

Developing a Resilience-Thinking Leadership Mindset Scale

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## Abstract

The purpose of this study was to develop a resilience-thinking leadership mindset construct and scale. Although literature exists on developing resilience and relational leadership theories, very little research and literature address a resilience-thinking mindset as a leadership strategy. This study represents an initial step in filling this gap. This research project was the initial phase toward the development of a resilience-thinking leadership mindset (RTLTM) scale. I used a mixed-methods approach which was divided into three stages. Stage 1 involved the development of the scale items and assessment of both face and content validity to revise the original scale. Stage 2 comprised conducting a pilot study and employing statistical analysis to assess the construct validity, which included an exploratory factor analysis and a partial confirmatory factor analysis (PCFA). The factor analysis revealed a two-factor solution with inter-item Cronbach's Alphas of .936 for Factor 1 and .906 for Factor 2. The PCFA revealed a CFI of .956. Stage 3 entailed giving the refined RTLTM scale to leaders in field of resilience management to further interpret and refine the scale's factors and items. This scale will be useful to practitioners, researchers, and organizations that are interested in advancing resilience-thinking, mindful organizing, and adaptive governance. This dissertation is available in open access at AURA: Antioch University Repository and Archive, <http://aura.antioch.edu/and> Ohiolink ETD Center, <https://etd.ohiolink.edu/>

*Keywords:* Adaptive Governance, Resilience-Thinking, Resilience-Thinking Leadership Mindset, Relational Leadership Social-Ecological Systems

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## Chapter I: Introduction

Every day, leaders find themselves vulnerable to socially constructed disruptions that can have potentially dire consequences. Rogoway (2016a) reported that an online software development company's CEO implemented a self-imposed disruption that caused his organization to lose productivity and direction; it ended its "radical experiment in empowering employees" to "propose projects, manage themselves, and evaluate each other" (Rogoway, 2016a, p. C1). Its organizational structure that did away with managers didn't work. "We were naïve" (Rogoway, 2016a, p. C1), chief executive Ryan Carson said. While Carson felt the experiment was innovative and forward thinking, employees felt "adrift" (Rogoway, 2016a, p. C1), but with the return to a management system, they then felt left out of the decision-making process.

After a continuation of poor market performance, the Intel organization has planned to eliminate 12,000 jobs worldwide by the end of 2017 (Rogoway, 2016b). Amid rising employee dissatisfaction, chief executive Brian Krzanich pledged to restore confidence "after a painful round of layoffs and buyouts that strained morale," conceding that implementation of the job cuts was too "harsh and quick" (Rogoway, 2016b, p. C1). Krzanich addressed fears of a "Hunger Games" (Rogoway, 2016b, p. C1) mentality within the company that pits employees against one another instead of encouraging collaboration. "That's a risk," Krzanich said. "Any time you push more performance management, it drives individual accountability" (Rogoway, 2016b, p. C1). He did, however, emphasize that "rebuilding trust" (Rogoway, 2016b, p. C1) would become a top priority for the organization.

On June 23, 2016, the United Kingdom voted to exit the European Union. Known as Brexit, it was Prime Minister David Cameron's manufactured gamble: "Cameron in effect

became collateral damage in a battle he himself launched by promising he would offer the public a vote on the Europe issue if his Conservative Party won the 2015 general election” (Gross, 2016). The result caused a domino effect around the world as stock markets plummeted and businesses lost trillions in value. Commentators emphasized that faced with the uncertainty business owners and CEOs were trying to make sense of the situation.

What do these stories have in common? Each of these vignettes offers a glimpse into a leader’s governance: his relationship with others and his sensemaking—a cognitive process “by which people seek plausibility to understand ambiguous, equivocal or confusing issues or events” (Brown, Coville, & Pye, 2015, p. 265) of a situation or issue. The fact that organizations and their leaders face uncertainty and disruptions on a daily basis begs the question as to how can organizations—and their leaders—create environments that support adaptation, transformation, and learning in order to identify vulnerabilities, lessen impacts of disruptions, and become more resilient.

This dissertation has sought to address this question by investigating a particular facet of resilience referred to as *resilience thinking* (Walker & Salt, 2006) in the context of *relational leadership as mindful organizing* (Uhl-Bien, 2006; Weick & Sutcliffe, 2015). More specifically, I had set my sights on developing a means to allow an organization to assess its resilience-thinking leadership through the development of a resilience-thinking leadership mindset (RTLTM) construct and scale.

In order to grasp the concept of a resilience-thinking leadership mindset developed throughout this dissertation, however, it is necessary to sketch out the key terms associated with the concept. I will make use of the following wordlist (see Table 1.1) in Chapter I and throughout this dissertation:

Table 1.1

*Key Terms Associated With RTLM*

<b><u>Term</u></b>	<b><u>Definition</u></b>
• Adaptability	Social adaptive strategies and practices toward assessing and managing risk and vulnerability (Walker, Holling, Carpenter, & Kinzig, 2004).
• Adaptive Cycle/Panarchy	“A metaphor for describing change in ecological systems. However, it also has relevance for how social systems and social-ecological systems change through time” (Walker & Salt, 2006, p. 75). Panarchy: Term used to describe adaptive cycles embedded with adaptive cycles (Holling & Gunderson, 2002).
• Adaptive Capacity	A social system’s ability to build resilience to prevent and absorb disruptions through social networks (Carpenter, Walker, Anderies, & Abel, 2001; Folke, 2006), and social capital (Adger, 2000).
• Adaptive Governance	A “polycentric process of spanning decision-making from individual to collective levels, from lower to higher organizational levels” (Olsson et al., 2006, p. 2).
• Adaptive Learning	Combining multiple sources of information and knowledge to make sense of issues (Walker et al., 2006).
• Boundary Spanning	“The capability to establish direction, alignment, and commitment across boundaries in service of a higher vision or goal” (Ernst & Chrobot-Mason, 2011; Ernst & Yip, 2009, p. 87).
• Complex Adaptive Systems	Non-linear, self-organizing systems that are capable of adapting (Gunderson & Holling, 2002).

- Diversity

“Means that the individual, organization, or community does not rely completely on any one element for a critical function . . . it also means the system can draw on a range of capabilities, information sources, people or groups” (Rodin, 2014, “Diverse” section, para. 1).
- Intersubjectivity

Refers to shared understanding between and among individuals and groups (*The Sage Encyclopedia of Qualitative Research*).
- Leadership as a Social Construct

A socially constructed relational process that does not reside in an individual; it resides in interactions across boundaries (Cunliffe, 2009).
- Mindful Organizing

Consists of three practices:  
 —*Sensemaking*: constructing the circumstances that may seem to require a decision;  
 —*Organizing and collective sensemaking*: the content of discussions that are produced there, and ‘become’ the organization when the macro actors summarize and speak on behalf of a sample of these conversations;  
 —*Adaptive managing*: the task of attending to, sorting out, and prioritizing an inherently messy world of competing demands (Weick & Sutcliffe, 2015, “Infrastructure of Mindful Organizing”).
- Resilience-Thinking Leadership

Integrating two dynamic aspects of adaptability: the adaptive capacity of social systems and the adaptive governance of organizational leaders. Adaptive capacity assesses the interconnectedness of organizational social networks and systems while adaptive governance assesses distributed relational leadership indicators in order to expand collaborative decision making across organizational boundaries.



- Resilience  
 “The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks” (Walker et al., 2004, p. 3).
- Resilience Thinking  
 Stresses that both social systems and ecological systems are interconnected (Brand & Jax, 2007; Folke et al., 2010; Walker & Salt, 2006) and “incorporates the dynamic interplays of persistence, adaptability, and transformability” (Folke et al., 2010, p. 6) through cycles of change (Walker & Salt, 2006).
- Requisite variety  
 Increasing “repertoire of actions that register and control variations in input” (Weick & Sutcliffe, 2015).
- Risk  
 A “situation or event in which something of human value has been put at stake and where the outcome is uncertain” (Jaeger, Ortwin, & Webler, 2001, p. 17).
- Social-ecological systems  
 A complex adaptive system that places emphasis on the “human-in-nature” perspective (Folke et al., 2010, p. 3).
- Social Construction  
 Subjective interpretations (sensemaking) of an objectified socially constructed world (Sandberg, 2001).
- Sensemaking  
 “Involves the ongoing retrospective development of plausible images that rationalize what people are doing” (Weick, Sutcliffe, & Obstfeld, 2005, p. 409).  
 Simply put, sensemaking is about creating order from chaos through framing an event or an issue and taking action based on the frame.
- Sensemaking Mindset  
 Becoming aware of the properties involved in one’s own sensemaking, how his/her actions become a part of the process, and one’s biases that could lead to plausible



Two fundamental attributes of resilience play an important role in resilience thinking: adaptability and transformability (Folke et al., 2010; Walker et al., 2004; Walker & Salt, 2006). Walker et al. (2004) have defined adaptability as using social adaptive strategies and practices toward assessing and managing risk and vulnerability, whereas transformability has been defined as the “capacity to create a fundamentally new system when ecological, economic, or social structures make the existing system untenable” (p. 5). In other words, adaptability is about adjusting to the new environment while transformability is about changing a system’s identity.

Two domains of adaptability are governance and capacity. Adaptive governance includes social adaptive leadership strategies used to manage vulnerabilities and disruptions and has been defined as a polycentric process of spanning decision-making from individual to collective levels, from lower to higher organizational levels (Olsson et al., 2006). Adaptive capacity consists of a social system’s ability to build resilience to prevent and absorb disruptions through social networks (Carpenter et al., 2001; Folke, 2006)

Resilience thinking maintains that both social systems and ecological systems are interconnected (Brand & Jax, 2007; Folke et al., 2010; Walker & Salt, 2006); it focuses on how people interact within a particular context or environment. (Folke et al., 2010), and it “incorporates the dynamic interplays of persistence, adaptability, and transformability” (Folke et al., 2010, p. 6) through cycles of change (Walker & Salt, 2006).

For the purpose of my research study within the adaptive governance domain, I have defined the construct of resilience-thinking leadership (RTL) as integrating the dynamic interplays of two characteristics of adaptability: adaptive capacity of social systems and the adaptive governance by organizational leaders. Adaptive capacity assesses the interconnectedness of organizational social networks and systems. Adaptive governance, on the

other hand, assesses resilience-thinking leadership mindset factors in order to build resilience-thinking leadership aptitudes and mobilize them by expanding collaborative learning and decision making across organizational boundaries.

### **Purpose of This Study**

This dissertation has addressed two fundamental resilience-thinking issues that perplex organizational leaders. First, given the speed, complexity, and uncertainty of contemporary organizational sensemaking, leaders create and re-create social risks and, subsequently, expose their organizations and employees to vulnerabilities. Risks can stem from an overconfidence in organizational practices, a complacency in production processes, centralized decision-making, a lack of knowledge sharing, standardization, an all-encompassing need for efficiency, a reliance on technology, or a reliance on routines to name a few. Consequently, both trivial and major disruptions can affect production, innovation, profitability, decision-making, strategic planning, employees' work and morale at all organizational levels. In some instances even minor disturbances can pose a threat to an organization's survival. Often times, organizations and their leaders rely on maintaining traditional structures and strategic planning processes to assess strengths, weaknesses, opportunities, and threats (SWOT) as a means to anticipate potential risks and vulnerabilities, but they take little time to discover their social vulnerabilities and thus fail to adequately prepare for, respond to, or learn from inevitable disruptions (Cumming et al., 2005; Rodin, 2014; Tierney, 2014; Weick & Sutcliffe, 2015). Consequently, they leave themselves just as vulnerable as before.

Second, as a consequence of organizations' and their leaders' failure to fully recognize their social vulnerabilities and to adequately prepare, respond, and learn from ensuing disruptions, there has been the emergence of a diverse body of research focusing on the

assessment and management of resilience in the realm of disaster and ecosystem management (Adger, 2006; Cutter, Ash, & Emrich, 2014; Cutter et al., 2008; Gunderson & Holling, 2002; Holling, 1973; Lee, Vargo, & Seville, 2013; McManus, Seville, Vargo, & Brunsdon, 2008; Pelling, 2003; Rodin, 2014; Somers, 2009; Tierney, 2014; Walker & Salt, 2006, 2012).

Likewise, several researchers have begun to assess the construct of social-ecological resilience in terms of management (Adger, 2000; Carpenter et al., 2001; Cumming et al., 2005; Folke, 2006; Gunderson & Holling, 2002; Smit & Wandel, 2006; Vogus & Sutcliffe, 2007; Walker et al., 2004). These researchers have posited that social systems and ecological systems are interrelated and need managed as such.

The scope of these related areas of research on resilience has focused primarily on individual and community relationships to ecosystems. A scant amount of research, however, has been conducted on organizational resilience-thinking leadership (van der Vegt, Essens, Wahlstrom, & George, 2015). Consequently, calls for more research into and of the social attributes of organizational resilience thinking (van der Vegt et al., 2015; Vogus & Sutcliffe, 2007; Walker et al., 2004; Walker & Salt, 2006; Weick & Sutcliffe, 2015) from a social perspective have been suggested. As a result of these organizational leadership shortcomings and subsequent calls for more research into resilience management and leadership, the purpose of my dissertation has been to advance the concept of resilience-thinking leadership and to create an instrument that measures the prominent factors that serve to explain a resilience-thinking leadership mindset construct in the domain of adaptive governance.

### **Proposed Nature, Value, and Rationale of the Study**

The evolution of this dissertation involved both collaborative and individual components. My colleague, Eddie Perez, and I have been working toward developing an inclusive

measurement instrument that provides organizations with valuable insights into how its members talk and think about resilience thinking, how they perceive their organizational resilience in real time, and how they might build or expand organizational resilience-thinking leadership at all organizational levels. We have theorized two domains, one focused on an organization's adaptive governance the other on its adaptive capacity. Collectively, these domains form a two-path approach that allows an organization a means of understanding its potential to put into practice organizational resilience-thinking leadership mindset and network.

The long-term goal is to combine Mr. Perez's work in the domain of adaptive capacity with my work in the domain of adaptive governance. We believe this blending of social networks (adaptive capacity) and resilience-thinking leadership mindsets (adaptive governance) will provide an organization's leaders with multiple perspectives with which to assess their current state of resilience-thinking leadership in real time and their potential for developing it throughout their organization. They should also be able to identify areas both of promise and concern.

While Mr. Perez's research study has focused on the adaptive capacity domain and social networks, my focus has been entirely in the adaptive governance domain. My rationale for focusing this research study in the adaptive governance domain and the development of a resilience-thinking leadership mindset construct stems from the fact that risk, vulnerability, and resilience are fundamental characteristics of organizational leadership (governance) systems. As such, from a social-ecological systems approach to governance and management, resilient organizations are those that can enrich and expand their boundaries of organizational management to include a social-ecological systems dimension in order to adapt to risk and vulnerabilities by building their resilience-thinking leadership capabilities. Consequently, the

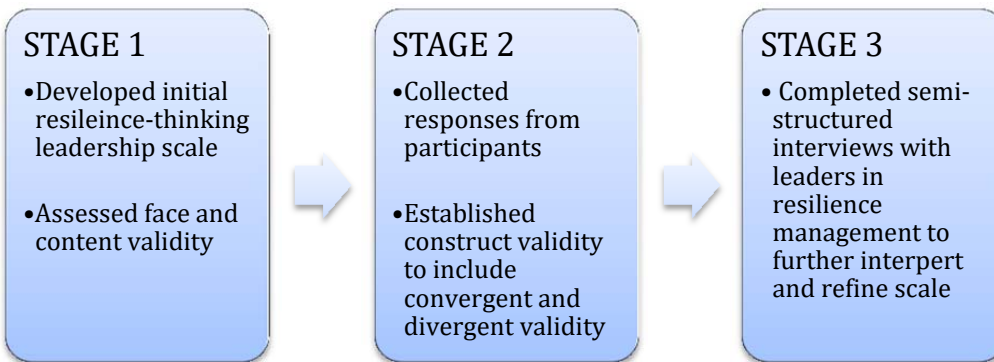
results of this study promise to give leaders a better understanding of the factors influencing social adaptability and adaptive governance by giving them a rapid assessment instrument (Abell, Springer, & Kamata, 2009) to both assess and develop an organizational resilience-thinking leadership mindset in their organizations.

### **Goals and Research Design**

The goals of this dissertation were to:

- Present a model that depicts the relationships among adaptive governance, a resilience-thinking leadership mindset construct, and its factors;
- Through a literature review, fully develop resilience-thinking leadership construct and identify theoretical factors;
- Define the key theoretical factors of the model and their relationship to each other;
- Develop a resilience-thinking leadership mindset scale and validate it through a factor analysis;
- Further interpret, understand, and refine the scale from feedback from leaders in resilience management.

The research study was conducted in a three-stage sequential mixed methods design. Stage 1 involved the development of the scale items and analyzing the scale, factors, and items for face and content validity. Stage 2 comprised conducting an initial study and employing statistical analysis to assess the construct validity and reliability of the factors. Stage 3 entailed presenting the scale to leaders working in the field of resilience management to further interpret and refine the scale. Figure 1.1 illustrates the three-stage mixed-methods design I followed.



*Figure 1.1.* Three-stage sequential mixed-methods design of the study.

