Looking at Resilience With a New Eye: A Nomological Network and Model

Geoffrey G. Bell
University of Minnesota Duluth

Abbey Sweetman
Protiviti

Resilience is an interdisciplinary construct examined at individual, group, and organizational levels. This broad disciplinary background has produced disparate and contradictory knowledge. In this paper, we develop a nomological network of resilience and other closely related constructs (agility, flexibility, stability, fragility, and rigidity) to clearly distinguish among these constructs, and thereby, we clearly define each of them. We adopt configurational principles to examine the relationships among these constructs and their antecedents, thereby developing a fuller and richer understanding of the nomological network. Doing so allows us to identify several antecedents to both resilience and its related constructs, allowing managers to focus their attention on "levers" to simultaneously bolster both resilience as well as other constructs that also enhance resilience. Finally, we outline several important paths forward for research.

Keywords: organizational resilience, organizational jolts, crises, nomological network

INTRODUCTION

Scholars have long been asking why some organizations and people are highly resilient - able to face environmental crisis (Sarkar & Osiyevskyy, 2018), jolts (Meyer, 1982; Meyer, Brooks, & Goes, 1990), or internal crises and quickly "bounce back" as strong or stronger than they were before, and why other organizations or individuals confronting similar circumstances face seemingly monumental difficulties bouncing back and do so slowly, if at all. The critical importance of resilience has been highlighted by the Covid pandemic, as some organizations faltered in responding to the pandemic, while others seem to be emerging stronger than ever.

The resilience literature remains fragmented, and often produces contradictory findings, both in terms of antecedents to, and consequences of, resilience (Iftikhar, Purvis, & Giannoccaro, 2021). Moreover, extant research has yet to clearly distinguish between resilience and related constructs (Linnenluecke, 2017). We respond to this gap by developing a nomological network of resilience and related constructs and clearly define each of these constructs, showing their similarities and differences. Once we have a clear understanding of these related constructs and their antecedents, we can model more effectively the relationships among them, which we then do.

Importantly, we also draw on insights from the configurational approach (Fiss, Marx, & Cambre, 2013; Miller, 1987) to examine the critical question of "what characteristics promote organizational resilience, and what characteristics lead to organizational fragility?" Recognizing the unique contributions of the

configurational approach is important because doing so recognizes that constructs may be related to each other and to resilience, and in addition it recognizes that relationships among constructs are not necessarily symmetric. For example, resilience and fragility are opposites (Comfort, 2002a, 2002b), such that fragile organizations are ones lacking in resilience, but factors leading to fragility are not necessarily simply the absence of factors leading to resilience. This in turn allows us to develop a more nuanced understanding of antecedents to resilience.

We begin our paper by reviewing what jolts and crises - the context normally associated with organizational resilience - are, and then we define our focal terms - resilience and other key related constructs (agility, flexibility, stability, fragility, and rigidity) that prior studies have related to resilience. In so doing, we build a nomological network of related yet distinct constructs, thereby helping resolve Linnenluecke's concern that the relationships among these clearly related constructs is not fully understood. As part of this process, we also summarize the literature on antecedents of the key constructs *other than* resilience, and finally and separately, we review and summarize the literature on antecedents to resilience. At this point, we develop a model of the interrelationships of resilience and its related constructs. Finally, we discuss the implications of the model and propose future research opportunities.

JOLTS AND CRISIS

Jolts are "a sudden and unprecedented event" (Meyer, 1982: 515) or "cataclysmic upheavals - changes so sudden and extensive that they alter the trajectories of entire industries, overwhelm the adaptive capacities of resilient organizations, and surpass the comprehension of seasoned managers" (Meyer et al., 1990: 93). Relatedly, Sarkar and Osiyevskyy (2018) draw on James and Wooten's (2010) definition of crisis as: "a rare, significant, and public situation that creates highly undesirable outcomes for the firm and its stakeholders… and requires immediate corrective action by firm leaders" (James & Wooten, 2010: 17 quoted by; Sarkar & Osiyevskyy, 2018: 48). In addition, Williams, Gruber, Sutcliffe, Shepherd, and Zhao (2017: 739-740) define crisis as "a process of weakening or degeneration that can culminate in a disruption event to the actor's… normal functioning."

Staw, Sandelands, and Dutton (1981: 511) argued that crisis occurs "when three conditions are present: (1) there is a major threat to system survival; (2) there is little time to react; and (3) the threat is unanticipated," or at least, ill-structured. Crises share three characteristics: the issue is important, immediate action is required, and there is uncertainty in the sense that the situation is complex and outcomes are not well-defined (Sarkar & Osiyevskyy, 2018: 49). While a specific event may precipitate a crisis, there is normally a "behind the scenes" unfolding of events that produce it (Sarkar & Osiyevskyy, 2018; Williams et al., 2017).

Organizations confronting a threat tend to rely on existing paradigms and fit new information into those world-views (Staw et al., 1981), rather than acknowledging that their world has changed. Threats tends to produce what Staw et al. (1981: 513) called "a mechanistic shift" - "increased centralization of authority, more extensive formalization, and standardization of procedures." In addition, during jolts, there is a need for increased information flow and communication coordination, and this tends to reduce organizational performance (Bhamra, Dani, & Burnard, 2011).

BUILDING OUR NOMOLOGICAL NETWORK OF RESILIENCE AND OTHER KEY AND RELATED CONSTRUCTS

Prior research has not carefully examined the relationship among resilience and other related constructs (Linnenluecke, 2017), so we must better understand these constructs and their inter-relationships with resilience and each other before theory can advance. She argued that these constructs – she identified agility, safety, and stability - support organizational resiliency through their constituent components. For example, she states that stability results from organizational calmness, flexibility, and readiness to respond to external environmental jolts. Similarly, safety is built upon strong communication within the organization and its ability to predict environmental jolts and take preventative measures. Combining stability and safety allows

organizations to increase their readiness for jolts. Agility works alongside the previous two constructs. It allows rapid movement and change to prepare for jolts and respond to jolts.

