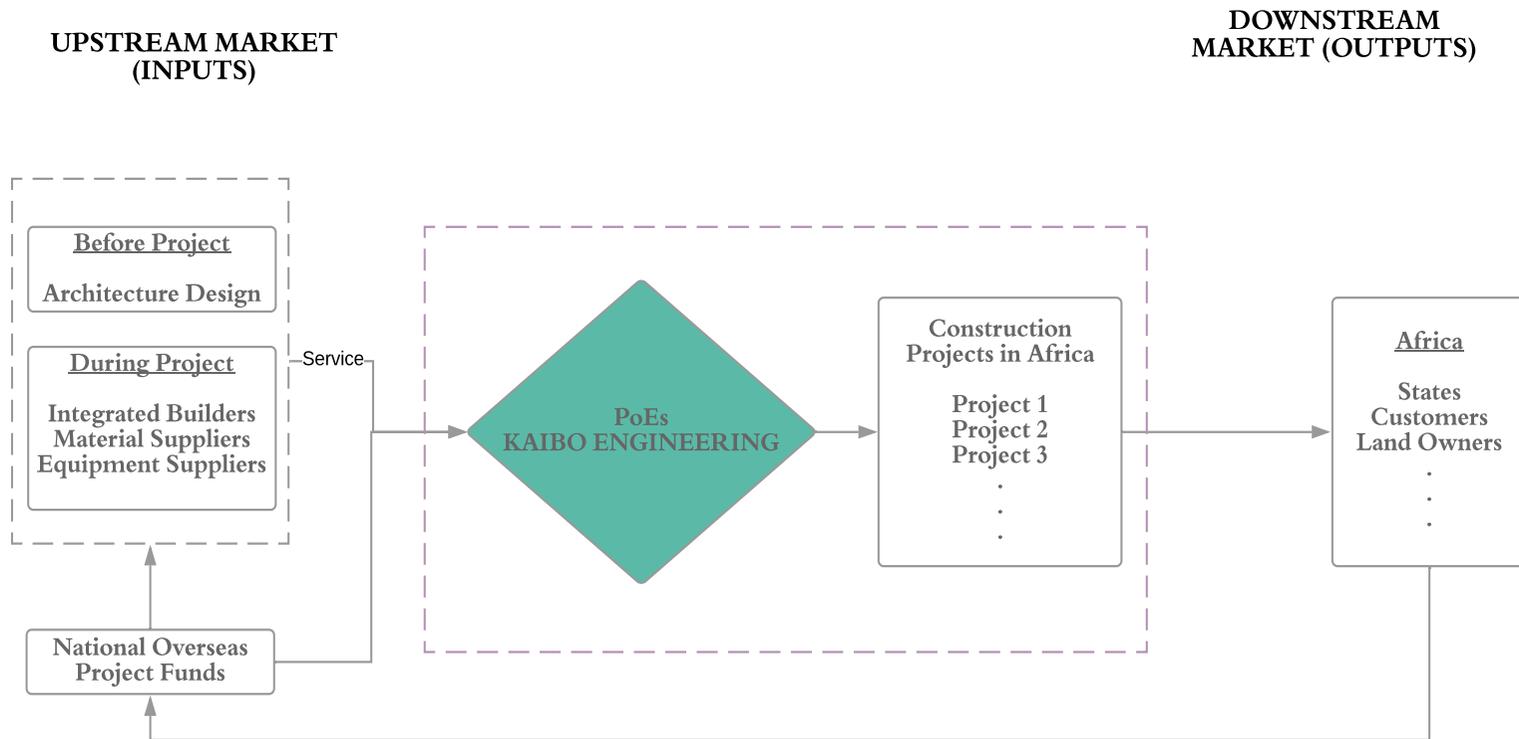
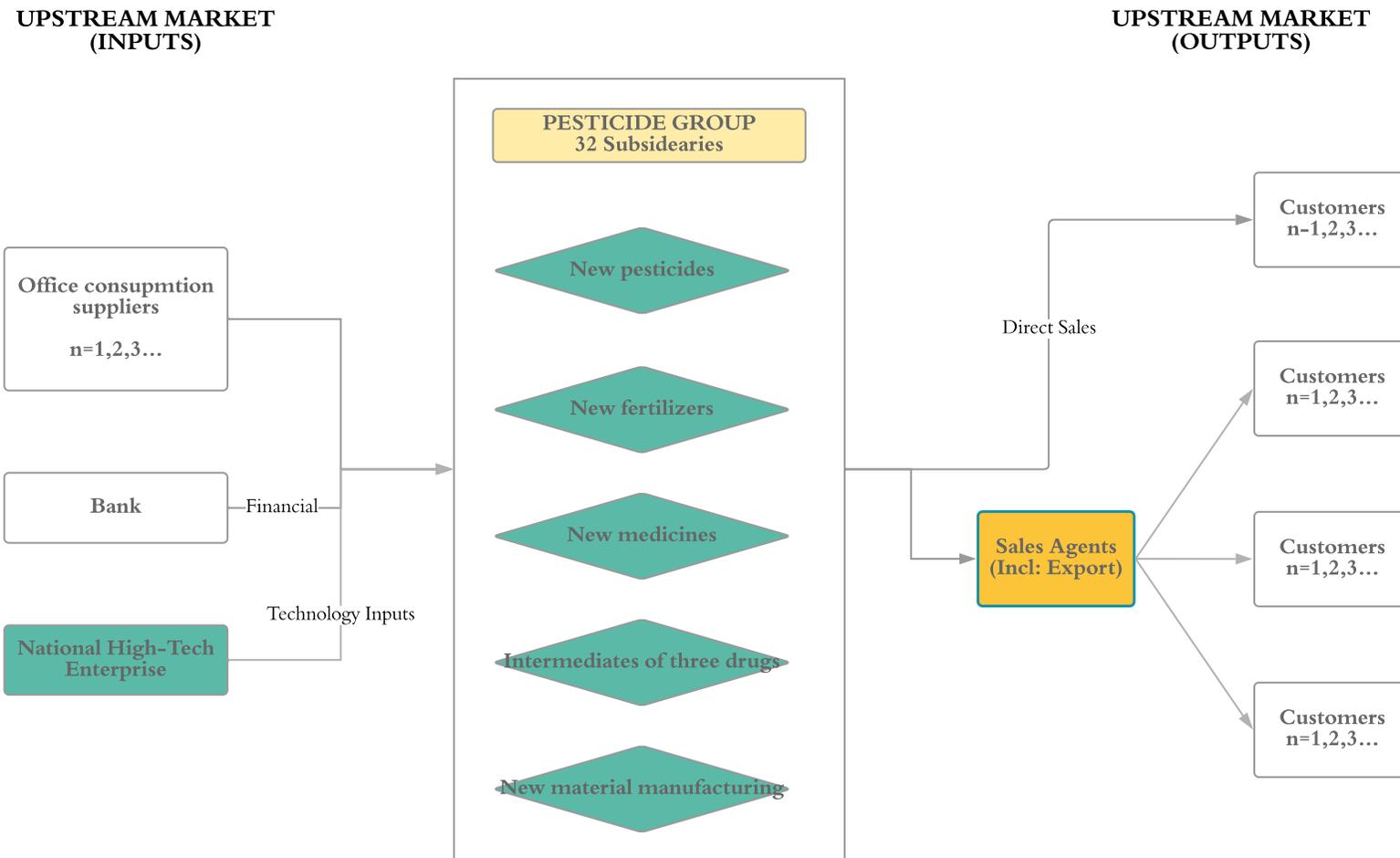Appendix 11: Case 11 system map
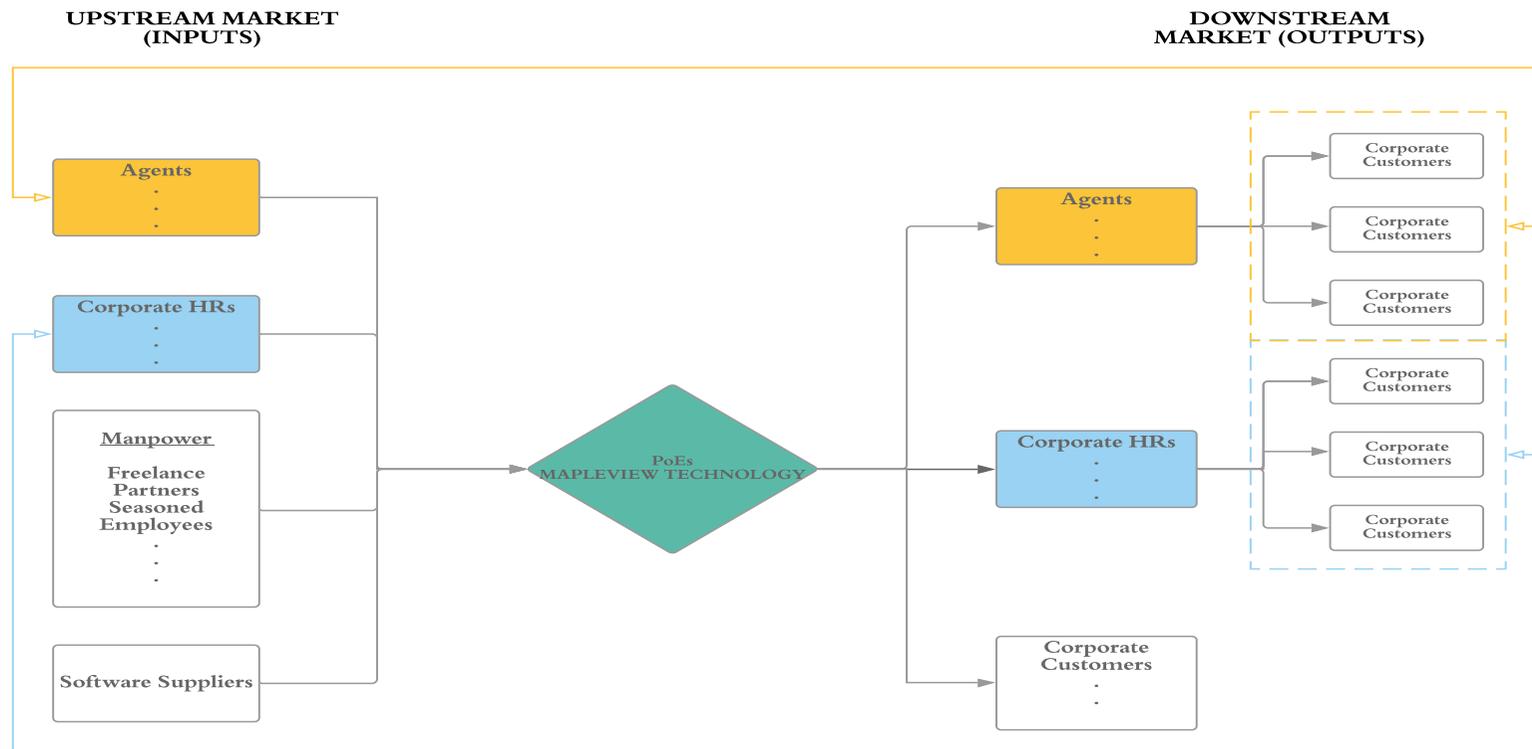
Appendix 12: Case 12 system map