### **General Research Questions**

Since the construct of leadership as a shared or relational decision-making process is a fundamental characteristic of adaptive governance, I set out to address two broad research questions: How can a resilience-thinking leadership mindset—a shared decision-making processes (Gronn, 2002) that emphasizes the adaptive/learning nature of systems (Uhl-Bien, Marion, & McKelvey, 2007)—be empirically measured in an organization, and how can I validate a resilience-thinking leadership mindset scale to assess its potential in an organization?

### **Mapping the Terrain**

**Why focus on resilience-thinking leadership?** The concept for this dissertation grew from the efforts of my colleague, Eddie Perez, and my interest in social justice for the poor in the arena of disaster relief. We were hoping to develop a means to provide the resources of water and temporary housing to individuals and communities immediately after a natural disaster through a less bureaucratic system. However, as we researched into how disaster relief organizations and Non-Governmental Organizations (NGOs) provide disaster relief and how the distribution of the disaster relief money—the “caravan” (Polman, 2010)—made it difficult for



one to work outside an affiliated disaster relief organization, we began to focus on how businesses might be able act as conduits for disaster relief.

As we continued to research complexity theory and complex adaptive systems (CAS) from natural disaster resilience perspectives, our original focus to limit our inquiry to disaster relief morphed. We became curious as to how organizations as complex social systems develop organizational resilience to deal with disruptions. Some organizations seemed to do a much better job adapting and bouncing back than others. My curiosity piqued around the concept of leadership as a boundary-spanning concept (Ernst & Chrobot-Mason, 2011) within organizations and how it enabled resilience thinking throughout an organization, while Mr. Perez's interest led him to question how social networks were interrelated with social capital to build a resilience thinking network within organizations.

As a result of our research together, we developed an organizational resilience-thinking leadership model (discussed below) that we believe identifies the major social components and traces the processes involved for practical application in organizations that see the need to learn, adapt, and possibly transform (Walker et al., 2004) in order to innovate and thrive in uncertain business environments. We refer to this collaborative model as a resilience-thinking leadership model (RTL). One reality emerged from our initial research: While both natural and human-made disruptions and disasters will always exist in our world, often times organizations' leaders exacerbate their risks and vulnerabilities (Weick & Sutcliffe, 2015).

**Why focus on adaptability?** When Mr. Perez and I began our research into resilience thinking leadership, we focused primarily on the concept of resilience and what that meant in relation to developing the concept of resilience thinking. However, the deeper we dug into discovering how to define, apply, and measure it, we discovered—much like peeling back the

layers of an onion—that it is multi-layered and both difficult to define and measure (Brand & Jax, 2007; Schipper & Langston, 2015). The most common definition of resilience—“the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks” (Walker et al., 2004, p. 2)—has been applied to ecosystems research (Holling & Gunderson, 2002; Walker & Salt, 2006, 2012) and research on disaster resilience (Rodin, 2014; Tierney, 2014). However, its popularity has resulted in the creation of multiple definitions by researchers in these disciplines as well as researchers in the social sciences (Brand & Jax, 2007; Schipper & Langston, 2015), and its overuse seems to have created a great deal of ambiguity as to its uniform meaning.

Adaptability, on the other hand, has been defined as the social component of developing resilience of a system: “individuals and groups acting to manage the system” (Walker et al., 2004, p. 3). Thus, adaptability includes the social processes through which the potential for resilience emerges. These adaptive processes include governance and capacity. To fully recognize the values of adaptability and adaptive governance, however, necessitates the understanding of complex adaptive systems and complex adaptive systems thinking (Uhl-Bien et al., 2007). Complex adaptive systems are characterized by the fact that they are self-organizing and able to adapt and learn. Walker and Salt (2006) have referred to a system’s adapting and learning as “adaptive cycles”: “The notion of an adaptive cycle developed as a metaphor for describing change in ecological systems. However, it also has relevance for how social systems and social-ecological systems change through time” (p. 75).

### **How does relational leadership as a social construct link to adaptive governance?**

The phenomenon of leadership underpins adaptive governance. However, leadership can be viewed from multiple perspectives. Some view leadership through an entity perspective (Ospina

& Uhl-Bien, 2012; Uhl-Bien, 2006) while others believe leadership to be a socially constructed, relational process (Cunliffe, 2009; Drath, 2001; Hosking, 1988; Ospina & Foldy, 2010; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012). I strongly lean toward the latter. The philosophy of Ricoeur (1995) has emphasized the relational nature of our being in the world, or, more specifically, as Cunliffe (2009) has stated, our being in relation to others. This frame positions leadership as emerging through socially constructed processes, through interactions among persons and groups. The idea that reality is socially constructed stems from Berger and Luckmann's (1967) seminal book, *The Social Construction of Reality*. Since then, many authors and researchers (Chia, 1995; Cunliffe, 2009; Drath, 2001; Fairhurst, 2011; Gergen & Gergen, 2004; Hosking, 1988; Ladkin, 2009; Maitlis & Sonenshein, 2010; Ospina & Foldy, 2010; Weick, 1995) have explored this concept from multiple perspectives and have described how it underlies much of how individual, group, and organizational cultures and assumptions are embedded and emerge as objective realities. Gergen and Gergen (2004) have offered a straightforward overview of what social construction means: "The foundational idea of social construction seems simple enough, but it is also profound. Everything we consider real is socially constructed" ("We Construct the World" section, para. 4).

Sandberg (2001) has further refined how the concept of social construction(ism) influences nearly every aspect of our lives and frames our worldviews:

The general tenet within social constructionism is that reality is not objective and given, but is socially constructed. More specifically, it is argued that all aspect of social reality such as male, female, family, identity, sexuality, genius, creativity, management, money, organization, and leadership can be seen as socially defined though ongoing actions, negotiations and agreements. (p. 28)

Sandberg went on to say "we are constantly involved in negotiation with other subjects about the reality in terms of our intersubjective [a shared understanding between people] sensemaking of

it. The agreed meaning constitutes the objective reality” (p. 37). Sandberg’s statement underscores the fact that we are constantly enmeshed and negotiating our subjective interpretations (sensemaking) of an objectified socially constructed world—a subjective interpretation that never quite catches up with the objective interpretation.

Bourdieu (1990) repositioned the idea of socially constructed objective reality with his concept of *habitus*. According to Swartz (1997),

*habitus* results from early socialization experiences in which external structures are internalized. As a result, internalized dispositions of broad parameters and boundaries of what is possible or unlikely for a particular group in a stratified social world developed through socialization. Thus, on one hand *habitus* sets structural limits for action. On the other hand, it generates perceptions, aspirations, and practices that correspond to the structuring properties of earlier socialization. (p. 103)

Ultimately, for Bourdieu (1990) social constructionism appeared to be about relationships, socialization, and power existing within and among those relationships.

Tierney (2014) has expanded on the ideas of these researchers and philosophers from the social constructionism arena and put them in the context of risk, vulnerability, and preparing for and recovering from disasters:

[B]oth perceptions and social activity are based not on our direct apprehension of ‘objective reality’ (in our case risk) but rather on systems of meaning that are provided by culture, developed through social interaction, and produced by claim-making activities that advance particular views of the world. (“Risk as Social Construction” section, para. 1)

Fairhurst (2011) has referred to these “views of the world” as frames, and the act of “claim-making” as *framing*. A frame is “that mental picture, and framing is the process of communicating that picture to others” (Fairhurst, 2011, p. 4). Consequently, framing or sensemaking is an act of social construction in which we make meaning of our social contexts.

Tierney (2014) has drawn attention to how

all aspects of social life, including those that are viewed immutable and acted on accordingly, are social creations that show variation both across societies and across time. These include such seemingly biologically based conditions as sex and sexuality, illness, childhood, and old age. Social activities and institutions are organized around such meanings, which receive reinforcement from culture. (“Risk as Social Construction” section, para. 1)

In other words, while various cultures differ to some extent, even those aspects of social life that are believed to be indisputable are firmly socially embedded (constructed) and reinforced by its culture.

From a social constructionist frame, then, social relationships, interactions, and networks are the conduits through which leadership emerges. Leadership, simply put, is a socially constructed relational process that does not reside so much in an individual; instead, it resides in interactions between and among individuals across many social boundaries. Consequently, leaders subscribing to a social constructionist frame understand that leadership in relation to others (Cunliffe, 2009) emerges from their interactions with others. Embedded in a social constructionist leadership framework are the concepts of relational, complexity, inter-group, and distributed leadership to name a few. Table 1.2 is a glossary of these socially constructed relational leadership constructs I have examined in this dissertation.

Table 1.2

*Glossary of Socially Constructed Leadership Constructs*

**Relational Leadership Construct**

**Definition**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Adaptive Leadership</li> </ul>       | <p>An emergent, interactive dynamic that is the primary source by which adaptive outcomes are produced (Uhl-Bien et al., 2007).</p>                                       |
| <ul style="list-style-type: none"> <li>• Administrative Leadership</li> </ul> | <p>Actions of individuals and groups in formal managerial roles who plan and coordinate organizational activities (the bureaucratic function; Uhl-Bien et al., 2007).</p> |

- **Boundary Spanning Leadership** “The capability to establish direction, alignment, and commitment across boundaries in service of a higher vision or goal” (Ernst & Chrobot-Mason, 2011; Ernst & Yip, 2009, p. 4).
- **Complexity Leadership** Emphasizes the adaptive/learning nature of systems. Uhl-Bien et al. (2007) posit three types of complexity leadership: adaptive, enabling, and administrative.
- **Distributed Leadership** Distributed leadership has similar characteristics as shared leadership, collaborative leadership, and co-leadership (Bolden, 2011); promotes the enactment of leadership at multiple levels (Ernst & Chrobot-Mason, 2011).
- **Resilience Thinking Leadership** A leadership process as a co-constructed act (Cunliffe & Eriksen, 2011; Drath, 2001; Ladkin, 2009; Ospina & Foldy, 2010; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012; Wheatley, 2006), emphasizing the adaptive/learning nature of systems (Uhl-Bien et al., 2007), and shared decision-making processes (Gronn, 2002).
- **Enabling Leadership** Enables adaptive dynamics and helps manage the entanglement between administrative and adaptive leadership (by fostering enabling conditions and managing the innovation-to-organization (interface; Uhl-Bien et al., 2007, p. 306).
- **Inter-Group Relational Leadership** “A leader working toward more positive relations between two groups” (Pittinsky & Simon, 2007, p. 599).
- **Relational Leadership** A relational or shared process, and in this context a relational leader who subscribes to a constructionist frame tends to view leadership, not residing in any one individual, but in one’s “relation to others” (Cunliffe, 2009; Cunliffe & Eriksen, 2011; Uhl-Bien, 2006) as an emergent property of interactions.

**How does a sensemaking mindset intersect with a resilience-thinking leadership mindset?** Sensemaking is weaved throughout leadership as a process (Hosking, 1988; Weick, 1995). Rodin (2014) has shown a sensemaking leadership mindset to be tied to resilience and is about change. Rodin has offered five characteristics which lay the groundwork for a sensemaking mindset: being aware, adaptive, diverse, integrated, and self-regulating. From this perspective, to develop a sensemaking mindset means that one is sensitive to adaptive change. She offered three practices: readiness, responsiveness, and revitalization that an individual or organization should develop in order to become mindful and resilient.

Likewise, Weick and Sutcliffe (2015) have suggested a sensemaking mindset begins with one becoming aware of the properties involved in one's own sensemaking, how his/her actions become a part of the process, and one's biases that could lead to plausible interpretations of an event or experience. As an organizational practice, Weick and Sutcliffe (2015) have proposed a concept they call *mindful organizing* which consists of "sensemaking, continuous organizing, and adaptive managing" ("The Infrastructure of Mindful Organizing" section, para. 1).

Most importantly, each of these sensemaking researchers believes diversity turns out to be an important aspect of both adaptability and resilience. Rodin (2014) has highlighted that diversity "means that the individual, organization, or community does not rely completely on any one element for a critical function . . . it also means the system can draw on a range of capabilities, information sources, people or groups" ("Diverse" section, para. 1).

Along with creating a diverse mindset, Ladkin (2009), through the lens of process philosophy, has presented an additional dialectical approach toward sensemaking leadership processes. She theorized that since the leadership moment is in many ways a co-created sensemaking or meaning-making moment between leaders and followers, one developing a

sensemaking mindset needs to become aware of the fact that meaning-making is an emergent process and to develop an awareness to read “the emerging patterns and become sensitive to already occurring changes” (p. 182). Moreover, a sensemaking mindset is one that is sensitive to the reflexive nature of sensemaking: “Rather than ‘providing answers, . . .’ ‘asking the right questions’ becomes critical in the meaning-making process” (Ladkin, 2009, p. 1). Consequently, the characteristics of a sensemaking mindset have become an integral part of the resilience-thinking leadership model and a resilience-thinking leadership mindset construct. Moreover, it has been reflected in the factors and items that reveal a RTLM.

### **Resilience-Thinking Leadership and Adaptive Governance Models**

Brit (2014) has suggested that model building is about attempting to understand relationships between and among concepts. As such, a model is a means to create a dialogue about the phenomenon in question and the relationships between concepts, factors, and indicators. However, a model is always a “simplification” of reality. Employing a model is an iterative process to help the researcher ask the “right questions” and “study processes” (Brit, 2014, p. 1). “Models may help us describe how aspects of situations are related to one another” (Brit, 2014, p. 1). Ultimately, Brit (2014) has considered the use of models primarily “as organizing devices for a continuing dialogue between multiple sources of data and assumptions” (p. 2). However, he also has cautioned that “such an approach requires relentless rethinking of the meaning of context, and action no matter what the scale of analysis or the sources of the data” (Brit, 2014, p. 2), and that model construction “is recognizing the extent to which values shape the research project” (Brit, 2014, p. 13).

As a sensemaking tool, models “tentatively specify what variables we believe are important, our current thinking about what their natures are, and how we believe they are related



to other variables in context . . . they facilitate sense making” (Brit, 2014, p. 15). And as a sensemaking tool, models can organize:

- *descriptive sensemaking*—being explicit as possible about the procedures used to gather data (p. 28)
- *interpretive sensemaking*—comprehending how those in the “situation see, define, and understand what is going on” (p. 34)
- *explanatory sensemaking*—linking the indicators to theoretical concepts (p. 38)
- and *predictability*—how it can be generalized (p. 41)

**Resilience-thinking leadership model.** With Brit’s (2014) ideas in mind, Mr. Perez’s and my goal in developing a resilience-thinking leadership model has been to explore the relationships between and among our phenomena of interest and explain how these relationships fit into our theoretical framework. Figure 1.2 illustrates the Resilience-thinking Leadership Model.

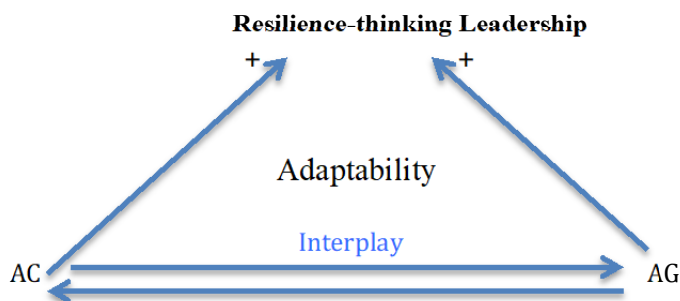


Figure 1.2. Resilience-thinking leadership model

A resilience-thinking leadership model relies heavily on the concept of adaptability, which we have divided into two domains: adaptive capacity (AC) and adaptive governance (AG). The model serves to illustrate the relationships (Walker & Salt, 2006, 2012) and the interplays between the adaptive capacity and adaptive governance dimensions. These domains serve as essential factors to foster organizational resilience-thinking leadership through adaptive

learning cycles (Folke, 2006; Gunderson & Holling, 2002; Walker & Salt, 2006, 2012).

However, while resilience thinking has its foundational principles in CAS, from my perspective it is also embedded in the constructs of relational, complexity, and distributed leadership theories and of developing a sensemaking mindset (Weick & Sutcliffe, 2015).

The organizational resilience-thinking leadership model specifies these relationships in terms of dialectical interplays (Schultz & Hatch, 1996) expressed by the arrows flowing in each direction. The arrows illustrate the linked relationships between the domains as “interplay” which refers to “the simultaneous recognition of both contrasts and connections between paradigms [domains]” (Schultz & Hatch, 1996, p. 534). The upward arrows pointing toward RTL signify this relationship. For the purpose of our individual research studies, Mr. Perez and I have developed the following definitions of adaptive capacity and adaptive governance:

Adaptive capacity (AC) refers to the strength and level of an organization’s social networks—the social ambidexterity an organization possesses and enhances. Adaptive governance (AG) refers to the level of a resilience thinking leadership mindset an organization possesses and the amount of capacity building and collaborative decision-making management supports. On the left, concepts and indicators within the adaptive capacity domain are the synthesis of an organization’s social network and its social capital (Aldrich, 2012; Colman, 1988; Lin, 2008; Pelling, 2003; Putman (1993). Exploring the adaptive capacity domain has been the focus of Mr. Perez’s research study.

**Initial adaptive governance domain model.** On the right of the RTL model is the adaptive governance domain (AG), which has been the entire focus of my research study. Similar to the resilience-thinking leadership model, my initial adaptive governance domain model illustrates the relationships within the adaptive governance domain and comprises the

interplay(s) of the resilience-thinking leadership mindset construct (RTLTM) and the factors that describe and explain it. Figure 1.3 illustrates my initial adaptive governance domain model.