Organizational Resilience

Part of the problem in clearly defining resilience is its multidisciplinary nature (Bhamra et al., 2011; Conz & Magnani, 2020; Iftikhar et al., 2021; Lotfi & Saghiri, 2018). Organizational resilience is rooted in at least four distinct literatures: engineering resilience, ecology, child development and social psychology. In engineering resilience, resilience refers to the ability of a physical system to return to its original condition after it has been disturbed (Barasa, Mbau, & Gilson, 2018). In ecology, it is similarly defined in terms of the ability of a system or element thereof to return to stability after disruption (Burnard & Bhamra, 2011). Resilience, particularly at the individual level, is also rooted in child development (Sutcliffe & Vogus, 2003) and social psychology (Lotfi & Saghiri, 2018).

Organizational resilience has often been defined in terms of an organization's ability to respond to adversity and shocks (Meyer, 1982; Meyer et al., 1990) by making positive adjustments allowing it to "bounce back" as strong as or even stronger than before the jolt (Barasa et al., 2018; Bhamra et al., 2011; Burnard & Bhamra, 2011; Golgeci, Arslan, Dikova, & Gligor, 2020; Sutcliffe & Vogus, 2003). Resilience allows an organization to maintain integrity and cohesion after a jolt (Golgeci et al., 2020: 101). Resilient organizations, systems, or individuals are able to respond to and recover from shocks, disruptions, or challenging conditions with little impact on stability and functioning (Burnard & Bhamra, 2011; Williams et al., 2017).

There is a development element to resilience, in that resilience implies adaptability (Sutcliffe & Vogus, 2003) and flexibility (Burnard & Bhamra, 2011). Resilience is a process capability; a capability to self-renew over time through innovative actions (Reinmoeller & Van Baardwijk, 2005). Resilience is achieved by both absorbing the challenges and adapting to them (Barasa et al., 2018). However, good outcomes do not define resilience (Sutcliffe & Vogus, 2003). One cannot simply look at whether or not an organization has responded successfully to a jolt or crisis to conclude whether or not it is resilient.

Temporally, resilience consists of both anticipatory planning (planning for what to do if something goes wrong) and adaptation (changing after something goes wrong), including the development of new capabilities to respond to the crisis (Barasa et al., 2018; Bhamra et al., 2011; Iftikhar et al., 2021). There must be balance between anticipation and preparedness and adaptation (Bhamra et al., 2011). In addition, there may be a dynamic component to resilience, reflecting the organization's ability to plan and adapt proactively and also engage reactively to a jolt (Iftikhar et al., 2021). Organizations require time to detect a problem, design a solution, implement the solution, and recover (Lotfi & Saghiri, 2018).

Organizational Agility - Definition and Antecedents

Agility is the proactive ability of an entity to adapt or respond quickly to changing conditions (Golgeci et al., 2020; Lotfi & Saghiri, 2018), or the organization's ability to redirect its actions to maintain its competitiveness by "reallocating resources, building capabilities, and jettisoning assets and activities that no longer create value" (Pulakos, Kantrowitz, & Schneider, 2019). Agility is "dexterous nimbleness" - the ability to change rapidly to rapidly changing conditions (Golgeci et al., 2020). It involves alertness and anticipation of changes (Gligor, Gligor, Holcomb, & Bozkurt, 2019; Golgeci et al., 2020) - "proactively sensing and redirecting in order to chart a competitive path by rapidly reallocating resources, building new capabilities, and jettisoning assets and activities that no longer create value" (Pulakos et al., 2019: 307). It is often used interchangeably with terms like versatility or plasticity (Pulakos et al., 2019). It is composed of both "being" and "doing" components (Prange, 2021), where agility as being refers to an organization's self-awareness. Building on these definitions, we define agility as "a firm's ability to reallocate its resources and routines to respond quickly to changing internal or environmental circumstances."

Scholars have proposed several distinct antecedents to agility. Agility results from rapid decision making (Prange, 2021), teamwork and collaboration (Pulakos et al., 2019), organizational stability (Gligor et al., 2019; Prange, 2021; Pulakos et al., 2019), relentless course correction (Pulakos et al., 2019), and environmental scanning (Gligor et al., 2019). It would seem that the latter two are related, in that

environmental scanning would enable course correction in the sense of micro-adjustments. However, the relationship between stability and course correction seems somewhat in tension. In addition, there is a complex, and possibly reciprocal, relationship between agility and flexibility because while Prange (2021) argued that agility leads to flexibility, Gligor et al. (2019) argued that agility arises from flexibility.

Comparing and Contrasting Resilience and Agility

Resilience and agility are intertwined and complementary concepts, in that "solely resilient firms may endure hardships… but may not necessarily prosper" (Golgeci et al., 2020: 102). Conversely, "agility without resilience can create an overexposed organization that emphasizes openness, and speed so much that severe shocks and disruptions can significantly damage its performance, even threaten its survival" (Lotfi & Saghiri, 2018: 171). Agility is a formative element of resilience (Lotfi & Saghiri, 2018), and the two rely on several common underlying drivers (Lotfi & Saghiri, 2018): the ability to accelerate operations, scan the environment and anticipate changes, and be flexible (Gligor et al., 2019). Resilience is most often reactive, whereas agility is proactive, and they serve different purposes: resilience promotes organizational longevity whereas agility fosters organizational prosperity (Gligor et al., 2019).