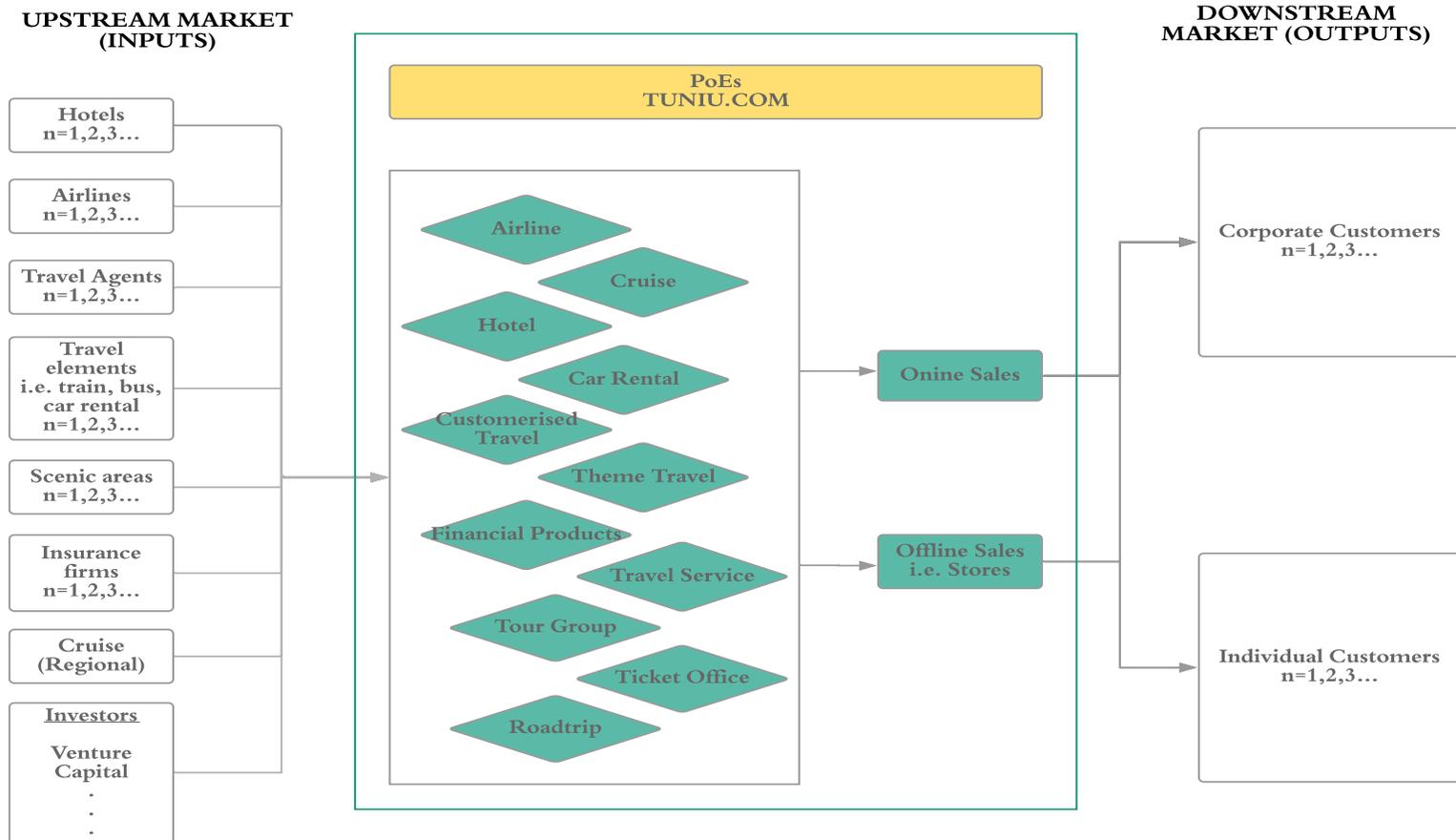
Appendix 13: Case 13 system map