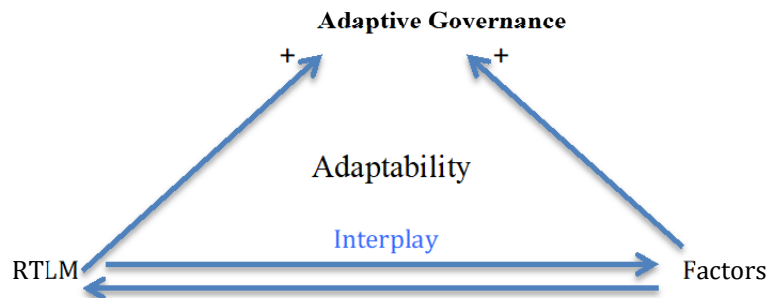


Figure 1.3. Adaptive governance domain model.

The RTLTM construct and the theoretical factors come from the synthesis of adaptive governance theory (Folke, 2006; Walker et al., 2004), relational leadership theory (Cunliffe, 2009; Cunliffe & Eriksen, 2011; Gergen & Gergen, 2004; Uhl-Bien, 2006), and associated relational leadership theories to include: distributed leadership theory (Bolden, 2011; Gronn, 2002; Spillane, 2005), inter-group relational leadership theory (Hogg, Van Kippenberg, & Rast, 2012; Pittinsky, 2009), complexity leadership theory (Uhl-Bien et al., 2007), boundary spanning theory (Ernst & Chrobot-Mason, 2011), complex adaptive systems theory (Gunderson & Holling, 2002; Walker & Salt, 2006, 2012), and sensemaking (Ladkin, 2009; Weick, 1995; Weick & Sutcliffe, 2015).

### Scope, Limitations, and Ethical Considerations

**The scope of the study.** The scope of the study has been to assess the relationships within the adaptive governance dimension. Likewise, my personal goal has been to gain a better understanding of the relationships between and among factors and indicators I had initially identified to create a RTLTM construct. Consequently, I created an RTLTM item response scale within adaptive governance domain.

**Assumptions of the study.** Several assumptions toward developing a RTLM construct and scale need to be stated. First, this study framed RTLM in the context of complex adaptive systems theory (Gunderson & Holling, 2002; Holling & Gunderson, 2002). Second, it framed adaptability (Walker et al., 2004) as the foundational social process from which resilience thinking emerges. Third, it has posited that adaptive governance is a socially constructed leadership processes essential to creating an organizational resilience-thinking leadership mindset. Consequently, it has been assumed that a better understanding of an organization's resilience-thinking leadership mindset would give it a means of creating learning processes of its own and better address risks, vulnerabilities, and disruptions in more innovative ways.

**Limitations.** The RTLM scale was designed to be valid and reliable in order to measure the potential for resilience-thinking leadership within an organization. In order implement an organizational resilience-thinking leadership mindset, organizations have to be willing to adapt. The scale will not apply to other circumstances. The initial RTLM survey was given to a diverse population consisting of over 300 participants. This research study has concentrated on the assessment of face, content, and construct validity of a resilience-thinking leadership mindset scale. In addition, a partial confirmatory factor analysis has been assessed. Predictive validity through a confirmatory factor analysis, however, was not assessed. Leaders in resilience management helped to further interpret, understand, and refine the revise RTLM scale.

**Ethical considerations.** I viewed my ethical considerations from a social constructionist perspective. Gergen and Gergen (2004) have delineated the moral aspects of a social constructionist viewpoint, pointing out that subscribing to a social constructionist viewpoint allows for multiple truths and opens more dialogue, especially in the case of minority voices:

Constructionism does not invite one to escape all moral visions; to do so would be to step out of all tradition . . . Indeed, for many scholars it is precisely the understanding of

moral ideologies as human constructions that have enabled them to speak out. For feminists, radical minority activists, gay rights activists, ex-mental patient groups, the deaf culture, and other minorities constructionist ideas have been deeply empowering. They invite open questioning of the status quo and the legitimating of one's otherwise marginalized. ("Beyond Moral Relativism" section, para. 2)

I have reflected on the phrase "do no harm." While the phrase refers to research practitioners taking steps to protect the population they are researching, Brit (2014) has pointed out that research is about opening dialogues. As an ethical consideration, then, I have been mindful of my influence, my biases, and my sensemaking as a researcher practitioner. I actively adhered to the dictum to be both reflective and reflexive (Cunliffe, 2004) as I had the most potential to do harm to the subjects, the data, and the results by not allowing for dialogues to emerge as I moved through each facet of the study.

### **Dissertation Chapters**

Chapter I has offered an introduction and presented an overview of this study, the importance of complex adaptive systems and social-ecological systems theory to the research study, my philosophical stance, a brief overview of the resilience-thinking leadership model, the adaptive governance model, and the concept of a resilience-thinking leadership mindset. Chapter II will offer a literature review over the primary theoretical concepts that had importance to the study and development of a resilience-thinking leadership mindset construct and scale. These concepts include complex adaptive systems theory, sensemaking, relational, complexity, and distributed leadership theories and boundary spanning. In addition, I will cover how scholars and researchers define the foundational terms and general factors and how they are used in studies. Chapter III will describe the methodology I used to complete the study. I included a rationale, which was supported by relevant scholarship, and stated the research goals. The study employed a mixed methods approach (Yin, 2013), using a survey to gather data and responses

from resilience managers to add depth to the study. Demographic data such as age, race, gender, and occupation was gathered as a part of the survey. Chapter IV will provide detailed analysis of the data and the results of each stage of the validity assessment. Chapter V will offer an analysis and discussion of both the quantitative and qualitative data and offer considerations for future research to include how organizations might use the resilience-thinking leadership mindset survey as a diagnostic tool.

## Chapter II: Critical Review of Theory and Research

This research study proposed to develop a new measurement tool to assess the potential within an organization's social structure to develop a *resilience-thinking leadership mindset* (RTLTM) by an organization's leaders, managers, and employees. The purpose of this chapter is to show how a resilience-thinking leadership mindset construct and a RTLTM scale serve to bridge four gaps in the literature by locating them in complex adaptive systems literature, presenting how they serve to advance organizational resilience literature and measurement, and demonstrating that they are a unique leadership construct and scale. Figure 2.1 illustrates the review process I followed.



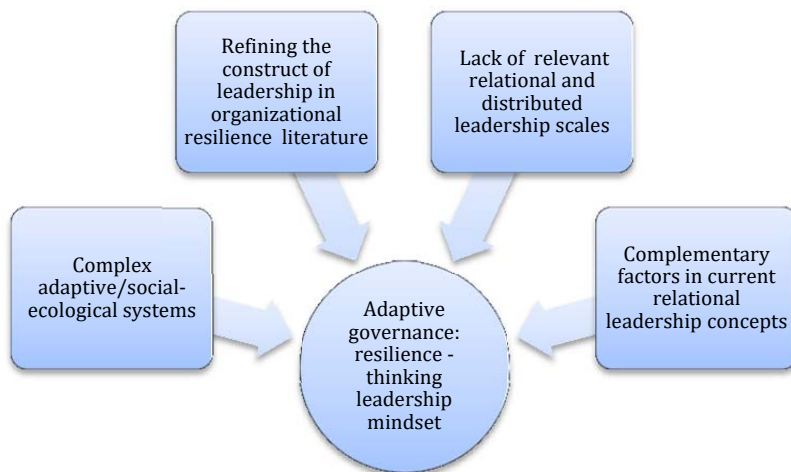
*Figure 2.1.* Construct and factor development process.

Four spheres of influence make clear the logic I followed to develop a RTLTM construct and scale:

1. Complex adaptive/social-ecological systems concepts describe the general resilience thinking attributes of adaptability and adaptive governance.
2. Further refinement of the construct of leadership as a distributed (boundary spanning), relational act of collective sensemaking in organizational resilience literature is warranted.

3. Relational and distributed leadership scales do not address the uniqueness of a resilience-thinking leadership mindset construct and scale.
4. Complementary relational leadership theories subscribing to leadership as a socially constructed phenomenon support a resilience-thinking leadership “mindset,” yet their factors need further refinement.

Figure 2.2 illustrates the convergence of literature and research that supports the development of a RTL construct and scale.



*Figure 2.2.* Convergence of resilience-thinking leadership mindset literature.

First, complex adaptive systems (CAS) and social-ecological systems (SES) theorists have emphasized that the concept of adaptability is the social aspect and/or influence within a CAS/SES (Walker et al., 2004). Likewise, SES theorists have suggested that the concept referred to as adaptive governance underscores that the management of organizational resilience emerges through leadership activities such as mindful organizing and distributing leadership processes throughout an organization (Folke, 2006; Weick & Sutcliffe, 2015).



Second, from studies to develop and measure organizational resilience and a community's resilience to natural disasters, leadership has been identified as an attribute of an organization's adaptive capacity (Lee et al., 2013; McManus et al., 2008). As such, leadership as an attribute tends to be measured as a part of the system/organization's structure or as an entity or trait-based attribute (Cutter et al., 2014; Cutter et al., 2008; Kantur & Iseri-Say, 2015; Somers, 2009). Ultimately, leadership in these contexts has been broadly defined and is in need of a more specific definition both in terms of leadership as a socially constructed relational process distributed by individuals throughout a system or organization and as a resilience-thinking leadership mindset (Tierney, 2014).

Third, a review of existing relational and distributed leadership measurement scales has tended to view the concept of relational and distributed leadership from an individual entity (being) perspective or from a trait-based perspective (Akram, Lei, Hussain, & Akram, 2016; Carifio, 2010; Grant, 2011; Hulpia, Devos, & Rosseel, 2009; Liden & Maslyn, 1998; Madlock, 2008; Ozer & Beycioglu, 2013; Wu, Wu, & Wu, 2013). Consequently, there has been a paucity of work to develop a scale focusing on resilience-thinking leadership factors that support resilience-thinking leadership mindset processes from a social constructionist perspective.

Finally, a need to develop a RTLTM construct has come from an outgrowth of a review of relational leadership theories that can be framed within a social constructionist mindset (Brown et al., 2015; Drath, 2001; Drath et al., 2008; Gergen, 2009; Gergen & Gergen, 2004; Hosking, 1988; Ospina & Foldy, 2010; Ospina & Uhl-Bien, 2012; Uhl-Bien, 2006; Weick, 2010; Weick & Sutcliffe, 2015). The concept of relational leadership as socially constructed, distributed throughout an organization, and emerging from relationship building across organizational boundaries has been integrated into several prominent leadership theories (Bolden, 2011; Brown

et al., 2015; Cunliffe, 2011; Drath, 2001; Drath et al., 2008; Ernst & Chrobot-Mason, 2011; Gronn, 2002; Hogg et al., 2012; Hosking, 1988; Ospina & Foldy, 2010; Ospina & Uhl-Bien, 2012; Pittinsky & Simon, 2007; Uhl-Bien, 2006; Weick, 2010; Weick, & Sutcliffe, 2015; Yip, Ernst, & Campbell, 2009).

Moreover, many of these relational leadership theorists have suggested that cultivating relational boundary-spanning mindsets would be an asset to organizations. Coincidentally, they have posited several theoretical factors that reveal relational leadership processes which complement the theoretical factors described within the adaptive governance domain. However, only indirectly have these relational leadership theories addressed the concept of leadership in relation to organizational resilience thinking in general or of leadership specific to a resilience-thinking leadership mindset construct. Consequently, a RTLM construct serves to fill this gap.

### **Definitions of Key Terms**

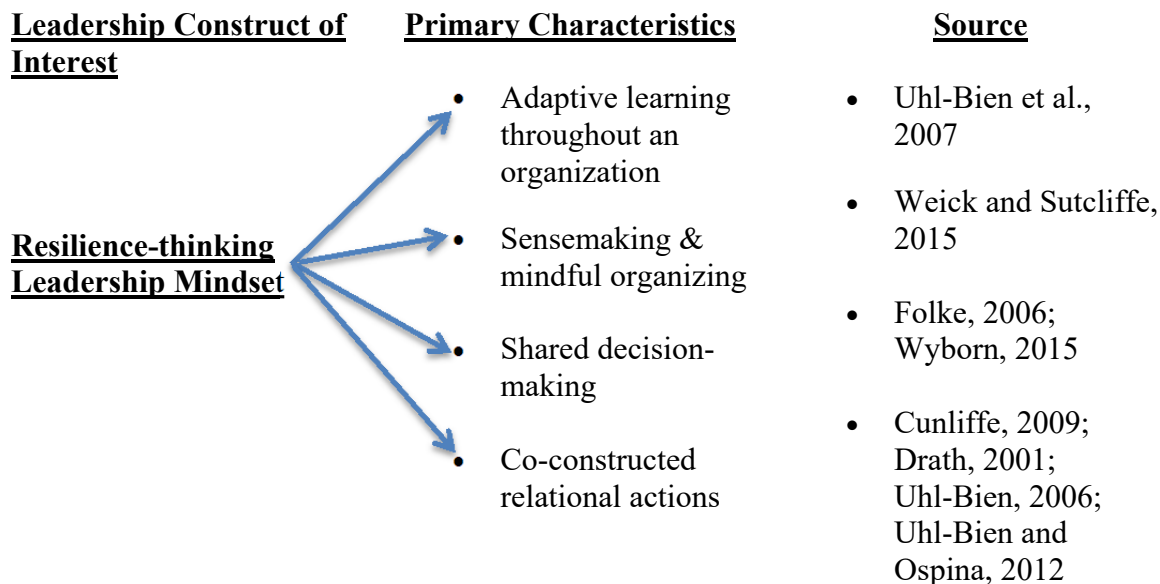
I have defined leadership as a socially constructed relational act between or among individuals and groups (Cunliffe, 2009; Drath, 2001; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012) that supports the shared purpose, commitment, and learning of the group or organization. A mindset is defined as a sensemaking act predicated on the belief that individuals, groups, and organizations can have the situational awareness to adapt, learn, and/or transform (Dweck, 2006; Weick & Sutcliffe, 2015) their organizations in times of disruption and change. Resilience thinking posits that both social systems and ecological systems are interconnected (Brand & Jax, 2007; Folke et al., 2010; Walker & Salt, 2006) and incorporate dynamic interplays of adaptive learning through cycles of change (Walker & Salt, 2006). Leadership, a sensemaking mindset, and resilience thinking are defined in Table 2.1.

Table 2.1

*Definitions of Leadership, Sensemaking Mindset, and Resilience Thinking*

<b><u>Term</u></b>	<b><u>Definition</u></b>	<b><u>Source</u></b>
• Leadership	A socially constructed relational act between or among individuals and groups that supports the shared purpose, commitment, and learning of the group or organization.	Cunliffe, 2009; Drath, 2001; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012
• Sensemaking Mindset	A cognitive act (sensemaking) that focuses on the belief that individuals, groups, and organizations can have the situational awareness and mindfulness to adapt, learn, and/or transform their organizations in times of disruption and change	Dweck, 2006; Weick & Sutcliffe, 2015
• Resilience Thinking	Stresses that both social systems and ecological systems are interconnected and incorporates dynamic interplays of adaptive learning through cycles of change.	Brand & Jax, 2007; Folke et al., 2010; Walker & Salt, 2006

At the outset of the research study, I theorized that a resilience-thinking leadership mindset (RTLTM) construct integrates the constructs of relational leadership, a sensemaking mindset, and resilience thinking. I, thus, defined a RTLTM construct as co-constructed relational acts among individuals and groups who promote the adaptive/learning nature of individuals and groups in systems through mindful organizing. Figure 2.3 offers my initial definition and primary characteristics of a resilience-thinking leadership mindset.



*Figure 2.3.* Initial definition and characteristics of a resilience-thinking leadership mindset.

### **Outline of the Chapter**

I begin this literature review by summarizing complex adaptive and social-ecological systems theory. I then turn to the concept of adaptive governance as a domain and offer a review of adaptive governance literature both to identify the theoretical factors posited by theorists and to demonstrate that the interplay between a RTLM and its factors is an essential aspect of adaptive governance. From this point, I explore literature concentrating on developing and assessing organizational resilience and building resilience from the effects of natural disasters to establish how leadership as a construct is measured as an indicator of resilience. Next, I look at several studies that have developed leadership scales in realms of relational and distributed leadership. Finally, I review several leadership constructs in the realm of socially constructed relational leadership which support the development of resilience-thinking leadership mindset factors.

I have divided the following discussion into three parts. Part 1 focuses on the sphere of complex adaptive systems and will:

- Present a review of complex adaptive systems to include the key concepts and a review of the social-ecological concepts associated with an adaptive cycle: risk and vulnerability, resilience, transformability, and adaptability;
- Evaluate adaptive governance's relationship to organizational resilience-thinking;
- Offer a working definition of adaptive governance and resilience-thinking leadership mindset as my primary constructs of interest within the adaptive governance domain.