Strategic Flexibility - Definition and Antecedents

Like many of the constructs we examine, strategic flexibility has been examined by many different business-related disciplines (Herhausen, Morgan, Brozovic, & Volberda, 2021), and has been defined in many different ways. Indeed, Brozovic (2018) identified 83 unique definitions of the term!

Fundamentally, flexibility is the ability to bend but not break (Iftikhar et al., 2021), strategic flexibility is "a combination of a repertoire of organizational and managerial capabilities that allow organizations to adapt quickly under environmental shifts" (Hatum & Pettigrew, 2006: 117), of which organizational innovativeness is a component (Hatum & Pettigrew, 2006). Flexibility is the capability of an organization to identify major changes in the surrounding environment and respond proactively or reactively to them by changing its resource allocation in response to the changes in the environment, and identify the best time to revert these resources to back to their original use (Brozovic, 2018; Herhausen et al., 2021; Shimizu & Hitt, 2004). These firm responses to environmental changes may be internal or external in nature or both (Herhausen et al., 2021). Building and maintaining a strong culture of strategic flexibility can be one of the most challenging, yet important, tasks for the organization in a dynamic environment (Shimizu & Hitt, 2004).

Flexibility is fostered by decentralized decision making, low formalization, high permeability of boundaries and collaborative partnerships (Hatum & Pettigrew, 2006), financial and slack resources, market orientation, and environmental scanning (Brozovic, 2018), and agility (Prange, 2021). A flexible response may lead to a resilient response (Burnard & Bhamra, 2011). In their meta-analysis, Herhausen et al. (2021) found that firm orientation (entrepreneurial orientation, market orientation, and learning orientation), decentralization, formal routines, and industry competitive intensity are positively associated with strategic flexibility, while slack resources, prior firm success, environmental dynamism, and demand uncertainty are negatively related. Conversely, (Brozovic, 2018) identified rigidity, a lack of financial resources, lack of proper information and feedback, lack of trained and skilled personnel, lack of R&D, and resistance to change as negatively related to flexibility (Brozovic, 2018). Because we conceive of rigidity as the opposite end of the flexibility continuum (discussed below), we anticipate that these factors that reduce flexibility would *foster* rigidity (other than rigidity itself).

Stability - Definition and Antecedents

"Stability is a psychological state that is created when organizational members feel secure in their roles and have confidence in the organization and its leadership" (Pulakos et al., 2019: 309), and is a function of consistency in organizational actions (Brozovic, 2018). Stability is distinct from rigidity, in that members of a stable organization are more likely to be able to respond to changes in the environment than are members of an unstable organization (Brozovic, 2018). Whereas rigidity reduces a firm's ability to respond to jolts (Staw et al., 1981), flexibility and stability must be balanced to maintain continuity (Brozovic,

2018). Stability is fostered by prior organizational success and organizational members' confidence in the organization's leadership (Pulakos et al., 2019).

Organizational Fragility - Definition

Fragility is the opposite of organizational resilience (Comfort, 2002a, 2002b). There has been surprisingly little study of the concept of organizational fragility. A current Google Scholar search for the term "organizational fragility" unearthed only 8 "hits," and an EBSCO Business Source Premier search unearthed only 6 "hits." Of these, only two were relevant to our study, both authored by Comfort (2002a, 2002b) in his examination of the American government's response to the 9/11 terror attacks.

Organizational fragility arose from engineering's concept of a fragility curve, which "implies that a building… does not fail all at once. Rather, the building is subject to strains and stresses incurred from use and interaction with its environment that accumulate until the building reaches a point where it loses structural viability and collapses" (Comfort, 2002b: 101). Similarly, organizations are not fine one moment and collapsing the next. Rather, they lie on a continuum from healthy and resilient (Comfort, 2002b: 102) to collapsing, and at some time, they reach a point where they are no longer viable, and they collapse (Comfort, 2002a: 115). Therefore, we define fragility as "the inability of an organization to respond successfully to the stresses and strains it encounters in its internal and external environments and recover from them," and we model fragility as the opposite end of a continuum of fragility to resilience, with organizations lying somewhere between the two ends of the continuum. We found no antecedents to fragility discussed in Comfort's papers or any others.

Organizational Rigidity - Definition and Antecedents

Because Burnard and Bhamra (2011) characterized rigidity as a "negative adjustment" and the opposite of a flexible response (Burnard & Bhamra, 2011), we model it at the opposite end from flexibility on the flexibility continuum. Rigidity is an inability to respond to environmental changes, and often arises in response to a threat (Staw et al., 1981). Rigidity is characterized by restricted information-processing capabilities and narrowed and re-centralized control and decision making (Soltwisch, 2015; Staw et al., 1981; Sutcliffe & Vogus, 2003). Threats will restrict information processing at an individual, group, and organizational levels (Soltwisch, 2015), either by narrowing organizational attention or by reducing the number of communications channels used (Staw et al., 1981). Severe adversity coupled with urgency may cause decision-makers to limit their choices which in turn produce rigidity (Sarkar & Osiyevskyy, 2018), and influence and decision making powers will be recentralized in top management (Staw et al., 1981).