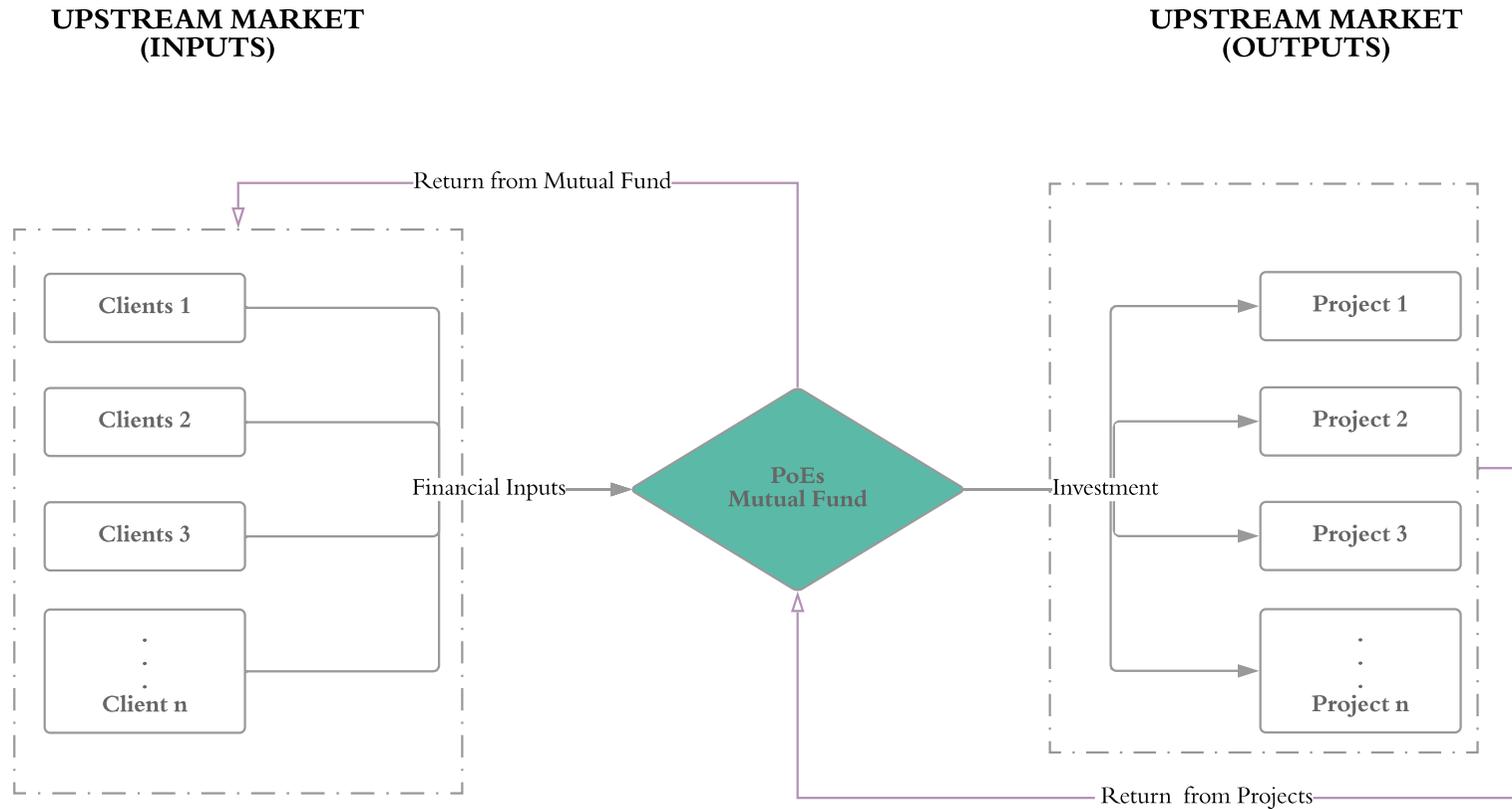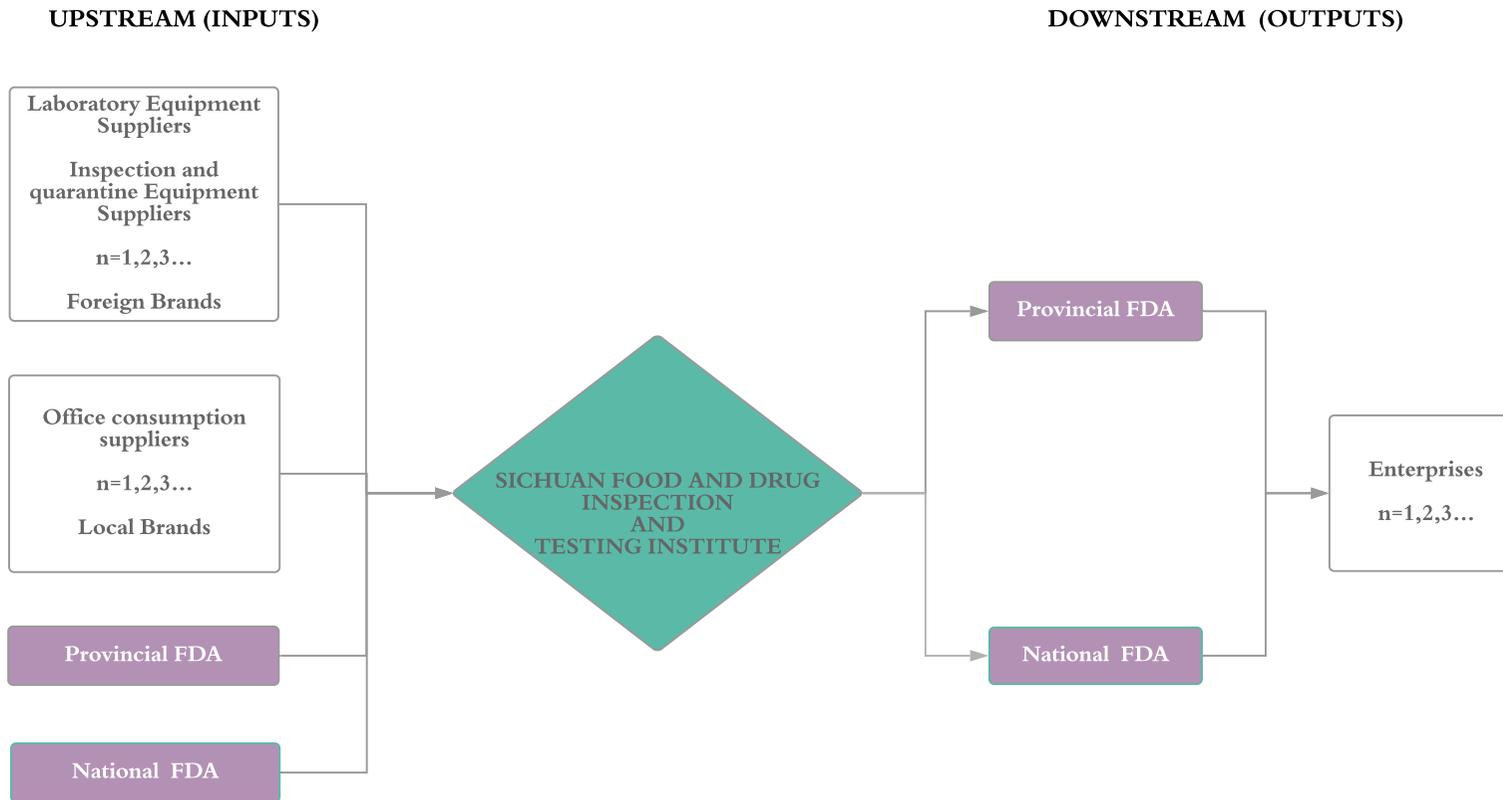
**UPSTREAM MARKET
(INPUTS)**