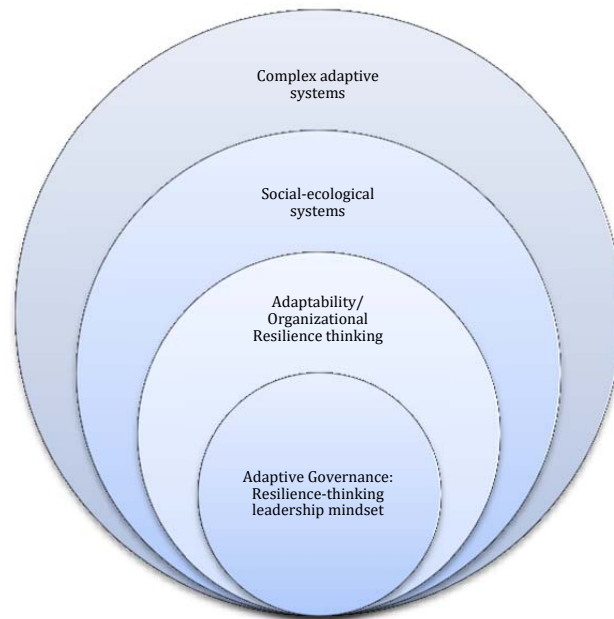
Part 2 focuses on the remaining three spheres of influence: (a) refining the construct of leadership in organizational resilience literature, (b) a lack of relevant relational and distributed leadership scales, and (c) a review of complementary factors in current relational leadership concepts and scales; and will:

- Review studies concerning assessing organizational resilience and building resilience from the effects of natural disasters;
- Review studies concerning developing relational and distributed leadership scales;
- Compare relational leadership constructs—which include sensemaking/mindful organizing, relational, complexity, boundary spanning, and distributed leadership all of which support a resilience-thinking leadership mindset construct.

Part 3 focuses on a review of resilience-thinking leadership mindset factors.

### **Part 1: Complex Adaptive/Social-Ecological Systems**

The importance of the embedded nature of a RTLTM within complex adaptive systems theory cannot be understated because the concepts of adaptability, adaptive governance, and resilience thinking have emerged from the concepts rooted in CAS theory. Figure 2.4 illustrates the embedded nature of these concepts.



*Figure 2.4.* Embedded nature of resilience-thinking leadership mindset in complex adaptive systems theory.

The concept of complex adaptive systems (CAS) has evolved from research concentrating primarily on ecosystems (Holling, 1973; Holling & Gunderson, 2002; Walker & Salt, 2006) and is characterized by the fact that complex adaptive systems are non-linear, self-organizing, and able to adapt to environmental change (Gunderson & Holling, 2002). This idea of complex adaptive systems thinking has come to include social-ecological systems (Adger, 2000, 2006; Carpenter et al., 2001; Cumming et al., 2005; Cutter et al., 2014; Cutter et al., 2008; Folke, 2006; Gunderson & Holling, 2002; Holling, 1973; Lee et al., 2013; McManus et al., 2008; Pelling, 2003; Rodin, 2014; Smit & Wandel, 2006; Somers, 2009; Tierney, 2014; Vogus & Sutcliffe, 2007; Walker et al., 2004; Walker & Salt, 2006, 2012). In essence, a social-ecological system is a complex adaptive system that integrates the interactions of a social system within an ecosystem (Folke, 2006). Table 2.2 is an index of key CAS/SES terms:

Table 2.2

*Index of Key CAS/SES Terms*

<b><u>Terms</u></b>	<b><u>Definition</u></b>
• Adaptive Cycle	“A metaphor for describing change in ecological systems. However, it also has relevance for how social systems and social-ecological systems change through time” (Walker & Salt, 2006, p. 75).
• Complex Adaptive Systems	Non-linear, self-organizing systems that are capable of adapting (Gunderson & Holling, 2002)
• Factor	“[A] indicator [factor] is a quantitative or qualitative measure derived from observed facts that simplify and communicate the reality of a complex situation (Freudentberg, 2003). Indicators [factors] reveal the relative position of the phenomena being measured and when evaluated over time, can illustrate the magnitude of change (a little or a lot) as well as direction of change (up or down; increasing or decreasing)” (Cutter, Burton, & Emrich, 2010, p. 2)
• Nested/ Embedded Panarchy	One CAS existing within another Term used to describe adaptive cycles embedded with adaptive cycles. (Holling & Gunderson, 2002)
• Scales	Boundaries or levels within a social-ecological system, i.e., between departments or levels of management
• Threshold	A term used for a system’s “crossing points that have the potential” alter the system’s future (Walker & Salt, 2006, p. 53).
• Trigger	Any type of system disruption

Complex adaptive systems are not static (Holling et al., 2002); they tend to move in cycles. Walker and Salt (2006) have referred to these cycles as adaptive cycles to describe how social-ecological systems change through time (p. 75). Both Walker and Salt (2006) and Holling and Gunderson (2002) have used the term adaptive cycle as a metaphor to illustrate the movement of a complex adaptive through time. Holling and Gunderson (2002) have illustrated

an adaptive cycle as a horizontal figure eight. They divided an adaptive cycle into two major phases (see Table 2.3), the fore-loop characterized by an incremental phase of growth and accumulation the back-loop characterized by the rapid phase of reorganization leading to renewal (Holling & Gunderson, 2002).

Table 2.3

*An Adaptive Cycle as a Horizontal Figure Eight*

<b><u>Fore-loop</u></b>	Slow, incremental phases of growth and accumulation
<ul style="list-style-type: none"> <li>• r-phase: The Exploitation Phase</li> <li>• K-phase: The Conservation Phase</li> </ul>	<p>Phase where competition leads to accumulation of capital [all types], development of networks, dominance over others, and more connectedness.</p> <p>Phase is one of maturity of a system and of becoming tighter, rigid, and in some cases over-connected in terms of bureaucracy, and more centralized control.</p>
<b><u>Back-loop</u></b>	Rapid “phases of reorganization leading to renewal.”
<ul style="list-style-type: none"> <li>• Omega phase: The Release or Creative Destruction Phase</li> <li>• Alpha phase: The Reorganization Phase</li> </ul>	<p>Phase begins with a “trigger” [a disturbance] (Holling &amp; Gunderson, 2002, p. 35) taking a system over a threshold and losing its connectedness.</p> <p>Phase is characterized by reorganization, innovation, and restructuring,</p>

Figure 2.5 is a representation of Holling and Gunderson’s (2002) conception of a CAS and its complex adaptive cycle.



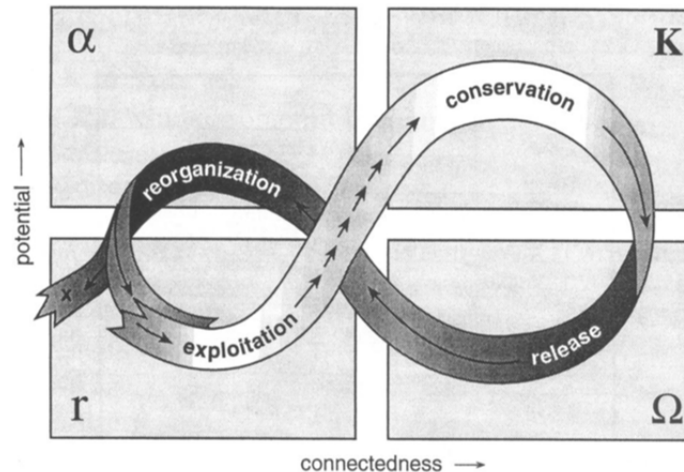


Figure 2.5. A complex adaptive cycle. From *Panarchy* edited by Lance H. Gunderson and C. S. Holling. Copyright © 2002 Island Press. Reproduced by permission of Island Press, Washington, DC.

Holling and Gunderson (2002) outlined each phase, each with its own distinct characteristics and types of risk, vulnerability and resilience. For instance, the fore-loop is characterized by the r-phase where competition leads to developing capital, networks, dominance over others, and more connectedness. The K or conservation phase is one of maturity of a system and of becoming tighter, rigid, and in some cases over-connected in terms of bureaucracy, and more centralized control.

The back-loop begins with the omega phase, the release phase, as a disturbance “triggers” (Holling & Gunderson, 2002, p. 35) a system over a threshold, and the system loses its connectedness. The omega phase transitions into the alpha phase which is characterized by reorganization, innovation, and restructuring. Each phase has a higher or lower potential for risk, vulnerability, and resilience. Similarly, each phase has a higher or lower potential for connectedness.

The most important feature of a complex adaptive system is that it is multi-layered, existing on multiple levels where a number of complex adaptive systems are nested or embedded within each other (Holling & Gunderson, 2002), each possessing its own “attributes” (p. 78).

These multiple levels are referred to as scales (Holling & Gunderson, 2002; Walker & Salt, 2006). While it is common to describe these vertical and horizontal scales in terms of a hierarchy, Holling and Gunderson (2002) have pointed out that the term “hierarchy” has tended to describe a top-down relationship—“The structural, top-down aspect has tended to dominate theory and application, however, reinforced by the proper, everyday definition of *hierarchy* that is vertical authority and control” (p. 73).

In complex adaptive systems thinking, on the other hand, since these hierarchies are neither static nor linear, Holling and Gunderson (2002) have reasoned that they should not be considered top-down; instead, they should be seen as “transitory structures, maintained by the interaction of changing processes across scales” (p. 72). Consequently, Holling and Gunderson (2002) coined the term “panarchy” to describe the nested relationships of adaptive cycles:

Since the word hierarchy is so burdened by the rigid, top-down nature of its common meaning, we prefer to invent another term that captures the adaptive and evolutionary nature of adaptive cycles that are nested within the other across space and time scales. We call them *panarchies*. (p. 74)

Figure 2.6 illustrates a structural nature of panarchies.

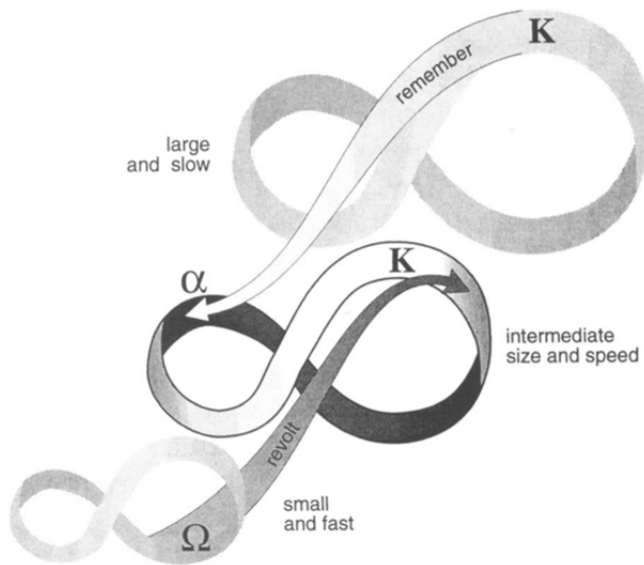


Figure 2.6. Panarchies. From *Panarchy* edited by Lance H. Gunderson and C. S. Holling. Copyright © 2002 Island Press. Reproduced by permission of Island Press, Washington, DC.

For Holling and Gunderson (2002) the term panarchies better described how a CAS is an integration of nested or embedded systems within systems. The larger, slower levels maintain the system by keeping it stable while faster nested levels innovate, experiment and create. Holling and Gunderson (2002) have defined these cross scale interactions in terms of sustainability:

The fast levels, invent, experiment, and test; the slower levels stabilize and conserve accumulated memory of past successful, surviving experiments. The whole panarchy is both creative and conserving. The interactions between cycles in a panarchy combine learning with continuity. . . . Sustainability is the capacity to create, test, and maintain adaptive capability. (p. 76)

The concepts of risk, vulnerability, and resilience within a complex adaptive system, subsequently, drive a complex adaptive system's needs to adapt, learn, or transform (Holling & Gunderson, 2002; Scheffer, 2009; Walker & Salt, 2006, 2012). Thus, these three characteristics inherent in complex adaptive systems play key roles when addressing how adaptive governance within a CAS emerges.

**Social-ecological systems.** The concept of social-ecological systems (SES) as a complex adaptive system hinges on recognizing that ecological systems and social systems are not separate (Berkes, Colding, & Folke, 2003; Folke et al., 2010), but interconnected. The term social-ecological system “emphasizes the integrated concept of humans in nature” (Berkes et al., 2003, p. 3). The *social* of SES stresses the governance aspects of managing SES while the *ecological* underscores the interactions of the communities within a system (Berkes et al., 2003). Ultimately, SES are “about people and nature as interdependent systems” (Berkes et al., 2003, p. 3), whose feedback loops govern the dynamics of the particular SES (Berkes et al., 2003).

Several concepts affect the dynamics of a SES. These include risk and vulnerability, resilience, transformability, and adaptability (Folke et al., 2010; Walker et al., 2004; Walker et al., 2006). Below I discuss each in turn.

**Risk and vulnerability.** Risk refers to “a situation or event in which something of human value (including humans themselves) has been put at stake and where the outcome is uncertain” (Jaeger et al., 2001, p. 17). While risk implies the “potential for harm, damage or loss,” it also implies the “potential for gain or benefit” (Tierney, 2014, “Risk, Hazard, and Vulnerability” section, para. 2). However, the uncertainty of the outcome stems from the fact that in many cases a risk or risks are not clearly evident and may lie outside an individual’s or a community’s ability to understand and assess it/them. Often times, these risks have been socially constructed (Tierney, 2014). And since people can be unaware of risks to which they have been exposed, they may take actions without knowing the extent or the possible consequences of the risk.

Vulnerability has been defined in terms of “the stresses to which a system is exposed, its sensitivity, and adaptive capacity” (Adger, 2006, p. 269). Vulnerability is a counterpart to risk.

Pelling (2003) has stated that vulnerability is typically measured by a person's or community's exposure to a hazard. Pelling has gone on to assert that vulnerabilities are "presented as root causes via intervening dynamic pressures that link global or historical forces with the immediate conditions that superficially indicate danger" ("A History of Human Vulnerability" section, para. 3). Tierney (2014) has argued the technical definition of vulnerability "arises from properties or characteristics of systems and subsystems that are of importance to people and societies: ecosystems, infrastructure systems and the built environment in general, and social systems" ("Risk, Hazard and Vulnerability" section, para. 4). In other words, vulnerability stems from its relation to risk and the amount of exposure to that risk. Vulnerability is not what will happen to a person, community, or organization, but what could happen to each (Tierney, 2014). Almost on a daily basis knowingly or unknowingly, people create risks and thus become vulnerable to the potential consequences of those risks.

**Resilience.** There is not a scarcity of definitions as to what the term resilience means (Schipper & Langston, 2015). Stein (2013) has listed 59 distinct definitions of resilience from 2001 to 2013. In a recent study, Cutter et al. (2014) identified six categories of resilience related to disaster resilience and 49 indicators. These resilience categories included social, economical, institutional, housing/infrastructure and environmental resilience. Brand and Jax (2007) have identified 10 definitions for resilience which they divided into three broad concepts: definitions that are descriptive concepts, definitions that are hybrid concepts which are combinations of both descriptive and normative concepts, and definitions that are normative concepts (p. 2).

Following Holling (1973), Walker and Salt (2006) have developed the most often cited definition of resilience in social-ecological literature as "the ability of a system to absorb disturbance; to undergo change and still retain essentially the same function, structure, and

feedbacks” (p. 32)—“its identity” (p. 113). Scheffer (2009) has also employed this definition in his book *Critical Transitions in Nature and Society*, stating it has become somewhat of the universal definition of resilience. The Resilience Alliance ([resiliencealliance.org](http://resiliencealliance.org)) also mirrored Walker and Salt’s (2006) definition of resilience stating resilience is

the capacity of a social-ecological system to absorb or withstand perturbations and other stressors such that the system remains within the same regime, essentially maintaining its structure and functions. It describes the degree to which the system is capable of self-organization, learning and adaptation (Gunderson & Holling, 2002; Holling 1973; Walker, Holling, Carpenter, & Kinzig, 2004). (“Resilience,” n.d., para. 1)

Because of the considerable number of definitions of resilience, Brand and Jax (2007) have advanced the proposition that as a descriptive concept, resilience has been diluted and is in danger of becoming an ambiguous term because the hybrid and normative concepts of resilience have broadened the original descriptive concept. They have argued that

both conceptual clarity and practical relevance are critically in danger. The original descriptive and ecological meaning of resilience is diluted as the term is used ambiguously and in a very wide extension. This is due to the blending of descriptive aspects, i.e., specifications of what is the case, and normative aspects, i.e., prescriptions what ought to be the case or is desirable as such. (p. 1)

They concluded the concept of resilience has become a “boundary object” (p. 8), a concept that “facilitates communication across disciplinary borders by creating a shared vocabulary although the understanding would differ regarding the precise meaning of the term in question” (p. 9). In this case, they see resilience as a “perspective,” a way of thinking or as an “approach to address learning, leadership, and adaptive governance” (p. 9).

Duit, Galaz, Eckerberg, and Ebbesson (2010) have contended the concept of resilience is “a cumbersome concept for social science” (p. 365) because it creates conflicts with “cornerstone concepts in social science such as power, democracy, and the right of self-determination when attempting to apply the concept of resilience to questions of politics and governance” (p. 365).

They suggested one approach to “unpacking resilience in social-ecological systems” is by recognizing that resilience is “inherently a matter of social framing by actors with different preferences and resources” (Duit et al., 2010, p. 365).

Cutter et al. (2008) have offered advice toward defining resilience: Since the concept of resilience has become multidimensional when it comes to measuring resilience, context is critical, and it comes down to defining the context. “The challenges in constructing techniques of measurement for resilience lay in its multifaceted nature, and beg the question of resilience *of* what and *to* what (Carpenter et al., 2001)” (Cutter et al., 2008, p. 603).