Extending Brozovic's (2018) analysis of the causes of flexibility, we anticipate that a lack of financial resources, proper information and feedback, trained and skilled personnel, and R&D will be antecedents of organizational rigidity. Rigidity is also produced by core rigidities - "inappropriate sets of knowledge embedded in the firm's values, skills, managerial systems and technical systems" (Brozovic, 2018: 10-11, drawing on Leonard-Barton, 1992). In addition, rigidity also arises as a result of prior organizational success because of effects at multiple organizational levels (Soltwisch, 2015). At the individual level, individuals begin to ignore relevant information and become overconfident in their ability (Soltwisch, 2015). At a group level, prior success produces more cohesive groups that increasingly recruit less-diverse new members, making it less likely that different perspectives will be heard or developed (Soltwisch, 2015). Finally, at an organizational level, organizational culture and routines as well as investment in fixed assets will limit action choices, again resulting in rigidity (Soltwisch, 2015). This behavior is reinforced by escalation of commitment to a course of action (Soltwisch, 2015, drawing on Staw, et. al.).

ANTECEDENTS TO ORGANIZATIONAL RESILIENCE

Now that we have defined each of our key terms - resilience, agility, flexibility, fragility, and rigidity, we review the extensive literature on the antecedents to resilience. Table 1 summarizes the extensive set of antecedents of resilience developed in the literature. The table groups the proposed antecedents by category, beginning with other constructs in this study, then moving from macro-level to individual-level antecedents.

TABLE 1
ANTECEDENTS TO ORGANIZATIONAL RESILIENCE

Overarching category	Included subcategories	Authors who proposed antecedent
Our primary constructs		
	Agility	Lotfi and Saghiri (2018)
	Flexibility	Bhamra et al. (2011); Iftikhar et al. (2021)
	Organizational stability	Pulakos et al. (2019)
Elements of organizational culture		
	Clear and shared vision	Barasa et al. (2018)
	Culture that views challenges as opportunities and learning opportunities	Barasa et al. (2018)
	Perseverance and optimism	Bhamra et al. (2011)
Organizational structural characteristics		
	Preparedness and planning	Barasa et al. (2018)
	Rightsized teamwork	Pulakos et al. (2019)
	Workgroup diversity	Sutcliffe and Vogus (2003)
Information, communication, and decision making		
	Communications	Burnard and Bhamra (2011)
	Decentralized decision making	Barasa et al. (2018); Burnard and Bhamra (2011); Sutcliffe and Vogus (2003)
	Effective social networks	Barasa et al. (2018)
	Environmental scanning	Burnard and Bhamra (2011)
	Information management	Barasa et al. (2018)
	Interfirm coordination in supply chains	Gligor et al. (2019)
	Organizational transparency	Barasa et al. (2018)

Organization-level resources		
	Adequate and appropriate human capital, including motivated and committed staff	Barasa et al. (2018); Bhamra et al. (2011); Sutcliffe and Vogus (2003)
	Conceptual slack	Sutcliffe and Vogus (2003)
	Redundant or latent (i.e., slack) resources	Barasa et al. (2018); Iftikhar et al. (2021); Sutcliffe and Vogus (2003)
	Absorptive capacity	Bhamra et al. (2011); Sutcliffe and Vogus (2003)
	Material and financial resources	Barasa et al. (2018); Sutcliffe and Vogus (2003)
Individual-level resources		
	Emotional capital	Sutcliffe and Vogus (2003)
	Mastery motivation system	Sutcliffe and Vogus (2003)
	Mindfulness	Sutcliffe and Vogus (2003)

As expected, all of our other key constructs - agility, stability, and flexibility - lead to resilience. In addition, at a very macro level, three elements of an organization's culture promote resilience - a clear and shared vision (Barasa et al., 2018), a culture that views challenges as both opportunities and learning opportunities (Barasa et al., 2018), and a culture characterized by perseverance and optimism (Bhamra et al., 2011). Alongside that, we identified several organizational structural characteristics that foster resilience: preparedness and planning (Barasa et al., 2018), "rightsized" teamwork - ensuring teams are not over- or under-utilized (Pulakos et al., 2019), and workgroup diversity (Sutcliffe & Vogus, 2003). Having a diverse workgroup is especially important for organizations to detect threats and activate a response (Sutcliffe & Vogus, 2003).

Not surprisingly, many elements of organizational information-processing, communication, and decision making facilitate organizational resilience. Effective communications - both within and between the organization and other organizations - alongside effective information processing facilitates resilience (Barasa et al., 2018; Burnard & Bhamra, 2011). In addition, organizational transparency (Barasa et al., 2018) and environmental scanning (Burnard & Bhamra, 2011) to detect potential threats both foster resilience. Effective social networks (Barasa et al., 2018) - which presumably facilitate effective communication - including interfirm coordination in its supply chain (Gligor et al., 2019) produces resilience.

In terms of decision making, decentralized decision making promotes resilience (Barasa et al., 2018; Burnard & Bhamra, 2011; Sutcliffe & Vogus, 2003). This is often portrayed as a direct relationship, but it is important to note that it may also operate indirectly through its positive effects on building individuals' mastery motivation systems and sense of self-efficacy (Sutcliffe & Vogus, 2003), as individuals who are empowered to make decisions and do so successfully will increase their self-efficacy. Sutcliffe and Vogus (2003: 100) assert, "Resilience is enhanced when individuals… have experiences that add to their growth, competence/expertise, and efficacy. Mastery experiences that contribute to individual competence and growth are more likely to occur when individuals can exercise behaviors such as judgment, discretion, and imagination… when they have the ability to make and recover from mistakes… and when they have the opportunity to observe role models who demonstrate these behaviors… In organizational settings, resilience

is engendered when individuals who are most likely to have the relevant and specific knowledge necessary to make a decision and resolve a problem are given decision-making authority."