**DOWNSTREAM
MARKET (OUTPUTS)**

SoEs
Electric Power Generating
Stations

Service Suppliers

Engineering Consultancy
Installation
.
.
.

Equipment Suppliers

Transformer
High Voltage Line
.
.
.

SoEs
State Grid Electric Power
Company

Commercial Customers
(National Coverage)

Residential Customers
(National Coverage)

Appendix 14: Case 14 system map

Appendix 15: Case 15 system map

**UPSTREAM MARKET
(INPUTS)**

**UPSTREAM MARKET
(OUTPUTS)**

Appendix 16: Case 16 system map

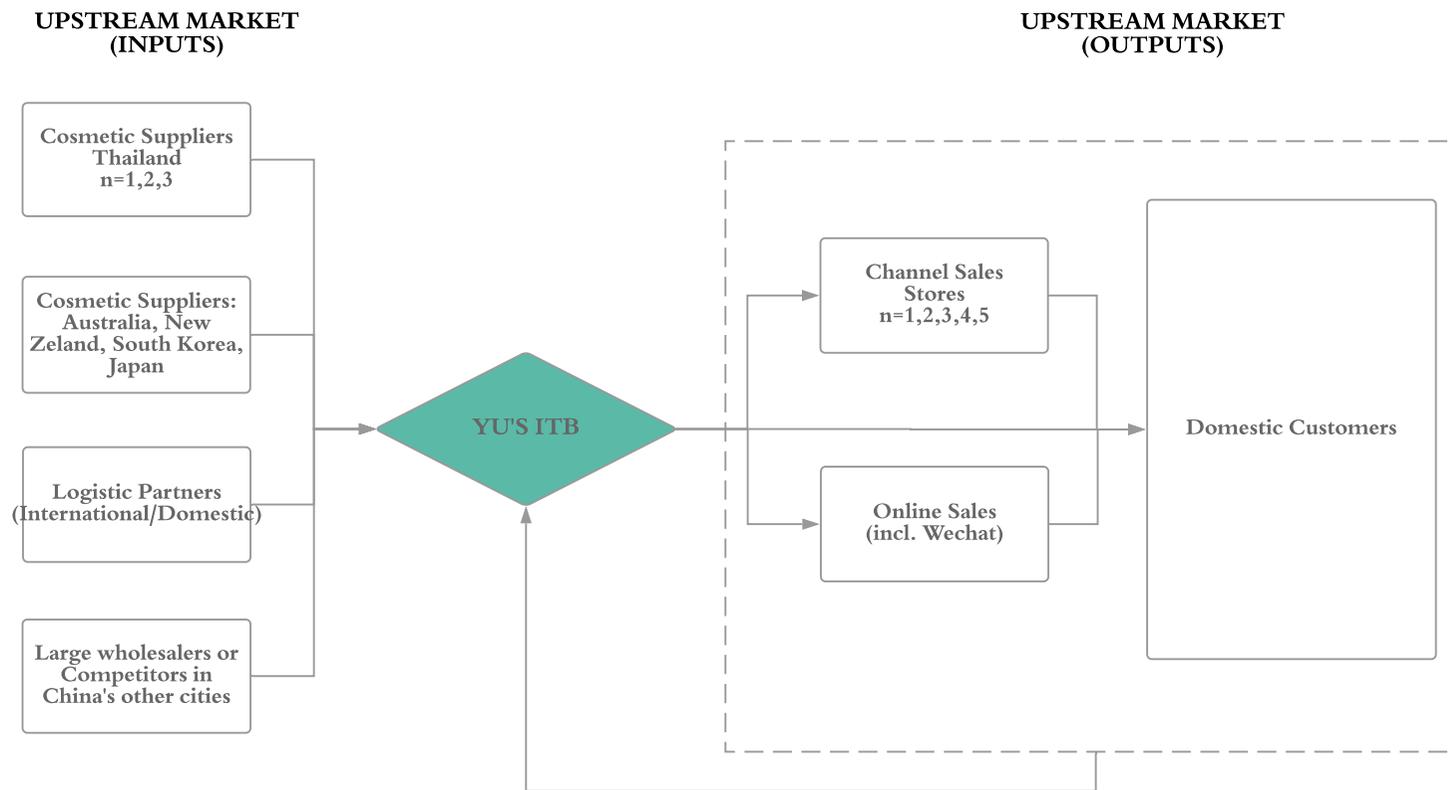UPSTREAM (INPUTS)   DOWNSTREAM (OUTPUTS)