The Community and Regional Resilience Institute (CARRI) has categorized the many definitions of resilience in relation to how communities or organizations “respond to some adverse event, a crisis” (“Definitions of Community Resilience,” 2013, p. 3). It divided 46 definitions of resilience into five core concepts:

- Attribute—resilience is an attribute of the community
- Continuing—a community’s resilience is an inherent an dynamic part of the community
- Adaptation—the community can adapt to adversity
- Trajectory—adaptation leads to a positive outcome for the community relative to its state after a crisis, especially in terms of functionality
- Comparability—the attribute allows communities to be compared in terms of their ability to positively adapt to adversity (“Definitions of Community Resilience,” 2013, p. 2)

Because of how the definitions have been used, they have concluded that it is difficult to choose a “best” (“Definitions of Community Resilience,” 2013, p. 10) definition, for each has led to

“positive contributions within its domain” (“Definitions of Community Resilience,” 2013, p. 10). Thus, they emphasized using the best definition to “reflect the way it will be used” (“Definitions of Community Resilience,” 2013, p. 10).

In the same vein, to tease apart the unique aspects of resilience within a SES, Folke (2006) further developed Carpenter et al.’s (2001) interpretation of resilience as a social-ecological concept by showing it has three distinctive aspects within two perspectives: that of the ecosystem and that of the social system, which emphasizes both adapting and learning:

- That of the ecosystem:
  - “The amount of disturbance a system can absorb and still remain within the same state or domain of attraction” (Folke, 2006, p. 259).
- That of the social system:
  - “The degree to which the system is capable of self- organization (versus lack of organization, or organization forced by external factors),
  - “The degree to which the system can build and increase the capacity for *learning and adaptation* (emphasis added)” (Folke, 2006, p. 260).

Clearly the concept of resilience is multi-faceted. Resilience within a CAS can be viewed as a metaphor (Holling & Gunderson, 2002; Scheffer, 2009; Walker & Salt, 2006, 2012) to describe how a social-ecological system adapts or transforms to disruptions. In addition, all of these definitions and analyses of resilience as a concept underscore the fact that while resilience helps a system maintain its structure and function, to have resiliency means the social-ecological system has the capability to adapt and learn (Cutter et al., 2008; Folke, 2006; Folke et al., 2010; Gunderson & Holling, 2002; Walker et al., 2004; Walker & Salt, 2006).



Transformability is an interesting attribute of resilience. Simply put, transformability is the capacity for a social-ecological system to create a new system if the need arises (Walker et al., 2004). Transformations are extreme responses to disruptions. Transformations occur when the current system can no longer adapt to changes or when it is untenable to remain in the current system. This type of change may require major social disruptions (Walker et al., 2006).

“Transformational change often involves shifts in perception and meaning, social network configurations, patterns of interactions among actors including leadership and political and power relations, and associated organizational and institutional arrangements” (Folke et al., 2010, p. 5). Depending on the context, actors in the social-ecological system can make a conscious choice to initiate a transformation—an internal transformation—or it can be forced upon them through an external event(s). In terms of organizational resilience thinking transformability is understood as changing the system.

**Adaptability.** Adger (2000), Cumming et al. (2005), and Folke (2006) have defined the social aspect of social-ecological resilience in terms of adaptability—the ability to learn and adapt to environmental change. “Social resilience is an important component of the circumstances under which individuals and social groups adapt to environmental change” (Adger, 2000, p. 349). Walker et al. (2004) have argued that adaptability is an “attribute” of a complex system:

Resilience of a system needs to be considered in terms of the attributes that govern the system’s dynamics. Three related attributes of social—ecological systems (SESs) determine their future trajectories: resilience, adaptability, and transformability. (p. 1)

While they have defined resilience as the “capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks” (Walker et al., 2004, p. 2), they have characterized adaptability as the

“capacity of actors in a system to influence resilience” and as “a function of the social component—the individuals and groups acting to manage the system. Their actions influence resilience, either intentionally or unintentionally” (p. 3). Folke (2006) has emphasized that adaptability in a resilience framework not only implies the adaptive capacity of a social-ecological system to respond within the social domain, but also its ability to respond to and shape ecosystem dynamics and change in an informed manner (Berkes et al., 2003, p. 262).

Merging the concepts of resilience and adaptability, Walker and Salt (2006) have concluded that in essence “resilience thinking is systems thinking” (p. 31). From a social-ecological perspective, they have defined resilience thinking as an “approach to managing natural resources that embraces human and natural systems as complex systems continually adapting through cycles of change” (Walker & Salt, 2006, p. 10). Likewise, from a sociological perspective, Vogus and Sutcliffe (2007) have determined resilience thinking is a learning mindset, which relies upon “processes, structures, and practices that promote competence, restore efficacy” (p. 3419).

**Conclusion.** To summarize, it is a system’s adaptability or, more specifically, its adaptive governance structure that operationalizes resilience (Walker & Salt, 2006). Thus, the attributes of adaptability are the primary force behind the development of an organizational resilience-thinking leadership model and, subsequently, a resilience-thinking leadership mindset construct.

**Adaptive governance.** Adaptive governance (AG) can be framed as the conceptual umbrella for approaches seeking to “integrate knowledge of social and ecological systems into inclusive decision-making that anticipates, learns from, and responds to change” (Wyborn, 2015, p. 57). Through adaptive governance processes, an organization remains poised to manage its

resilience potential (Lebel et al., 2006). Adaptive governance has been described as a “polycentric process of spanning decision-making from individual to collective levels, from lower to higher organizational levels to provide a balance between decentralized and centralized control” (Olsson et al., 2006, p. 2). Likewise, it can be seen as a social adaptive strategy used to manage vulnerabilities and disruptions. Folke (2006) has argued an

adaptive governance framework relies critically on the collaboration of a diverse set of stakeholders operating at different social and ecological scales in multi-level institutions and organizations (Olsson et al., 2004). Individual actors play essential roles in providing leadership, trust, vision and meaning, and in social relations e.g. actor groups, knowledge systems, social memory. (p. 262)

The Resilience Alliance (2010) has contended that adaptive governance “can enhance resilience by encouraging flexibility, inclusiveness, diversity, and innovation” (p. 37), and it can facilitate numerous functions throughout an organization which include: “interaction across organizational levels, experimentation, new policies for ecosystem management, novelty in cooperation and relationships among agencies and stakeholders, new ways to promote flexibility, and new institutional and organizational arrangements” (p. 37). Wyborn (2015), Folke (2006), and the Resilience Alliance (2010) have clearly pointed out that adaptive governance operationalizes resilience thinking by crossing both vertical and horizontal organizational management boundaries to include shared or collaborative sensemaking and decision-making throughout an organization.

Moreover, Folke, Hahn, Olsson, and Norberg (2004) have perceived adaptive governance systems as self-organized in social networks with teams and actor groups that draw on various knowledge systems and experiences for the development of a common understanding and policies (p. 441). Cundill, Leitch, Schultz, Armitage, and Peterson (2015) have stated “Adaptive governance focuses on boosting learning through knowledge sharing across scales in order to

bridge various organisations and institutions. This cross-scale focus on learning is pursued in order to develop new social norms and cooperation” (p. 174). Likewise, Olsson, Folke, and Berkes (2004) posited that “dynamic learning” is a characteristic of a collaborative co-management and is foundational to adaptive governance (p. 75). Social learning entails collective learning, reflexive practice, and action (Wyborn, 2015), while co-management involves distributing leadership across boundaries (Ernst & Chrobot-Mason, 2011; Gronn, 2002; Yip et al., 2009). Adaptive governance characteristics include: (a) Collaboration: working with diverse groups to make decisions (Folke, 2006; Folke et al., 2005; Wyborn, 2015); (b) Distributing leadership: distributing decision-making across vertical and horizontal boundaries, from more centralized to more decentralized (Folke, 2006; Wyborn, 2015); (c) Diversity and innovation: encouraging multiple sources of information and creative thinking (Resilience Alliance, 2010); (d) Knowledge sharing and learning: sharing information across boundaries and learning from information shared (Cundill et al., 2015; Folke et al., 2006; Wyborn, 2015); (e) Shared or distributed decision making: collective meaning making/decision-making (Folke et al., 2005; Olsson et al., 2006); (f) Spanning of boundaries: relationship building across organizational boundaries (Folke, 2006; Resilience Alliance, 2010; Wyborn, 2015); and (g) Trust: shared understanding among individuals and groups (Lebel et al., 2006). Leadership as socially constructed relational acts between or among individuals and groups (Cunliffe, 2009; Drath; 2001; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012), thus, becomes a factor in how the characteristics of adaptive governance are managed within a system’s adaptive cycle. Walker et al. (2006) have determined leadership is a part of a systems social capacity:

Given the varying conditions of the different stages of an adaptive cycle there is no single style of leadership that guarantees adaptability and transformability. Rather, leadership needs to be a dynamic process, including changes in leaders, that is responsive to prevailing social and biophysical conditions. (p. 7)

As a factor of leadership across boundaries Lebel et al. (2006) posited that trust through participation and shared understanding are essential to the capacity of a social system to manage its resilience. Folke et al. (2010) have theorized that resilience thinking is central toward the governance of a social-ecological system. Consequently, three fundamental qualities have come to characterize adaptive governance in relation to resilience thinking leadership:

- Adaptive governance is associated with a system's management of resilience and how resilience-thinking leadership is enacted and distributed throughout an organization.
- Adaptive governance of a complex adaptive system underscores relational, distributed, and mindful leadership factors of a resilience-thinking leadership mindset.
- Knowledge sharing and learning, shared/distributed decision-making processes, collaboration, diversity and innovation, and boundary spanning are principal factors of a resilience leadership mindset in the domain of adaptive governance.

Clearly, the adaptive governance domain plays a critical role in developing an organization's resilience-thinking leadership mindset. A resilience-thinking leadership mindset aptly describes this prime leadership construct that integrates leadership factors within the adaptive governance domain. Figure 2.7 illustrates my initial adaptive governance domain model as an adaptive interplay between a resilience-thinking leadership mindset (RTLTM) and its theoretical factors.

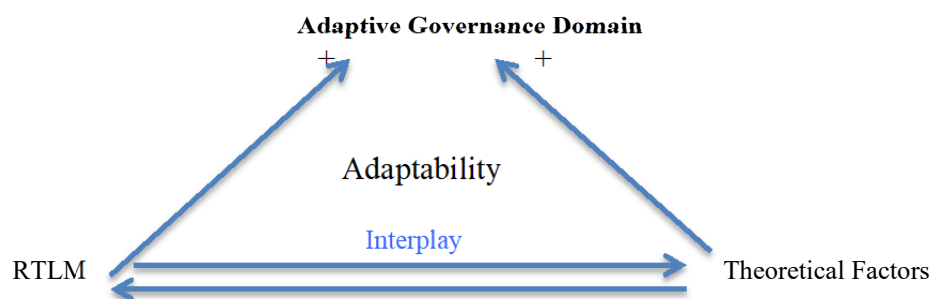


Figure 2.7. Preliminary adaptive governance domain model.

I had originally theorized that individuals and/or groups supporting a RTLM throughout an organization and facilitating its emergence through the interplays with relational factors are essential to the adaptive governance domain.

## Part 2: Organizational Resilience and Disaster Resilience Literature Review

A second sphere of influence that supports the development of a resilience-thinking leadership mindset construct comes from studies from the disciplines of disaster and organizational resilience. Since studies in disaster and organizational resilience are relatively new fields of study, researchers tend to study the attributes of governance and leadership in studies on disaster resilience and organizational resilience. These studies reveal that the attribute of leadership encompasses a broad range of meanings. For example, several studies in the area of disaster resilience focus on the attribute of leadership in terms of an organization's structure. In addition, two prominent studies in the area of organizational resilience tend to define and measure the attribute of leadership as entity or trait-based. I will explore each of these aspects of leadership below.

**Leadership as a part of the organizational structure.** Tierney and Bruneau (2007), examining recovery from disaster by looking at both the “attributes and determinants” (p. 15),

posited that “resilience-enhancing measures” (p. 15) seek to reduce the gap from disaster to recovery through strategies that mitigate the destruction and reduce the time for recovery. They presented a 4R framework:

- *Robustness*, the ability of a system to withstand a disaster without a great loss of performance
- *Redundancy*, the extent to which system elements are substitutable
- *Resourcefulness*, the ability to diagnose problems and initiate solutions through mobilizing appropriate resources
- *Rapidity*, the capacity of the system to bounce back in a timely way (Tierney & Bruneau, 2007, p. 15).

Further, they proposed that resilience refers to both its inherent and adaptive properties. Inherent “refers to an entity’s ability to function well during [noncrisis] times” (Tierney & Bruneau, 2007, p. 17), and adaptive resilience refers to “an entity’s demonstrated flexibility during and after disasters” (Tierney & Bruneau, 2007, p. 17). They advanced four dimensions of resilience: technical, organizational, social, and economic. The technical refers to a system’s physical properties, organizational denotes the management of resilience, (including leadership), social signifies the characteristics of a community that makes it more or less vulnerable and/or adaptable, and economic refers to the capital that comprises the system. Consequently, they reasoned that the 4R framework would allow communities to assess ways to enhance resilience through decision-making processes to develop organizational or community capacities to respond and cope with disasters. This framework was used as a basis for the following study.

Kantur and Iseri-Say (2015) sought to develop an organizational resilience scale adopted from Tierney and Bruneau’s (2007) 4R framework due to the paucity of scales to measure

organizational resilience. Their mixed-method approach began with semi-structured interviews to develop themes; second, they reviewed emergent themes with a focus group to develop a content analysis of 26 items. Subsequently, they developed an organizational resilience construct originally using six dimensions and 23 items based on the literature and their content analysis. Through scale validation they reduced it to three: robustness, agility, and integrity with 12 items all of which addressed organizational governance as a resilience factor. The items closest to addressing the attribute of leadership the researchers measured were “to be powerful” and “powerful management structure” (Kantur & Iseri-Say, 2015, pp. 460–461). None of the items addressed specific relational leadership attributes, practices or mindsets.

Cutter et al. (2008) offered a framework to assess disaster resilience they referred to as the disaster resilience of place (DROP) model. The DROP model was designed to “present the relationship between vulnerability and resilience” (p. 602), and offered six dimensions to consider: ecological, social, economic, institutional, infrastructure, and community competence. Under the institutional dimension, they included leadership as a structural element or the capacity of an organization’s leadership structure and cited the example of a hierarchical vs. integrated leadership structures. In terms of leadership, they suggested that a more command and control organizational structure offers less flexibility while a more integrated organizational structure “encourages flexibility and adaptation” (Cutter et al., 2008, p. 604).

Cutter et al. (2014) followed the Cutter et al. (2008) study by focusing on ‘inherent disaster resilience’ (p. 66). It, too, subscribed to the disaster resilience of place (DROP) model proposed by Cutter et al. (2008). Their development of a placed based metrics sought to “capture a snapshot of all facets of a community that can be integrated toward the goal of enhancing disaster resilience: its infrastructure, its governance structures, economy, natural resources and



attributes, and its demographic character and social interactions” (Cutter et al., 2014, p. 66).

They created a composite index of community resilience to disasters from data collected from governmental sources, academic sources, and non-profit sources. The index included six types of resilience: social, economic, community, institutional, housing/infrastructure, and environmental with 61 variables. Under the heading of Institutional Resilience, indicators related to “governance of disaster resilience” (Cutter et al., 2014, p. 67) were limited to coordination of agencies, not specific leadership practices, activities, or behaviors.

Leitch and Bohensky’s (2014) study focused on how a community’s structure is a key aspect of its resilience. They studied how the term resilience was represented in the media after a natural disaster. They considered three attributes of resilience they believed to be important in “determining how communities respond to disasters” (Leitch & Bohensky, 2014, p. 14). These key attributes included (a) structure and function, (b) self-organization, and (c) learning and adaptation (p. 14). They concluded that

resilience resides in a system’s structure and function, while self-organization and learning and adaptation exhibit a higher-level [of] interdependent relationship: self-organization is needed to maintain structure and function and to enable learning and adaptation; learning and adaptation allow structure and function to be adjusted if needed. (Leitch & Bohensky, 2014, p. 24)

Subsequently, they suggested that leadership seemed to be embedded in the way a community/organization self-organized and created its structure and function.

Somers (2009), in an exploratory study of a single public works organization, developed an Organizational Resilience Potential Scale (OPRS) in order to access the “latent” resilience in an organization (p. 13). Somers (2009) theorized that “organizations that score for higher levels of resilience potential as measured on the scales developed for his study have a greater propensity to display adaptive behaviors than those with lower scores” (p. 13). Using Mallak’s

(1998) study as a basis for his study, Somers (2009) adopted six of Mallak's factors measuring latent resilience. Factors included

1) perception of environmental risk by department managers, 2) the extent to which management seeks information about environmental risk, 3) the structure of the organization, 4) extent of participation in community planning activities, 5) level of compliance with continuity operations planning (COOP), and 6) whether the department has professional accreditation. (p. 13)

Somers (2009) concluded that OPRS was a good statistical fit to understand the latent organizational resilience in an organization and that organizations should "create internal processes and organizational structures that build latent resilience within organizations so that they demonstrate positive adaptive behaviors when under stress" (p. 21). Although Somers' study was limited to surveying managers and senior managers of the public works departments, he suggested that leadership was a part of how an organization structures itself and the behaviors it subsequently applied to become resilient.