Several organization-level resources promote and foster resilience. Adequate, appropriate, motivated, and committed personnel are critical to the development of resilience (Barasa et al., 2018; Sutcliffe & Vogus, 2003). Such personnel will be motivated to respond favorably to jolts and crises rather than giving up. When "individuals have access to a sufficient amount of quality resources (i.e., human, social, emotional, and material capital) … they can develop competence. Second, and perhaps more importantly, resilience is more likely when an individual's mastery motivation system is mobilized; that is, when individuals have experiences that allow them to encounter success and build self-efficacy and that motivate them to succeed in their future endeavors" (Sutcliffe & Vogus, 2003: 100).

Several scholars (Barasa et al., 2018; Iftikhar et al., 2021; Sutcliffe & Vogus, 2003) assert that redundant or latent - i.e., slack - resources promote resilience. One important component of slack is conceptual slack, which Sutcliffe and Vogus (2003: 105) describe as "diversity in organizational members' analytical perspectives about the organization's technology or production processes, a willingness to question what is happening rather than feign understanding, and a greater usage of respectful interaction to accelerate and enrich the exchange of information and capability to process it." Another component of resources is material and financial resources that enable the organization to respond to a shock (Barasa et al., 2018; Sutcliffe & Vogus, 2003), or isolate it from the shock (Becerra & Markarian, 2021).

Finally, individual-level resources may contribute to organizational resilience, although Williams et al. (2017) carefully point out that organizational resilience is more than just the sum of individual resilience. Sutcliffe and Vogus (2003) identify three individual elements that contribute to organizational resilience: emotional capital, an individual's mastery motivation system, and mindfulness.

MOVING TOWARD A MODEL OF RESILIENCE AND RELATED CONSTRUCTS

At this point, we have outlined the definitions of and antecedents to organizational resilience and its key related constructs. Table 2 summarizes relationships among these constructs and antecedents as demonstrated in the existing literature. So far as we know, this is the first attempt to relate not only the antecedents of resilience but also other key related constructs. Doing so allows us to develop a much fuller, richer, and more nuanced picture of the causes of resilience and other constructs critical to firms' survival and success when they encounter jolts and crises. We also graphically portray these results in Figure 1.

TABLE 2
SUMMARY OF ANTECEDENTS OF PRIMARY CONSTRUCTS

| Antecedents to the constructs | Primary constructs | | | | | |
	Resilience	Agility	Flexibility	Organizational stability	Fragility	Rigidity
Key constructs studied						
Resilience		+				
Agility	+		+			
Flexibility	+	+	+			
Organizational stability	+	+				

Industry characteristics						
Competitive intensity			+			
Industry dynamism			-			
Demand uncertainty			-			
Elements of organizational culture						
Clear and shared vision	+					
Culture that views challenges as opportunities and learning opportunities	+					
Perseverance and optimism	+					
Confidence in organizational leadership				+		
Firm orientation (market, entrepreneurial, learning)			+			
Prior firm success			-	+		
Resistance to change			-			+
Organizational structural characteristics						
Preparedness and planning	+					
Teamwork & collaboration	+	+				
Workgroup diversity	+					
Low formalization			+			
Formal routines			+			
High boundary permeability			+			
Information, communication, and decision making						
Communications	+					
Decentralized decision making	+		+			
Rapid decision making		+				
Effective social networks	+					

Environmental scanning	+	+	+			
Information and feedback			+			-
Information management	+					
Interfirm coordination in supply chains	+					
Collaborative partnerships			+			
Organizational transparency	+					
Course correction		+				
Organization-level resources						
Adequate and appropriate human capital, including motivated and committed staff	+		+			-
Conceptual slack	+					
Redundant or latent (i.e., slack) resources	+		+/-			
Absorptive capacity	+					
Material and financial resources	+		+/-			-
R&D			+			-
Individual-level resources						
Emotional capital	+					
Mastery motivation system	+					
Mindfulness	+					

Key: A plus-sign in a cell indicates that the antecedent is a positive antecedent of the construct in question, while a minus-sign indicates that the antecedent is a negative antecedent to the construct in question.

FIGURE 1
ANTECEDENTS TO RESILIENCE
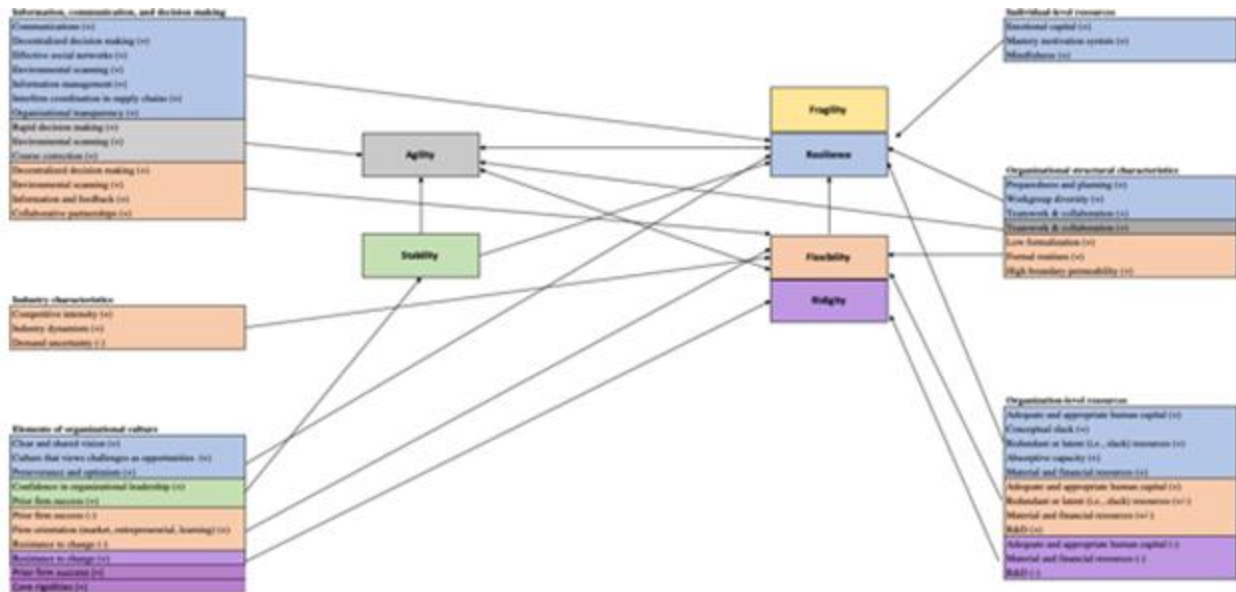
Examining the figure, we note that many different types of factors, ranging from industry conditions to individual-level resources, influence resilience as well as agility, flexibility, and stability. Specifically, six groups of factors appear to cause the key variables of resilience, flexibility, agility, and stability, namely industry characteristics, elements of organizational culture, information, communication, and decision-making characteristics of the firm, organization-level resources and structural characteristics, and, finally, individual-level resources.