Appendix 17: Case 17 system ma

UPSTREAM MARKET
(INPUTS)

UPSTREAM MARKET
(OUTPUTS)

Cosmetic Suppliers
Thailand
n=1,2,3

Cosmetic Suppliers:
Australia, New
Zeland, South Korea,
Japan

Logistic Partners
(International/Domestic)

Large wholesalers or
Competitors in
China's other cities

YU'S ITB

Channel Sales
Stores
n=1,2,3,4,5

Online Sales
(incl. Wechat)

Domestic Customers

Appendix 18: Case 18 system map
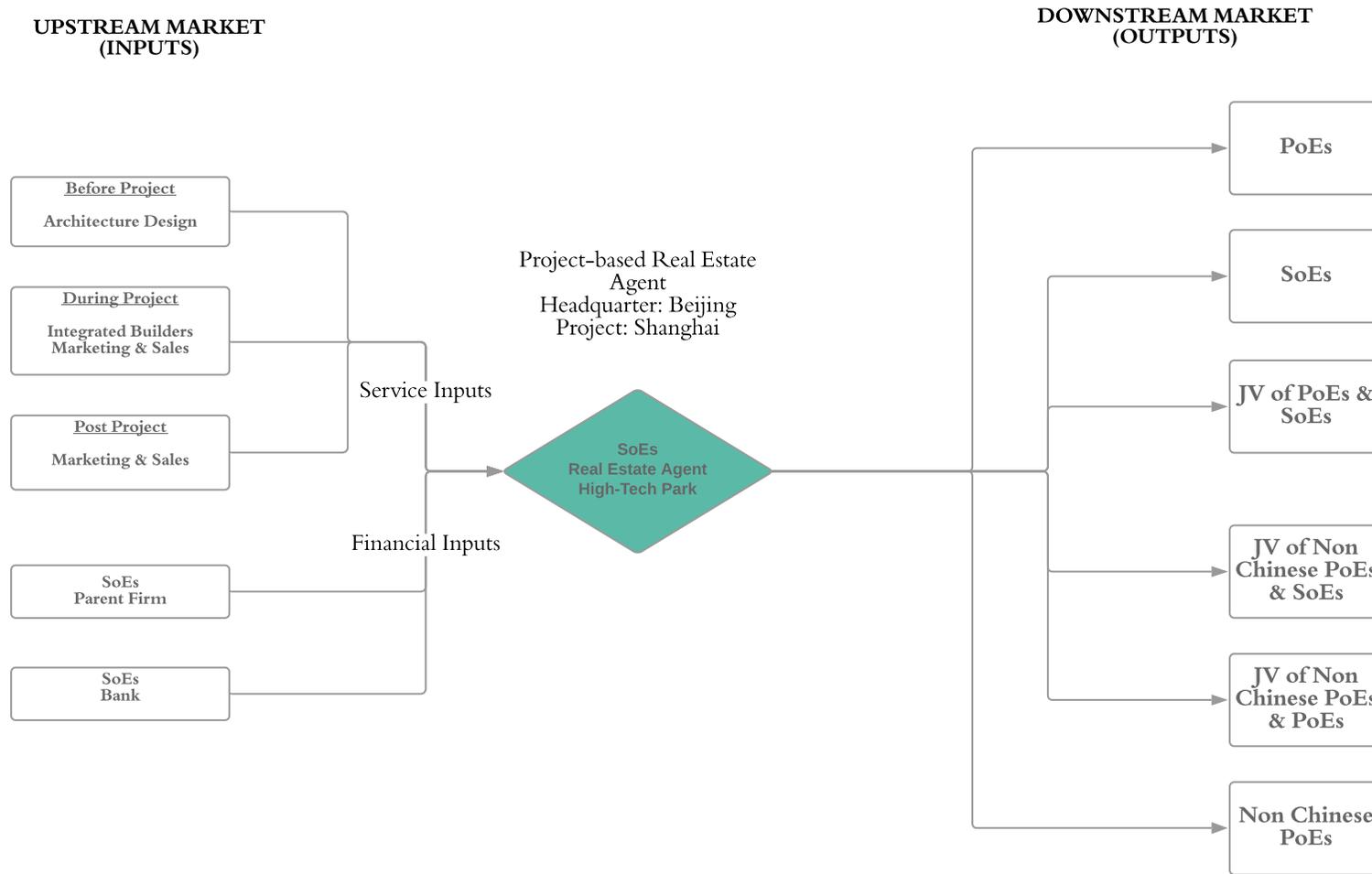
Appendix 19: Case 19 system map