**Leadership as an individual trait.** Two studies developing measures to assess organizational resilience offered more of a trait-based view of leadership as an attribute of organizational resilience; both studies focus on assessing organizational resilience and offered a clear leadership indicator. First, McManus et al. (2008), through a grounded theory study, developed, tested, and proposed a process for improving organizational resilience through a "resilience management process" (p. 87). Using a case study methodology of how 10 organizations contribute to building organizational resilience, they offered three characteristics or attributes of organizational resilience: (a) situational awareness, (b) management of keystone vulnerabilities, and (c) adaptive capacity (p. 82). They defined situational awareness as a "measure of an organization's understanding and perceptions of its entire operating environment" (McManus et al., 2008, p. 83) to include looking forward to critically assess

potential threats and their consequences. An organization's understanding of its situational awareness was theorized to drive the decision-making processes in a complex adaptive system.

Keystone vulnerabilities were defined as those “components in the organizational system, which by their loss or impairment, have the potential to cause exceptional effects throughout the system” (McManus et al., 2008, p. 83). Management of these keystone vulnerabilities “relates to the aspects of an organization, operational and managerial, that have the potential to have significant negative impacts in a crisis situation” (McManus et al., 2008, p. 83).

Adaptive capacity was defined in terms of social-ecological systems as the “measure of the culture and dynamics of an organization that allow it to make decisions in a timely and appropriate manner” (McManus et al., 2008, p. 83). In their study adaptive capacity included the leadership and decision-making structure of an organization, its ability to retain and share knowledge, and its degree of creativity and flexibility.

McManus et al. (2008) cited the “quality of leadership” as a factor of an adaptive organization. Quality of leadership was defined as the degree to which leaders disseminate the “empowerment to lower levels of an organization” (McManus et al., 2008, p. 84) as critical for an adaptive organization. Likewise, they cited “flexible leadership decision-making structures” (McManus et al., 2008, p. 84) as indicators of an adaptive organization. Other leadership indicators included knowledge sharing and creative problem solving. The term *bricolage*—“the ability to adapt known information and apply it to the current situation in a creative manner” (McManus et al., 2008, p. 84)—was used to describe organizational learning. While they identified these factors of quality leadership, they did not address the degree to which leaders achieved quality leadership.

They concluded that by developing a resilience management process to include situational awareness, the ability to identify keystone vulnerabilities, and increasing the organization's adaptive capacity on resilient management processes an organization would improve an organization's capacity to cope with disruptions (McManus et al., 2008, p. 88). They further stated that silo mentalities, poor communication and relationships, inflexible and uncreative decision making were likely to have considerable negative impact on organizational resilience.

Lee et al. (2013) advanced the work of McManus et al. (2008) concerning organizational resilience. Their purpose was to develop a survey tool to measure and compare an organizations' resilience. Their study focused on developing a measurement instrument that assessed "leading indicators" (Lee et al., 2013, p. 30), indicators that "measure observable processes, actions, and practices that are thought to contribute to an organization's resilience" (Lee et al., 2013, p. 30). They argued that while measuring lagging indicators of resilience measure where an organization has been, measuring leading indicators could give an organization information concerning its strengths and weaknesses in terms of resilience (p. 30). They stated that "leading indicators measure observable processes, actions, and practices that are thought to contribute to the organization's resilience" (Lee et al., 2013, p. 30).

As a starting point, they began with McManus et al.'s (2008) three factors of situation awareness, management of keystone vulnerabilities, adaptive capacity, and their 15 proposed indicators/items. Lee et al. (2013) then adjusted the McManus et al.'s (2008) model to include the factor: resilience ethos. They used eight items for each of the first three factors and two for resilience ethos with a total of 73 items. They stated that a "two-factor solution was extracted based on all 73 items. . . . This resulted in a very clean two factor structure, where 53 items were

retained to measure organizational resilience” (Lee et al., 2013, p. 34). The two factors were Adaptive Capacity and Planning. Adaptive Capacity included the following constructs with definitions:

- *Minimization of silos*: Minimization of divisive social, cultural, and behavioral barriers, which are most often manifested as communication barriers creating disjointed, disconnected, and detrimental ways of working.
- *Internal resources*: The management and mobilization of the organization’s resources to ensure its ability to operate during business-as-usual, as well as being able to provide the extra capacity required during a crisis.
- *Staff engagement and involvement*: The engagement and involvement of staff who understand the link between their own work, the organization’s resilience, and its long-term success. Staff are empowered and use their skills to solve problems.
- *Information and knowledge*: Critical information is stored in a number of formats and locations and staff have access to expert opinions when needed. Roles are shared and staff are trained so that someone will always be able to fill key roles.
- *Leadership*: Strong crisis leadership to provide good management and decision making during times of crisis, as well as continuous evaluation of strategies and work programs against organizational goals.
- *Innovation and creativity*: Staff are encouraged and rewarded for using their knowledge in novel ways to solve new and existing problems and for utilizing innovative and creative approaches to developing solutions.
- *Decision making*: Staff have the appropriate authority to make decisions related to their work and authority is clearly delegated to enable a crisis response. Highly skilled

staff are involved, or are able to make, decisions where their specific knowledge adds significant value, or where their involvement will aid implementation.

- *Situation monitoring and reporting*: Staff are encouraged to be vigilant about the organization, its performance and potential problems. Staff are rewarded for sharing good and bad news about the organization including early warning signals and these are quickly reported to organizational leaders. (Lee et al., 2013, p. 34)

Planning included:

- *Planning strategies*: The development and evaluation of plans and strategies to manage vulnerabilities in relation to the business environment and its stakeholders.
- *Participation in exercises*: The participation of staff in simulations or scenarios designed to practice response arrangements and validate plans.
- *Proactive posture*: A strategic and behavioral readiness to respond to early warning signals of change in the organization's internal and external environment before they escalate into crisis.
- *External resources*: An understanding of the relationships and resources the organization might need to access from other organizations during a crisis, and planning and management to ensure this access.
- *Recovery priorities*: An organization wide awareness of what the organization's priorities would be following a crisis, clearly defined at the organization level, as well as an understanding of the organization's minimum operating requirements. (Lee et al., 2013, p. 34)

The items in their organizational resilience survey covering leadership management, and governance tended to focus more on trust in top management to make good decisions in times

of crisis. These were measured on a Likert scale from strongly disagree to strongly agree. These items included:

- I am confident that our management would provide good leadership if our organization were hit by a real crisis.
- I believe that people would accept decisions by management about how should manage a crisis, even if they were developed with little consultation.
- Managers constantly monitor staff workloads and reduce them when they become excessive.
- Top management think and act strategically to ensure our organization is always ahead of the curve
- Top management in our organization are good examples of professionals that we can aspire to learn from. (Lee et al., 2013, p. 37)

Items assessing “Information and knowledge” and “Devolved and responsive decision making” (Lee et al., 2013, p. 37) tended to address an organization’s culture, i.e., “when we need to, our organization can make tough decisions quickly” (Lee et al., 2013, p. 37).

Two interesting aspects of the Lee et al. (2013) study emerged. First, while McManus et al. (2008) identify the “quality of leadership” as more trait-based to promote knowledge sharing and shared decision-making, Lee et al. separate leadership from knowledge sharing, decision making, and innovation and creativity toward becoming a more trust-based reflection of an organization’s managers. Second, Lee et al. tended to describe macro organizational processes for assessing organizational resilience, not specific relational leadership processes. Both studies ultimately emphasized traits or characteristics of leaders, not how or if leaders enable the process of relational leadership. Table 2.4 lists the pros and cons of these studies.

Table 2.4

*Pros and Cons of Organizational and Disaster Resilience Studies*

<u>Scale</u>	<u>Pros</u>	<u>Cons</u>
Tierney and Bruneau (2007), 4R	Assessed disaster preparedness and potential for recovery	Did not address leadership specifically, but as a part of the system
Kantur and Iseri-Say (2015)	Scale measured robustness, agility, and integrity	Attempted to measure leadership in terms of power of top administrative individuals and groups
Cutter et al. (2008) DROP	Developed DROP model to “present the relationship between vulnerability and resilience”	Leadership is considered an attribute of governance structure.
Cutter et al. (2014) DROP	Using the DROP model focused on assessing “inherent disaster resilience”	Leadership is considered an attribute of governance structure.
Leitch and Bohensky’s (2014)	Focused on how community’s structure is key aspect of its resilience through key attributes: 1) structure and function, 2) self-organization, and 3) learning and adaptation	Suggested that leadership is embedded in the way a community self-organizes
Somers (2009) OPRS	The development of a scale that attempted to measure organizational resilience potential (OPRS) in order to access the “latent” resilience in an organization	Suggested that leadership was a part of how an organization structures itself and the behaviors it subsequently applied to become resilient.
McManus et al. (2008)	Key grounded theory study that developed key factors of organizational resilience: situational awareness, management of keystone vulnerabilities, adaptive capacity	Identified “quality leadership” as the degree to which leaders empower other, but was vague on how it was done.



Lee et al. (2013)	Developed a quantitative study based on McManus et al. (2008). Refined the factors to two: Adaptive Capacity and Planning	Measured leadership as a management quality to make good decisions. Ultimately, it was reduced to trust in management to make good decisions
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**Conclusion.** From the preceding review of organizational and disaster resilience literature review, two important details emerge worth consideration: First, the attribute of leadership has been described as either embedded within the organizational or institutional structure or trait/characteristic-based describing what leadership is. Second, consistent with the literature over CAS/SES, factors of resilience were those that distributed it throughout an organization: shared decision-making, knowledge sharing, creativity, and learning. Consequently, while the studies tended to focus on general factors found within the domain of adaptive governance, they did not directly address leadership as a socially constructed relational act. Thus, developing a construct describing a resilience-thinking leadership mindset and developing specific RTLM factors would fill this gap.

### **Relational and Distributed Leadership Scales**

A third sphere of influence to develop a resilience-thinking leadership mindset construct and scale comes from a review of relational and distributed leadership scales. One prominent issue arises from this review: Most scales assessing relational and distributed leadership tend to focus on attributes. For example, Carifio (2010) developed the Relational Leadership Questionnaire (RLQ) consisting of five attributes [factors] he developed from assessing the attributes developed by Komives, Lucas, and McMahon (1998) and Regan and Brooks (1995). His attributes included: (a) Inclusive, (b) Empowering, (c) Caring, (d) Ethical, and (e) Vision and intuition (p. 17). While these attributes showed strong correlations between a modified leader-member exchange (LMX) scale (Bauer & Green, 1996; Liden & Maslyn, 1998) and a

modified trust scale (Martin, 1999), these attributes tended to focus on behaviors of relational leaders rather than relational leadership processes.

Akram et al. (2016) used Carifio's (2010) RLQ to explore how relational leadership generates organizational social capital. Although they pointed out that theorists have described relational leadership as a relational process (Uhl-Bien, 2006), they assessed relational leadership in terms of leadership qualities. Likewise, they pointed to Social Learning Theory (Bandura, 1986) as a foundation to their study as it explains how behaviors of leaders as role models can influence behaviors of employees.

Liden and Maslyn's (1998) assessment of the multidimensionality of leader-member exchange (LMX) dyads focused on four relational domains: Affect, loyalty, contribution, and professional respect. From these domains they developed 31 items that represented these domains. These domains were based on psychometric interpretations over how a leader and subordinate interacted, and their relationship in terms of supervisor toward subordinate.

Kilinc (2014) assessed distributed leadership to organizational citizenship behaviors in Turkish schools. Using a distributive leadership scale developed by Ozer and Beycioglu (2013), the study showed a high correlation as the authors concluded that distributed leadership "promotes participation in decision making, learning from experiences, and being committed to organizational goals. Schools where teachers are provided opportunities to perform leadership practices promote teachers' extra role behaviors that benefit both to the organization and the individual" (p. 74). Consequently, this study focused on developing leadership practices.

Grant (2011) studied the relationship between distributed leadership and a principal's leadership effectiveness in North Carolina schools. His distributed leadership factors included setting direction, managing the instructional program, redesigning the organization and

developing people (p. 37). Grant's dependent variable was leadership effectiveness. It was measured by two items on a five-point Likert scale from the 2008 North Carolina Working Conditions Survey:

1. Overall, the school leadership in my school is effective.
2. Overall, my school is a good place to teach and learn. (Grant, 2011, p. 38)

The analysis suggested that the model sought to determine strong indicators of behavior that "influence teacher perceptions of distributed and effective principal behaviors" (Grant, 2011, p. 39).

Likewise, Hulpia et al. (2009) developed a distributed leadership inventory that they divided into two domains: leadership functions and the characteristics of the team leadership (p. 9). The attributes used for the leadership function domain included: strength of vision, supportive leadership behavior, providing support, providing intellectual stimulation, and supervising and monitoring teachers (Hulpia et al., 2009, p. 9). For leadership team characteristics they used the attributes of role ambiguity, group cohesion, degree of goal consensus, expertise of the leadership team. Though exploratory and confirmatory factor analysis, Hulpia et al. (2009) reduced the attributes to group cohesion for characteristics of team leadership and two attributes for leadership functions: support and supervision (p. 37). Consequently, the study assessed leadership practices rather than leadership processes. Table 2.5 illustrates the pros and cons of these relational and distributed leadership scales.

Table 2.5

*Pros and Cons of Relational and Distributed Leadership Scales*

<u>Scale</u>	<u>Pros</u>	<u>Cons</u>
Carifio (2010) RLQ	Developed RLQ and found its five attributes correlated with LMX scale	Assessed leadership as behaviors
Akram et al. (2016)	Compared RLQ to organizational social capital	Assessed leadership as behaviors
Liden and Maslyn (1998) LMX	Focused on leader and subordinate dyads and their relationships	Treated leadership as behaviors
Kilinc (2014)	Assessed distributed leadership and organizational citizenship	Tended to focus on leadership practices
Grant (2011)	Studied the relationship between distributed leadership and a principle's leadership effectiveness	The model sought to determine strong factors of behavior that "influence teacher perceptions of distributed and effective principal behaviors"
Hulpia et al. (2009)	Developed a distributed leadership inventory that they divided into two domains: (1) leadership functions and (2) the characteristics of the team leadership	Found characteristics of team leadership and two attributes for leadership functions: support and supervision. Consequently, the study assessed leadership practices

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**Conclusion.** First, most of the scales discussed in this section approach leadership from attribute and behavioral perspectives so that they do not directly reflect the theoretical factors of a RTLM. Second, in conjunction with the first issue, leadership as an attribute seems to be used in the realm of organizational leadership, while factors as leadership measurement tools are used more in the realm of organizational resilience assessment.

## Relational Leadership Theories

**Overlap of relational leadership indicators.** A final sphere of influence to develop a resilience-thinking leadership mindset construct and scale stems from the overlap of leadership theories framed within a social constructionist mindset. The concept of leadership as socially constructed, being distributed throughout an organization, and emerging from relationship building across organizational boundaries can be found in several prominent leadership theories.

These leadership theories include:

- Relational leadership (Cunliffe, 2009; Drath, 2001; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012);
- Complexity leadership (Uhl-Bien et al., 2007);
- Inter-group relational leadership (Hogg et al., 2012; Pittinsky, 2009; Pittinsky & Simon, 2007);
- Boundary-spanning leadership (Drath et al., 2008; Ernst & Chrobot-Mason, 2011; Marrone, 2010);
- Distributed leadership (Bolden, 2011; Gronn, 2002; Spillane, 2005);
- Sensemaking as mindful organizing (Weick, 2010; Weick & Sutcliffe, 2015).

The fundamental characteristics that tie these leadership theories together are that of relationships and the process of building relationships across organizational boundaries.

Likewise, many of these relational leadership theories suggest comparable indicators that complement those theoretical constructs within the adaptive governance domain. However, none of these relational leadership theories completely encapsulate concept of leadership in relation to organizational resilience thinking or a resilience-thinking leadership mindset. Consequently, a resilience-thinking leadership mindset would serve to fill this gap. Table 2.6 illustrates these

relational leadership constructs and their prominent indicators. One of the fundamental characteristics all of these leadership theories share is that leadership is both a relational and a boundary spanning process. I discuss each leadership theory in the next section.