Figure 1 is color-coded such that the antecedents are the same color as the construct of interest. For example, all factors leading to agility are colored gray, while all antecedents producing resilience are coded blue, making it easier to see antecedents of each key construct. We also readily observe that the literature has yet to examine what factors lead to fragility - an important oversight. It is also important to recognize that some of the factors examined distinctly in the literature may reflect close similarities. For example, decentralized decision making has been shown to promote both resilience and flexibility, while rapid decision-making fosters agility. However, it is likely that in turn, decentralization will promote decision making rapidity, so those are likely also linked.

In addition, many constructs of interest share antecedents. As noted, both flexibility and resilience are fostered by decentralized decision making. However, they are also both promoted by environmental scanning, and flexibility and agility are both fostered by teamwork and collaboration. Resilience and flexibility are bolstered by adequate and appropriate human capital, slack resources, and material and financial resources.

However, we also note that the extant literature proposes some equivocal relationships. For example, prior firm success has been associated with organizational stability, while reducing flexibility, and resistance to change reduces organizational stability but fosters rigidity. Finally, several antecedents of interest, such as slack and material/financial resources have previously been shown to be both positively and negatively associated with flexibility, so the exact anticipated relationship remains unclear.

DISCUSSION

In this paper, we sought to develop a nomological network of organizational resilience and its related constructs. We reviewed the literature on resilience, as well as the related concepts of agility, flexibility,

stability, fragility, and rigidity. Doing so allowed us to carefully define each of these constructs, as well as understand the antecedents to them, developing a much richer and fuller picture of what produces resilience.

It is clear from our examination that the critical concepts of fragility and rigidity are badly understudied. While prior work has shown that rigidity is produced by core rigidities (Brozovic, 2018) and prior organizational success (Soltwisch, 2015), that seems to be the extent of the field's knowledge. Moreover, this reveals an important observation that is fully consistent with the configurational approach: conditions leading to rigidity are not merely and necessarily the absence of conditions producing flexibility. The presence of potentially unique antecedents for each (e.g., core rigidities producing rigidity; multiple organization-level resources producing flexibility) highlights the value of adopting a configurational perspective that specifically models relationships between constructs as not necessarily symmetrical.

Similarly, once one realizes that resilience and fragility are potentially asymmetric and the causes of one are not merely and necessarily the absence of the causes of the other, and vice versa, determining antecedents of fragility and rigidity as distinct from the absence of the causes of resilience and agility become critical tasks.

Identifying "Leverage Points"

By adopting a holistic approach drawing on configurational analysis, we can identify leverage points that may have an even more powerful impact on resilience through mediated relationships with other constructs. For example, our review shows that having rapid &/or decentralized decision-making fosters resilience, flexibility, and agility, so organizations may find that having a decentralized decision making process will have an exponential impact on resiliency, not only directly, but also through agility and flexibility. Similarly, having slack and other resources - especially good human resources - is likely to enhance both resilience as well as flexibility.

In some cases, there are mixed effects when one considers indirect paths to resilience. For example, prior firm success builds organizational stability (a positive for resilience), but it reduces flexibility. Therefore, managers will need to calculate carefully both these positive and negative effects on resilience.

In addition, our review of the resilience literature showed that resilience when modeled as a process involves both anticipatory planning and adaptation. It seems as though agility (the ability to respond quickly) and flexibility (the ability to change and respond) would be more related to adaptation than to planning. Conversely, environmental scanning, conceptual slack, and preparedness and planning are likely to relate most to anticipatory planning. In addition, firm orientation, particularly market orientation, which has been shown to enhance flexibility, but has not been studied in the context of resilience, quite possibly fosters anticipatory planning, and indeed, may work alongside environmental scanning in that task.

Can Organizations Be Fully Resilient?

One disquieting result of our study is that while our goal may be to build organizations that are highly resilient and not at all fragile, this may be an impossibility. While Comfort (2002b) posed resilience and fragility as opposite ends of a continuum, it is possible, maybe even likely, that they may both reside within a single organization, and which one triumphs in the end may depend on the nature of the jolt the organization experiences. As Meyer (1982: 515) stated, "environmental jolts rarely threaten the survival of soundly designed organizations with well-maintained environmental alignments. However, seismic tremors often disclose hidden flaws in the architecture and construction of buildings, and environmental jolts trigger responses that reveal how organizations adapt to their environments."