UPSTREAM MARKET (INPUTS)

DOWNSTREAM MARKET (OUTPUTS)

Market Feedback

ZTE in-house Integrated System Manufactory

Material Suppliers
n=1, 2,3…

Semi-finished product suppliers
n=1,2,3…

Indirect Procurement
n=1,2,3…

Wireless System

Wireline System

Consumer Electronics

Distribution Centres
n=1,2,3…

Commerical Customers
n=1,2,3…
i.e. China Telecom
China Unicom
China Mobile
Other telecom operatiors in different countries
.
.
.

Online Sales

Agent Sales

End Users

Market Feedback
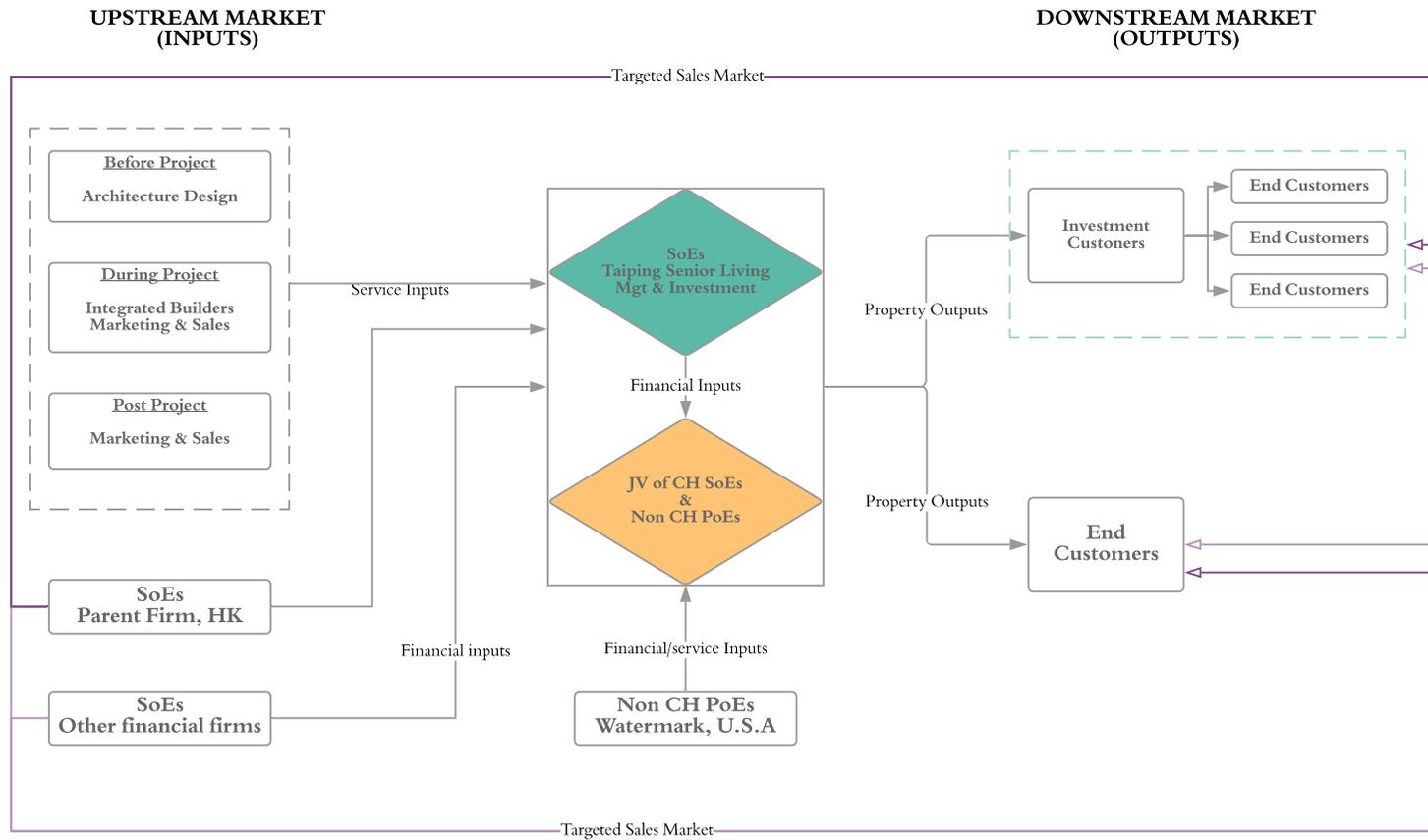
Appendix 20: Case 20 system ma
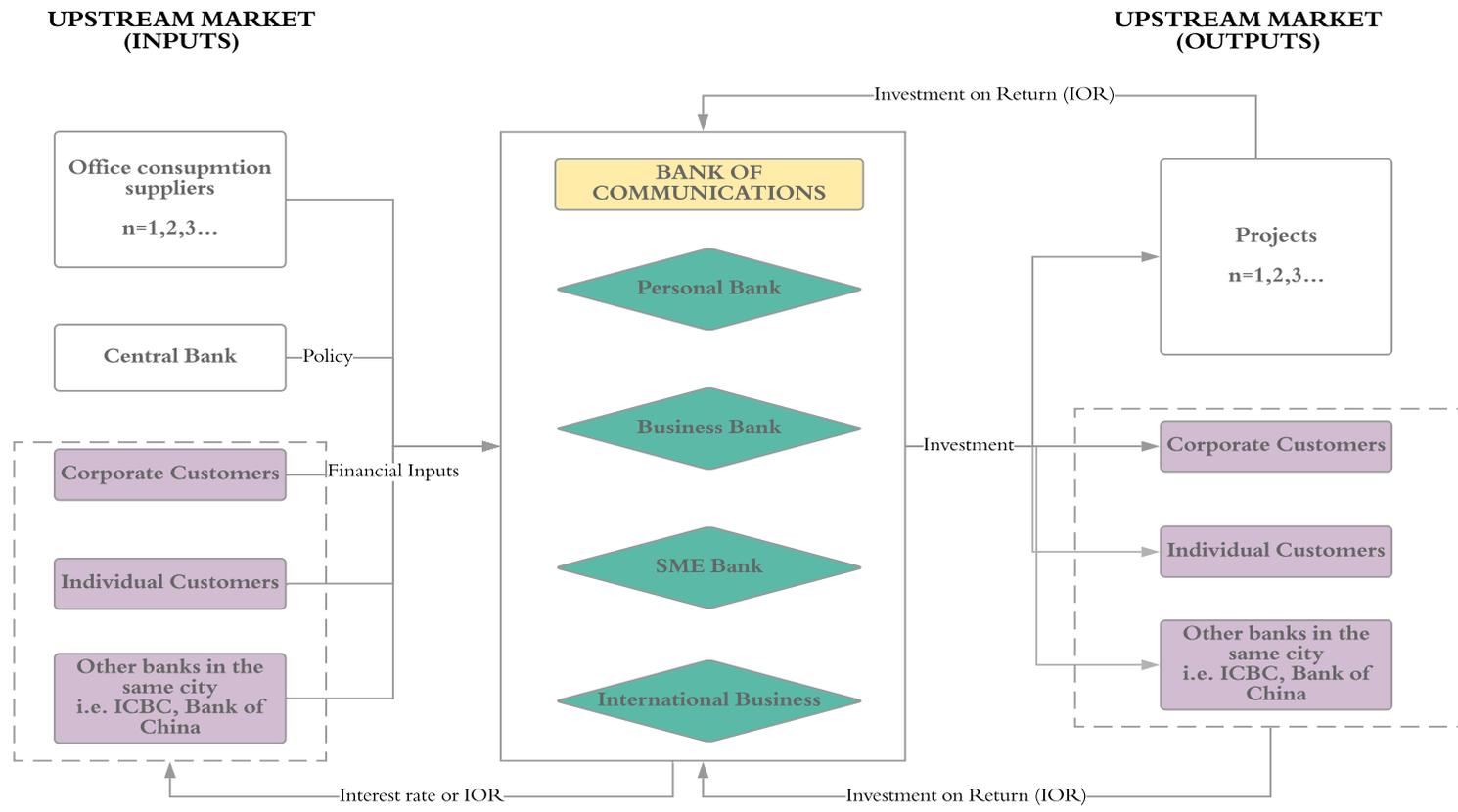
Appendix 21: Case 21 system map

Appendix 22: Case 22 system map