Table 2.6

*Types of Leadership Concepts and Indicators*

<b><u>Leadership Concept</u></b>	<b><u>Definition</u></b>	<b><u>Prominent Indicators</u></b>	<b><u>Source</u></b>
<b>Boundary Spanning Leadership</b>	“The capability to establish direction, alignment, and commitment across boundaries in service of a higher vision or goal” (Ernst & Yip, 2009, p. 4)	<ul style="list-style-type: none"> <li>• Shared purpose throughout organization</li> <li>• Collaboration across functions</li> <li>• Empowerment at all levels</li> <li>• Cross-organizational learning</li> </ul>	Drath et al., 2008; Ernst and Yip, 2009; Ernst and Chrobot-Mason, 2011; Yin et al., 2009
<b>Complexity Leadership</b>	Emphasizes the adaptive/learning nature of systems which consists of three types of leadership: adaptive, enabling, and administrative:	<ul style="list-style-type: none"> <li>• Collaboration as empowerment throughout an organization</li> <li>• Adaptability</li> <li>• Learning</li> <li>• Creativity</li> </ul>	Uhl-Bien et al., 2007
<ul style="list-style-type: none"> <li>• Adaptive Leadership</li> <li>• Administrative Leadership</li> <li>• Enabling Leadership</li> </ul>			
<b>Distributed Leadership</b>	Distributed leadership has similar characteristics as shared leadership, collaborative leadership, and co-leadership models; promotes the enactment of leadership at multiple levels. (Ernst & Chrobot-Mason, 2011)	<ul style="list-style-type: none"> <li>• Knowledge sharing</li> <li>• Collaborative learning</li> <li>• Collaborative decision-making</li> </ul>	Bolden, 2011; Gronn, 2002; Ernst and Chrobot-Mason, 2009
<b>Inter-group Relational Leadership</b>	“A leader orking toward more positive relations between two groups” (Pittinsky & Simon, 2007)	<ul style="list-style-type: none"> <li>• Collaboration among groups</li> <li>• Trust among individual and groups</li> </ul>	Hogg et al., 2012; Pittinsky, 2009; Pittinsky and Simon, 2007

<b>Relational Leadership</b>	A relational or shared process, and in this context a relational leader who subscribes to a constructionist frame tends to view leadership, not residing in any one individual, but in one's "relation to others" as an emergent property of interactions.	<ul style="list-style-type: none"> <li>• Empowerment of individuals and groups through interactional dialogue and meaning making</li> <li>• Organizational learning</li> <li>• Trust among individuals and groups</li> </ul>	Cunliffe, 2009; Cunliffe and Eriksen, 2011; Drath, 2001; Uhl-Bien and Ospina, 2012; Uhl-Bien, 2006
<b>Sensemaking/Mindful Organizing</b>	Cognitive "processes by which people seek plausibility to understand ambiguous, equivocal or confusing issues or events" (Brown et al., 2015, p. 265) of a situation or issue. A sensemaking leadership mindset is tied to resilience and is about understanding one's situational awareness and adaptability,	<ul style="list-style-type: none"> <li>• Situational awareness</li> <li>• Knowledge sharing throughout an organization</li> <li>• Organizational learning</li> <li>• Shared decision-making</li> <li>• Diversity of decision making</li> </ul>	Brown et al., 2015; Ladkin, 2009; Rodin, 2014; Weick, 2010; Weick and Sutcliffe, 2015

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**Boundary spanning leadership.** Boundary spanning leadership focuses on creating direction, alignment, and commitment (Drath et al., 2008; Ernst & Chrobot-Mason, 2011) throughout an organization by creating a boundary spanning mindset (Chrobot-Mason, Yip, & Yu, 2014). Chrobot-Mason et al. (2014) have defined a boundary spanning mindset "as a person's identification across two or more groups, with a motivation to establish linkages and manage interactions between the groups" (p. 3). "Direction is indicated by agreement on what the collective is trying to achieve. Alignment exists when activities are coordinated and

integrated in service of the shared direction. Commitment is evident when individuals make the success of the collective a priority” (Cullen, Palus, Chrobot-Mason, & Appaneal, 2012, p. 429). As a relational leadership process, a boundary-spanning leadership mindset focuses on collective organizational learning through shared purpose, coordination of knowledge work, and mutual commitment (Drath et al., 2008). Yip et al. (2009) have emphasized three facets of boundary spanning leadership that organizational leaders see as indicating the collaborative nature of boundary spanning. These include “collaboration across functions, empowering employees at all levels, and developing cross-organizational learning capabilities” (Yip et al., 2009, p. 21).

**Complexity leadership.** Complexity leadership theory emphasizes the adaptive/learning nature of systems. Uhl-Bien et al. (2007) posited the interaction of three types of leadership that comprise complexity leadership: administrative, adaptive, enabling. Figure 2.8 illustrates this interplay.



*Figure 2.8.* Complexity leadership as an interplay among administrative, adaptive, and enabling leadership.

- *Administrative leadership* includes the actions of individuals and groups in formal managerial roles who plan and coordinate organizational activities. Administrative leadership is the top-down function of leadership often referred to as the bureaucratic function that is responsible for structuring tasks, planning, creating a vision, acquiring



resources, crisis management, and organizational strategy (Uhl-Bien et al., 2007, p. 306).

- *Adaptive leadership* is an emergent, interactive dynamic that produces adaptive outcomes in a social system. It is a collaborative change movement that emerges nonlinearly from interactive exchanges, or, more specifically, from the “spaces between agents (cf Bradbury & Lichtenstein, 2000; Drath, 2001; Lichtenstein et al., 2006)” (Uhl-Bien et al., 2006, p. 306). While adaptive leadership is more of a “dynamic rather than a person” (p. 306), Uhl-Bien et al. (2007) refer to it as the source by which adaptive outcomes are produced in an organization (Uhl-Bien et al., 2007, p. 306).
- *Enabling leadership* serves to act as a catalyst to enable adaptive dynamics to emerge and helps to manage the entanglement between administrative and adaptive leadership by “fostering enabling conditions” and “managing the innovation-to-organization” interface (Uhl-Bien et al., 2007, p. 309).

Emerging from the interplay of these three leadership constructs are individual or group learning, collaboration, knowledge sharing, and shared decision-making. Within this context complexity leadership involves developing an enabling mindset: “Enabling leadership, then, fosters complex networks by (1) fostering interaction, (2) fostering interdependency, and (3) injecting adaptive tension to help motivate and coordinate the interactive dynamic” (Uhl-Bien et al., 2007, p. 309).

**Distributed leadership.** Distributed leadership is most often used in the realm of education (Bolden, 2011; Gronn, 2002; Spillane, 2005). Distributed leadership implies shared roles of multiple leaders within an organization, each with delineated duties (e.g., principal, teacher, staff), and each with common goals and shared values (Bolden, 2011). Distributed

leadership focuses on decentralizing decision-making and employing relational or interactional learning and decision-making processes. The idea that leadership is a social process has similar characteristics of those espoused in shared leadership, collaborative leadership, co-leadership theories (Bolden, 2011). However, shared and collaborative leadership theories tend to focus on how groups create a shared vision and make decisions (Chrislip & Larson, 1994; Lambert, 2002). Moreover, distributed leadership illustrates the idea of extending or reaching across boundaries (Ernst & Chrobot-Mason, 2011). Chrobot-Mason et al. (2014) have referred to reaching across boundaries as creating a “boundary spanning mindset.” Drath, Palus, and McGuire (2010) referred to it as culture work. Since people in organizations, by the nature of their work, develop in and out group relationships at multiple levels, there have been calls for a *distributed leadership mindset*, one that must promote the enactment of shared decision-making at multiple levels (Bolden, 2011).

**Inter-group relational leadership.** Hogg et al. (2012) have stated that the goal of inter-group relational leaders is collaboration among groups, so they need to address ways to include both in and out groups so that decision-making processes can occur. However defined, people in organizations, by the nature of their work, develop in and out-group relationships at multiple levels. This reality calls for a boundary spanning mindset, a mindset that must promote the enactment of leadership at multiple levels. Trust becomes a primary factor in building collaborative inter-groups (Pittinsky & Simon, 2007). From a social constructionist viewpoint, Ospina and Foldy (2010) have suggested that collaborative governance spans boundaries through five leadership practices that bring groups together and support “bridge-building work of leadership” (p. 297).

**Relational leadership.** Embedded in a social constructionist framework is the concept of relational leadership. From a social constructionist viewpoint, relational leadership is not a thing per se, but emerging processes, constructed through interactions (Cunliffe & Eriksen, 2011). Within this frame, the leadership process, as a co-constructed act, emerges between or among persons in authority and followers within a specific context (Cunliffe & Eriksen, 2011; Drath, 2001; Ladkin, 2009; Ospina & Foldy, 2010; Uhl-Bien, 2006; Uhl-Bien & Ospina, 2012; Wheatley, 2006). From this perspective, relational leadership is defined as a relational or shared process, and in this context a relational leader who subscribes to a constructionist frame tends to view leadership, not residing in any one individual, but in one's "relation to others" (Cunliffe, 2009; Cunliffe & Eriksen, 2011; Uhl-Bien, 2006) as emerging through interactions. In short, leadership is a relational process (Hosking, 1988). As a leadership process, relational leadership focuses collective meaning making with the goal of empowering and/or enabling others (Hosking, 1988; Ospina & Foldy, 2010; Ospina & Uhl-Bien, 2012).

**Sensemaking mindset/mindful organizing.** Applied to a social-ecological systems perspective, Rodin's (2014) has shown that a sensemaking leadership mindset is tied to resilience and is about change. Rodin offered five characteristics that lay the groundwork for a sensemaking mindset: being aware, adaptive, diverse, integrated, and self-regulating. From this perspective, to develop a sensemaking mindset means that one is sensitive to adaptive change. Moreover, Rodin has described three practices—readiness, responsiveness, and revitalization—that an individual or organization should develop in order to become mindful and resilient. Likewise, Weick and Sutcliffe (2015) have suggested that a sensemaking mindset begins with one becoming aware of the properties involved in one's own sensemaking, how his/her actions

become a part of the process, and one's biases that could lead to plausible interpretations of an event or experience.

Practical guidance toward developing a sensemaking mindset may be to heed the advice of Walker and Salt (2006) to keep your options open, which translates into be diverse as possible. In fact, diversity turns out to be an important aspect of both resilience and of mindful sensemaking. Rodin (2014) has highlighted that diversity “means that the individual, organization, or community does not rely completely on any one element for a critical function . . . it also means the system can draw on a range of capabilities, information sources, people or groups” (“Diverse” section, para. 1). Weick and Sutcliffe (2015) have referred to diversity as “requisite variety.” In this instance, however, it means having the ability to “increase your repertoire of actions that register and control variations in input. . . . when people enlarge their ability to act on problems, they also enlarge the range of issues they can now notice” (“Organizing More Variety in Processes” section, para. 1). Moreover, requisite variety means that one's specialty in a specific context dictates one's role—leadership emerges from the context.

Consequently, the similar leadership characteristics from these relational leadership theories can be brought together. Table 2.7 below compare relational leadership characteristics with the characteristics of adaptive governance. This comparison has served as the basis for the development of the proposed resilience thinking leadership characteristics.

Table 2.7

*Comparison of Relational Leadership Characteristics With Adaptive Governance Characteristics*

<b><u>Collective Socially Constructed Relational Leadership Characteristics</u></b>	<b><u>Adaptive Governance Characteristics</u></b>
• Collaboration of individuals and group	• Collaboration across scales
• Knowledge sharing/learning throughout an organization	• Distributed leadership throughout an organization
• Shared decision making throughout an organization	• Knowledge sharing
• Shared purpose/commitment throughout an organization	• Diversity and innovation
• Trust among individuals and groups	• Shared decision making
• Diversity of thought	• Spanning of boundaries
	• Trust

**Conclusion.** Two themes emerge from this discussion of current socially constructed relational leadership theories. First, the comparative set of characteristics demonstrate that leadership emerges from actions such as collaboration, knowledge sharing, collective/shared decision making, shared purpose and commitment, diversity, and trust. Second, these fundamental characteristics complement the foundational characteristics theorized as principal leadership qualities of adaptive governance; moreover, they posit leadership as a processes.

### **Part 3: Resilience Thinking Leadership Mindset Factors**

From a review of the literature, a clear need to develop a resilience-thinking leadership mindset construct and a measurement instrument to assess a resilience-thinking leadership

mindset potential within organizations existed. The following discussion illustrates how I arrived at five theoretical resilience-thinking leadership mindset factors. Cutter et al. (2010) have defined a resilience indicator as follows: “An indicator is a quantitative or qualitative measure derived from observed facts that simplify and communicate the reality of a complex situation (Freudenberg 2003). Indicators reveal the relative position of the phenomena being measured and when evaluated over time, can illustrate the magnitude of change (a little or a lot) as well as direction of change (up or down; increasing or decreasing)” (p. 2). Schipper and Langston (2015) have suggested that resilience indicators can be placed into four categories: input, process, outcome, or output (p. 12). They have called attention to the fact that “the purpose of the indicator is a vital characteristic” (Schipper & Langston, 2015, p. 12): “The distinction between the various types of indicators is able to bring to the attention of both developers and users of frameworks what type of information can be extracted from different types of questions and indicators” (Schipper & Langston, 2015, p. 12). (For the sake of clarity, I will use the term *factor* instead of the term *indicator* as a measure of the strength and/or the level of a resilience-thinking leadership mindset in an organization.)

From a review of the relational leadership literature, six characteristics have been shown to describe relational socially constructed relational leadership; these characteristics include: collaboration, knowledge sharing throughout an organization, shared/distributed decision-making, shared purpose/commitment, diversity/flexibility, and trust. Similarly, seven characteristics have been shown to characterize the foundational features of adaptive governance: collaboration, distributing leadership throughout an organization, knowledge sharing, diversity and innovation (creativity), shared/distributed decision-making, the spanning of boundaries, and trust.

I combined these general characteristics from the relational leadership and adaptive governance theories and made decisions to include specific factors based on how they complement the characteristics that describe a resilience-thinking leadership mindset construct:

- Adaptive learning throughout an organization
- Sensemaking and mindful organizing
- Shared decision-making
- Co-constructed relational actions

I reduced the characteristics from these two groups to five general factors to include shared decision-making, knowledge sharing/learning, diversity and innovation, shared purpose/commitment, and trust. While I initially included trust as a factor, I decided that it was an inherent aspect of the four other factors, so I decided not to include it as an individual factor. Table 2.8 lists the four general resilience thinking leadership mindset factors and definitions.

Table 2.8

*Resilience Thinking Leadership Mindset Factors and Definitions*

<b><u>Resilience Thinking Leadership</u></b>	<b><u>What It Measures</u></b>	<b><u>Relational Leadership Source</u></b>	<b><u>Adaptive Governance Source</u></b>
<b>Shared/distributed decision making</b> = collective/collaborative meaning making and decision-making among individuals and groups	The level of centralized or decentralized decision-making in an organization	Bolden, 2011; Chrobot-Mason et al., 2014; Ospina and Foldy, 2010; Uhl-Bien and Ospina, 2012; Uhl-Bien et al., 2007;	Cundill et al., 2015; Folke, 2006; Wyborn, 2015
<b>Knowledge sharing/learning</b> = Information sharing across boundaries with the goal of individual and group learning from information shared	The level to which information is shared among individuals and groups throughout an organization for the purpose of learning.	Drath et al., 2008; Hogg et al., 2012; Yip et al., 2009	Cundill et al., 2015; Folke, 2006; Olsson et al., 2006
<b>Diversity</b> = Ability by individuals or groups to increase repertoire of actions that register and control variations in input	The level individual and group autonomy to make decisions and take action.	Rodin, 2014; Weick and Sutcliffe, 2015	Resilience Alliance, 2010
<b>Shared purpose and commitment</b> = Agreement and commitment by individuals and groups to a shared goal	The strength of agreement and commitment by individuals and groups in an organization to a shared goal or mission	Cullen et al., 2012; Ernst and Chrobot-Mason, 2011	Wyborn, 2015

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## Summary

The purpose of this research study has been to design and develop an initial RTLM scale. Currently, scales exist that assess organizational resilience. Likewise, relational leadership scales exist that provide feedback as to leadership traits and behaviors. However, a specific resilience-thinking leadership mindset scale that assessed both the underlying RTLM in an organization and potential for developing it did not exist. This proposed study was the initial step to create such a scale.

For an organization to adopt a resilience-thinking leadership mindset and create an adaptive learning environment that anticipates, reacts to, and learns from disruptions, it will require that an organization become familiar with and attend to its underlying potential for a resilience thinking leadership mindset at every level of the organization. A survey assessing an organization's RTLM will become a useful assessment instrument for an organization's leaders to gain insight their current social practices and beliefs and to take the necessary steps to develop a RTLM.

The exploratory RTLM scale measured the perceived state of RTLM in an organization by assessing how individuals in an organization perceived their organization's leaders during times of disruptions and in its current state. Items were intended to measure an organization's social interactions among its leaders, managers, and employees over four theoretical factors: level of distributed decision-making, level of knowledge sharing, level of diversity and innovation, and strength of shared purpose and commitment. This scale was intended to allow organizations to better assess what mindful leadership processes needed to be developed, encouraged, and/or maintained to encourage a resilience-thinking leadership mindset. The

specific details concerning the research design and procedures, including scale development, analysis, and participant selection will be discussed in Chapter III.

### Chapter III: Methodology and Study Design

The fact that an organization's governance in its day-to-day decision-making creates social risks is not new. Risk is defined as a "situation or event in which something of human value has been put at stake and where the outcome is uncertain" (Jaeger et al., 2001, p. 17). Risks can stem from an overconfidence in organizational practices, a complacency in production processes, centralized decision-making, a lack of knowledge sharing, standardization, an all-encompassing need for efficiency and optimization, a reliance on technology, a need to reorganize, or a reliance on routines just to name a few. Risks expose vulnerabilities so that even small disruptions have the potential to affect production, innovation, profitability, strategic planning, and employees' work and morale at all organizational levels.