This question is exemplified by returning to the architectural and engineering analogy underlying Comfort's (2002a, 2002b) work. There have been instances in history when a seemingly resilient building was struck down by unforeseen circumstances that arguably were unavoidable. The Twin Towers were two massively resilient buildings that, despite their resilience, were unable to withstand the impacts caused by the 9/11 terrorist plane crashes. This supports the idea that the buildings *must* have possessed some unidentified fragility because they did indeed collapse, that notwithstanding that experts assert that no building could have ever survived the hit taken by the towers (Kamin, 2001). Similarly, the Citicorp Center tower in New York City was designed with a hidden flaw that would have made it incredibly fragile under

the right conditions (Anonymous, 2022). Clearly, the twin towers lay very close to the resilient side of the resilient-fragility continuum, as did the Citicorp Center, but no building - or we would argue, organization - can be fully resilient. It is only that the potentially fatal source of rigidity has yet to be revealed. Therefore, the goal of the organization and its managers is not to be completely resilient; rather it is to maximize their resilience and identify and respond to what may be unidentified sources of fragility to have the highest likelihood of overcoming unpredictable jolts, crises, and shocks (such as the 9/11 attacks, the Covid-19 pandemic etc.).

This realization that no organization can be fully resilient and that it may be subject to unanticipated jolts that expose its sources of fragility highlights an urgent need for further research, especially in the areas of the causes of fragility and the nature of the fragility-resilience continuum. As we said earlier in this paper, the only significant research we found on the nature of fragility was the work of Comfort, and he did not move us very far down the road to understanding the causes of fragility.

The Nature of Jolts/Crises

Much of the research on environmental jolts or crises presume that a jolt or crisis is either a single discrete event or a relatively short-duration event. (Even the financial crisis of 2007-2008 "only" lasted a matter of months.) However, the recent experience with Covid has demonstrated that jolts can be relatively long-duration events lasting years. Moreover, there is also a possibility that a jolt may appear to be brief and violent, but the underlying factors that precipitated the actual event that we experience as "the jolt" may have been ongoing for a long time (Meyer, 1982). Once again, we turn to our architecture/engineering examples, this time observing last year's condo collapse in Florida (Baker, Singhvi, & Mazzei, 2021). In this case, there were a series of ongoing smaller "shocks" (e.g., the oceanfront condo was subject to salt water spraying onto the condo that over time weakened the structure until it collapsed), and even though the ultimate collapse *seems* sudden, it's really a build up over time. The nature and effect of these two very different types of shocks (dramatic and gradual) need to be examined in more detail in future literature.

The Role of Environmental Scanning and Communication in Resilience

The role of environmental scanning has been associated with many of our outcomes of interest - resilience, agility and flexibility. This is particularly so for detection of and activation in developing a response to a threat (Burnard & Bhamra, 2011). However, this role of scanning and communication needs also to consider the risk of both false positives (falsely perceiving a threat when in fact none exists), which will needlessly deplete organizational resources to respond to the ephemeral threat, and false negatives (failing to perceive a real threat) that may jeopardize the organization. In particular, organizations should focus on "high impact / low probability (HILP) events" and develop an ability to detect their occurrence (Burnard & Bhamra, 2011). This increases the need to distinguish signal from noise and amplify weak signals. HILP events "require planning and response activities outside of traditional work routines and standard operating procedures" (Burnard & Bhamra, 2011: 5592), so these detection capabilities may stand distinct from the firm's "routine" ones.

The Temporal Phases of Resilience: Complements or Substitutes?

The literature has identified distinct temporal components of resilience, namely anticipatory planning and adaptation (Barasa et al., 2018; Bhamra et al., 2011; Iftikhar et al., 2021), and has proposed that there must be balance between anticipation and preparedness and adaptation (Bhamra et al., 2011). However, it seems to be worthwhile to consider in addition whether anticipatory planning and adaptation are complements or substitutes. That is, if one does not have sufficient abilities to plan ahead (perhaps because of deficiencies in environmental scanning capacity or a lack of foresight), is it possible to make up for that by adaptation fostered by agility? Future studies could productively examine this issue.

CONCLUSION

Our purpose in this paper was to develop a nomological network of resilience and other key constructs, and then identify antecedents to each of them, adopting a configurational perspective. In so doing, we identified several significant gaps in the literature that fur research should be directed to filling in. In addition, we importantly observed that organizations cannot be fully resilient, so managers should work to maximize sources of resilience and also to identify potential causes of fragility and overcome them. Doing so will maximize the likelihood of their surviving future exogenous shocks and rebound from them.

ACKNOWLEDGEMENTS

REFERENCES

Anonymous. (2022). *Citicorp Center engineering crisis*. Retrieved from https://en.wikipedia.org/wiki/Citicorp_Center_engineering_crisis

Baker, M., Singhvi, A., & Mazzei, P. (2021, Sept 21, 2021). Engineer warned of 'major structural damage' at Florida condo complex. *New York Times*. Retrieved from https://www.nytimes.com/2021/06/26/us/miami-building-collapse-investigation.html

Barasa, E., Mbau, R., & Gilson, L. (2018). What is resilience and how can it be nurtured? A systematic review of empirical literature on organizational resilience. *International Journal of Health Policy Management*, *7*(6), 491–503. doi:10.15171/ijhpm.2018.06

Becerra, M., & Markarian, G. (2021). Why are firms with lower performance more volatile and unpredictable? A vulnerability explanation of the Bowman paradox. *Organization Science*, *32*(5), 1327–1345.

Bhamra, R., Dani, S., & Burnard, K. (2011). Resilience: The concept, a literature review and future directions. *International Journal of Production Research*, *49*(18), 5375–5393. doi:10.1080.00207543.2011.563826

Brozovic, D. (2018). Strategic flexibility: a review of the literature. *British Journal of Management*, *20*, 3–31. doi:10.1111/ijmr.12111

Burnard, K., & Bhamra, R. (2011). Organisational resilience: Development of a conceptual framework for organisational responses. *International Journal of Production Research*, *49*(18), 5581–5599. doi:10.1080.00207543.2011.563827

Comfort, L.K. (2002a). Governance under fire: Organizational fragility in complex systems. In *Governance and Public Security* (pp. 113–127). Syracuse, NY: Campbell Public Affairs Institute, Maxwell School, Syracuse University.

Comfort, L.K. (2002b). Rethinking security: Organizational fragility in extreme events. *Public Administration Review*, *62*(Special issue), 98–107.

Conz, E., & Magnani, G. (2020). A dynamic perspective on the resilience of firms: A systematic literature review and a framework for future research. *European Management Journal*, *38*, 400–412. doi:10.1016/j.emj.2019.12.004

Fiss, P.C., Marx, A., & Cambre, B. (2013). Configurational theory and methods in organizational research: Introduction. In P.C. Fiss, B. Cambre, & A. Marx (Eds.), *Configurational theory and methods in organizational research* (Vol. 38, pp. 1–22). Bingly, UK: Emerald Group Publishing Limited.

Gligor, D., Gligor, N., Holcomb, M., & Bozkurt, S. (2019). Distinguishing between the concepts of supply chain agility and resilience. *International Journal of Logistics Management*, *30*(2), 467–487. doi:10.1108/IJLM-10-2017-0259

Golgeci, I., Arslan, A., Dikova, D., & Gligor, D.M. (2020). Resilient agility in volatile economies: institutional and organizational antecedents. *Journal of Organizational Change Management*, *33*(1), 100–113. doi:10.1108/JOCM-02-2019-0033

Hatum, A., & Pettigrew, A.M. (2006). Determinants of organizational flexibility: A study in an emerging market. *British Journal of Management*, *17*, 115–137. doi:10.1111/j.1467-8551.2005.00469.x

Herhausen, D., Morgan, R.E., Brozovic, D., & Volberda, H.W. (2021). Re-examining strategic flexibility: a meta-analysis of its antecedents, consequences and contingencies. *British Journal of Management*, *32*, 435–455. doi:10.1111/1467-8551.12413

Iftikhar, A., Purvis, L., & Giannoccaro, I. (2021). A meta-analytical review of the antecedents and outcomes of firm resilience. *Journal of Business Research*, *135*, 408–425. doi:10.1016/j.jbusres.2021.06.048

James, E.H., & Wooten, L.P. (2010). *Leading under pressure: From surviving to thriving before, during, and after a crisis*: Routledge.

Kamin, B. (2001, December 6). What made New York's twin towers collapse? *Chicago Tribune*. Retrieved from https://www.chicagotribune.com/nation-world/sns-worldtrade-collapse-ct-story.html

Linnenluecke, M.K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews*, *19*, 4–30. doi:10.1111/ijmr.12076

Lotfi, M., & Saghiri, S. (2018). Disentangling resilience, agility and leanness. *Journal of Manufacturing Technology Management*, *29*(1), 168–197. doi:10.1108/JMTM-01-2017-0014

Meyer, A.D. (1982). Adapting to environmental jolts. *Administrative Science Quarterly*, *27*, 515–537.

Meyer, A.D., Brooks, G.R., & Goes, J.B. (1990). Environmental jolts and industry revolutions: organizational responses to discontinuous change. *Strategic Management Journal*, *11*, 93–110.

Miller, D. (1987). The genesis of configuration. *Academy of Management Review*, *12*(4), 686–701.

Prange, C. (2021). Agility as the discovery of slowness. *California Management Review*, *63*(4), 27–50. doi:10.1177/00081256211028739

Pulakos, E.D., Kantrowitz, T., & Schneider, B. (2019). What leads to organizational agility: It's not what you think. *Consulting Psychology Journal: Practice and Research*, *71*(4), 305–320. doi:10.1037/cpb0000150

Reinmoeller, P., & Van Baardwijk, N. (2005). The link between diversity and resilience. *MIT Sloan Management Review*, *46*(4), 61.

Sarkar, S., & Osiyevskyy, O. (2018). Organizational change and rigidity during crisis: A review of the paradox. *European Management Journal*, *36*, 47–58. doi:10.1016/j.emj.2017.03.007

Shimizu, K., & Hitt, M.A. (2004). Strategic flexibility: Organizational preparedness to reverse ineffective strategic decisions. *Academy of Management Executive*, *18*(4), 44–59.

Soltwisch, B.W. (2015). The paradox of organizational rigidity: A contingency model for information processing during times of opportunity and threat. *Journal of Leadership & Organizational Studies*, *22*(4), 395–403. doi:10.1177/1548051815594884

Staw, B.M., Sandelands, L.E., & Dutton, J.E. (1981). Threat-rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly*, *26*, 501–524.

Sutcliffe, K.M., & Vogus, T.J. (2003). Organizing for resilience. In K.S. Cameron, J.E. Dutton, & R.E. Quinn (Eds.), *Positive Organizational Scholarship: Foundations of a new discipline* (pp. 94–110). San Francisco, CA: Berrett-Kohler.

Williams, T.A., Gruber, D.A., Sutcliffe, K.M., Shepherd, D.A., & Zhao, E.Y. (2017). Organizatioonal response to adversity: Fusing crisis management and resilience research streams. *Academy of Management Annals*, *11*(2), 733–769. doi:10.5465/annals.2015.0134