If an organization's leaders were to adopt a resilience-thinking leadership mindset culture, they would develop a work environment where individuals intuitively anticipate risks and vulnerabilities, adapt to disruptions, and learn from them as a part of their day-to-day practices. By using a quick assessment instrument to measure the state of a resilience-thinking leadership mindset (RTLTM), an organization's leaders will be able to evaluate or 'map' their RTLTM throughout their organizational governance structure (Folke, 2006; Wyborn, 2015). Implementing this resilience-thinking approach will move an organization from simply reacting to events to creating a "mindful organizing" (Weick & Sutcliffe, 2015) culture—a culture that values the complex nature of social connections and allows for emergent social interactions, an understanding of situational awareness (context), and a willingness to adapt and learn (Weick & Sutcliffe, 2015).

The purpose of this study was exploratory in nature. Its intent was to design an initial resilience-thinking leadership mindset scale for organizations and their leaders in order to give

them feedback and allow them to analyze or “map” the levels resilience-thinking leadership mindset existing in their organizations. This chapter will explain the research procedures that were used in this study, which included scale development, data collection, factor analysis, and further refinement by leaders in resilience management. Psychometric feedback by individuals—employees/supervisors/managers—within an organization was the method used to assess the initial scale items in relation to the theoretical factors.

### **Research Purpose and Goals**

This research project was an initial phase toward the development of a comprehensive RTLM scale. Yin (2013) and Creswell (2014) have delineated the nuanced differences between exploratory, descriptive, and explanatory research. Exploratory research tends to be broader in scope in order to better understand a phenomenon or to identify variables. Descriptive research looks to provide an accurate description of the phenomenon of interest. Explanatory looks to explain relationships among variables. While Yin (2013) and Creswell (2014) have underscored the fact that there is plenty of overlap among the three types of research and they are not mutually exclusive, Yin (2013) has cautioned that the “goal is to avoid gross misfits—that is, when you are planning to use one type of method but another is really more advantageous” (“Comparing Case Studies with Other Research Methods in the Social Sciences” section, para. 5). Yin has drawn attention to being mindful of the fact that the overarching methodology employed by a researcher is contingent on three factors: the research question, the control of the researcher to the events surrounding the research, and the focus or purpose of the research (“When to Use Each Method,” section, para. 1).

This research project has incorporated a combination of both exploratory and explanatory research—identifying factors and demonstrating relationships. The research projects specific goals were to:

- Develop a RTLTM scale and its items
- Assess RTLTM and its theoretical factors (distributed decision-making, knowledge sharing and learning, diversity and innovation, shared purpose and commitment)
- Determine the relationship between/among the factors
- Assess to what degree these factors contribute to a RTLTM

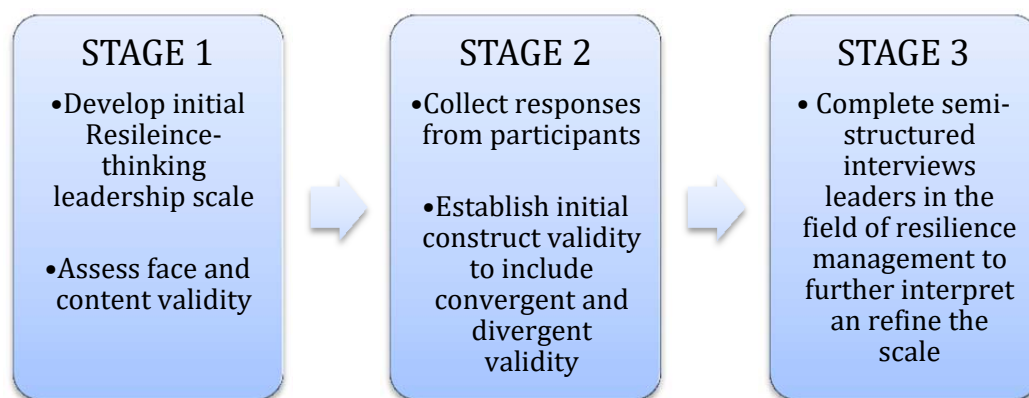
### **Research Design Justification**

The research included a combination of both quantitative and qualitative methods. Creswell (2014) has referred to the combining of quantitative and qualitative methods as a “mixed-methods” design. Creswell has pointed out that the choice to use a mixed-methods design should be contingent upon the outcome expected (p. 230). For example, quantitative and qualitative data can be used to build on one another in a sequential manner. Explanatory and/or exploratory mixed-methods sequential designs should be employed if the outcomes include “a test of better measures for a sample of a population” or “a more in-depth understanding of the quantitative results (of cultural relevance)” (Creswell, 2014, p. 230).

The outcomes expected for this research study were to achieve a higher-quality understanding of the phenomenon of interest, a clearer grasp of the factors that reveal the phenomenon of interest, the determination of relevant items, and, ultimately, a rapid assess instrument. Consequently, I felt a mixed-methods exploratory/explanatory sequential design was the best fit for the purpose of my research and planned outcomes. Moreover, these two methods

aided me in the exploration and interpretation of the underlying socially constructed meanings and/or narratives existing in an organization.

I gathered quantitative (QUANT) data in the form of an initial RTLTM survey in order to obtain wider sampling and large enough number of responses from participants to meet the suggested construct validity requirements (Abell et al. 2009; DeVellis, 2015). I followed up with qualitative (qual) data which provided more in-depth analysis and served to refine and interpret the scale (Creswell, 2014). I separated the process into three stages. Stage 1 involved the development of the scale items and analysis of the scale, factors, and items which were assessed for face and content validity. Stage 2 comprised gathering data from participants and employing statistical analysis on the data collected to assess the construct validity and reliability of the factors. Stage 3 entailed presenting the developed scale to leaders in the field of resilience management to further interpret and refine the scale. Through the factor analysis process, factors and items were revised or dropped as necessary. Figure 3.1 illustrates the three-stage research design process that I followed.



*Figure 3.1.* The three-stage research design process.

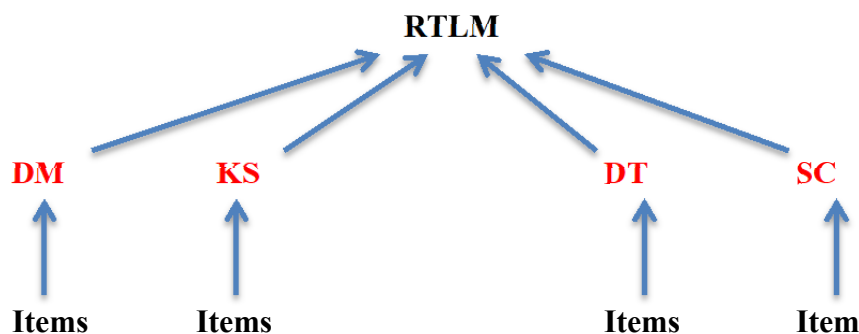
## Stages 1 and 2 Scale Development and Establishing Validity

**Developing conceptual boundaries.** Scale development followed a multi-step process as suggested by DeVellis (2015) and Creswell (2014). I determined what factors I wanted to measure, generated an item pool, determined the format for the measurement, had the survey factors and items reviewed by experts, administered the survey to participants, and evaluated factors and items. Likewise, Abell et al. (2009) have recommended that initial scale development should involve a clear sense of what the scale is attempting to measure and develop conceptual boundaries. They state that “[I]n classical measurement theory, the construct or target [phenomenon of interest] in scale development is understood as a latent variable (not directly observable, and subject to change) that is best expressed through *observable indicators* (quantified responses to individual scale items)” (Abell et al., 2009, p. 17). Moreover, Abell et al. (2009) have put forth the concept of “multidimensionality” which they have defined as the number of “constructs or factors” used to describe the phenomenon of interest. “The number of dimensions [constructs/factors] intended for a scale is determined by the range of topics the developer wishes to capture, and by the level(s) of underlying complexity associated with each” (Abell et al., 2009, p. 38). “[M]ultidimensional” constructs/factors consisting of “multi-items” are the “most complex” (Abell et al., 2009, p. 39), because while each construct/factor addresses an aspect of the phenomenon of interest, each is, in essence an individual subscale which is expressed through its item(s).

One point Abell et al. (2009) and DeVellis (2015) each made while discussing scale development and multidimensionality concerned the various terms researchers use to describe various aspects of a scale, namely the constructs or factors: While these terms are interchangeable, it is best to use one term for consistency’s sake and to lessen confusion of the

reader. Therefore, I used the term “factor” to describe each dimension of the phenomenon of interest I was exploring as it seemed to be the most common term used in the field of resilience research.

The conceptual research design followed Abell et al.’s (2009) observations of scale development boundaries and DeVellis’s (2015) scale development process. This was a multidimensional study aimed at assessing the latent variable or phenomenon of interest, a resilience-thinking leadership mindset (RTLTM). I used four theoretical factors to describe and assess RTLTM: shared decision-making (SD), knowledge sharing (KS), diversity of thought (DT), and shared commitment (SC). Figure 3.2 is an illustration of the multi-dimensional research model.



*Figure 3.2.* Multidimensional research model.

**What it was I wanted to measure.** The characteristics of a resilience-thinking leadership mindset came primarily from two theoretical spheres. The first sphere of influence consisted of complex adaptive system and social-ecological systems theories of resilience-thinking and adaptive governance (Folke, 2006; Walker et al., 2004; Wyborn, 2015). The second theoretical sphere comprised relational leadership theories that placed an emphasis on the concept of socially constructed relational leadership (Brown et al., 2015; Cunliffe, 2009; Drath, 2001; Drath



et al., 2008; Gergen, 2009; Gergen & Gergen, 2004; Hosking, 1988; Ospina & Foldy, 2010; Ospina & Uhl-Bien, 2012; Uhl-Bien, 2006; Weick, 2010; Weick & Sutcliffe, 2015). From these two spheres, I theorized that there were five dimensions of a RTLM. However, I decided to exclude “trust” as an independent factor because it was imbedded in each of the other theoretical factors. From this point, I described and defined a set of theoretical factors that, together, offered an indication of a resilience-thinking leadership mindset by a supervisor or manager. I later combined these two terms as “management” in the item development stage. These theoretical factors included shared decision-making, knowledge sharing, diversity of thought, shared commitment, and trust. Table 3.1 offers the specific definitions of the RTLM factors, what it measures, and of what or whom.

Table 3.1

*RTLM Factors and What They Measure*

**Theoretical Resilience Thinking Leadership Mindset Factors and Definitions**

**Shared decision-making (DM):** Capacity of management to enable collaborative meaning making and decision-making among individuals and groups.

**Knowledge sharing/learning (KS):** Capacity of management to share information across organizational boundaries with the goal of individual and group learning from information shared.

**What it measures: of What**

The level of centralized or decentralized decision-making by leaders in an organization.

The level to which management shares information among individuals and groups throughout an organization for the purpose of learning.

**Of What/Whom**

Leaders of an organization

Leaders of an organization

<b>Diversity of Thought (DT):</b> Ability of management to seek information from individuals or groups in times of crisis.	The level to which management encourages individual and group autonomy to make decisions and take action.	Leaders of an organization
<b>Shared purpose and commitment (SC):</b> Commitment by management to instill a shared goal to individuals and supervisors.	The level/degree to which management inspires commitment by individuals and groups to a shared goal or mission.	Leaders of an organization

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I theorized that the higher the level of these theoretical factors among employees and managers in an organization, the higher the potential for a resilience-thinking leadership mindset and organizing (Hosking, 1988; Weick & Sutcliffe, 2015) throughout an organization. Therefore, I developed a scale that measured the levels to which these factors exist in an organization.

**Generation of an item pool.** In order to capture specific representations of the factors through the items, Abell et al. (2009) and DeVellis (2015) have suggested the “theoretical saturation” of a factor, which means “generating items for each factor until it seems no more new content can be identified” (p. 41). To begin a process of item saturation, I reviewed items from several resilience studies (Lee et al., 2013; McManus et al., 2008), relational leadership studies (Akram et al., 2016; Carifio, 2010), distributed leadership studies (Grant, 2011; Hulpia et al., 2009; Liden & Maslyn, 1998; Madlock, 2008; Ozer & Beycioglu, 2013; Wu et al., 2013), a mindfulness survey (Weick & Sutcliffe, 2015), and a group trust survey (Carmeli, Tishler, & Edmondson, 2011). Using their items as a starting point, I developed items for each of the factors I had theorized. Abell et al. (2009) has cautioned that a scale developer should be mindful when writing items for each factor “[b]ecause each factor in multidimensional scale will require its

own evidence of psychometric strength and, often, be tested for its cohesion with or distinction from other factors in the larger scale, the work required in validation increases as well” (p. 40).

In order to select items that reflect the purpose of the factor, I wrote the items so that they could be measured in terms of either agreement or levels (Somers, 2009), e.g., the level to which “Management sees disruptions as opportunities to learn and adapt.” However, to assess convergent validity I adapted trust items and measures from Carmeli et al. (2011). Likewise, I also used items from Lee et al. (2013), Ozer & Beycioglu (2013), and Weick & Sutcliffe (2015) to aid in assessing convergent validity.

DeVellis (2015) mentioned that theoretical saturation would result in some redundancy in items, which could have the effect of looking at the factor from all angles (Abell et al., 2009). Consequently, I developed some redundant items to ensure I was covering the breadth of the characteristics of each theoretical factor. Likewise, DeVellis (2015) has pointed out that “internal consistency reliability is a function of how strongly the items correlate with one another (and hence the latent variable) and how many items you have in the scale” (“Number of Items,” para. 1). Thus, he has recommended creating a large pool to begin with, knowing it will be reduced throughout the factor analysis process. The initial RTLM item pool consisted of 71 items. It was reduced to 46 items through the face and content validity processes.

**Format for measurement.** Because of the nature of the research and the ultimate goal of attempting to develop a “map” of the final factors, I wanted to use an ordinal measure (Babbie, 2011). I ranked and ordered as to the level of the factor that existed as perceived among the various hierarchical levels in an organization: workers/staff and supervisors/management. I divided the survey into four sections. Each section was initially intended to measure specific aspects of theorized factors. The initial survey consisted of seven demographic questions to

acquire additional demographic data on the respondents such as gender, income, ethnicity, and age to also be used for divergent analysis. Section 1 consisted of six questions on a slider scale; Section 2 consisted of one question with 25 items requiring “Yes/No” (dichotomous) responses; Section 3 consisted of one question focusing on a specific disruption experienced by the participant with 21 items requiring a response on a six-point Likert scale. Section 4 consisted of one question focusing on how participants felt about their organizations’ present state of a resilience-thinking leadership mindset. It consisted of 19 items requiring a response on a six point Likert scale.

**Validation of items and factors.** In order to create a valid scale, a researcher needs to consider several types of validity (DeVellis, 2015; Neville, Lilly, Duran, Lee, & Browne, 2000). For the purpose of this research project I asked an overarching question concerning validation of scale: Does the scale have evidence of five types of validity: face, content, construct, convergent, and divergent? Consequently, the research project was to assess each of these forms of validity. Table 3.2 illustrates the five forms of validity that I assessed.

Table 3.2

*Types of Validity Assessed*

<b><u>Type of validity</u></b>	<b><u>How I planned to assess it</u></b>	<b><u>What I assessed</u></b>
<b>Face Validity:</b> the degree to which the assessment appears to measure what it claims to measure (DeVellis, 2015)	Show the scale to my colleague, dissertation chair, and committee members to assess its face validity	The overall scale to make sure it includes all of the factors/indicators that support the construct of interest.
<b>Content Validity:</b> the degree to which the items cover the range of the indicators (Abell et al. 2009)	Ask experts in the fields of relational leadership and resilience to review my items	How each of the items relate to the indicators

<b>Construct Validity:</b> the degree to which the assessment measures the intended constructs. Two types of construct validity are convergent and divergent validity (Abell et al., 2009; DeVellis, 2015)	Statistical summary of the relationships among items for each indicator and relationship/correlation among indicators	The relationships among items show statistical significance.
<b>Convergent Validity:</b> the degree to which the factors and items are similar to assessments that measure similar relationships	Integrate items from other assessments, i.e., relational or distributed leadership instruments	Items from a related assessment show a positive statistical relationship
<b>Divergent Validity:</b> the degree to which the assessment and/or factors are dissimilar to assessments that should be unrelated	Integrate items from an assessment that is dissimilar to the construct being assessed.	Items from a dissimilar assessment show little or no relationship.

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First, I assessed face validity—the degree to which the assessment appears to measure what it is proposed to measure. To assess face validity, I followed Neville et al. (2000) and reviewed my scale with my research colleague and members of my dissertation committee. Content validity assesses the degree to which the items cover the range of the factors (DeVellis, 2015). To assess content validity, I followed Neville et al. (2000) and had a small team of experts in the field of resilience-thinking and relational leadership review the items to ensure that the indicators were covering the range of the factors. In addition, I asked members in a PhD program to take the RTLM survey and review the factors and items.

To assess the construct validity, the degree to which the instrument measures the intended factors (DeVellis, 2015), I used a statistical tool, SPSS, and completed a descriptive statistical summary and exploratory factor analysis to assess the relationship among items and relationships

among factors. I followed up with a partial confirmatory factor analysis. As a further assessment of construct validity, convergent validity assesses the degree to which the scale is similar to scales that measure similar relationships. In contrast, divergent validity assesses the degree to which a scale is unrelated to other measures that measure unrelated items (DeVellis, 2015). Neville et al. (2000) measured convergent validity through a second survey where they compared their survey to a similar tool. In an interview, Chrobot-Mason (2015) pointed out that convergent and divergent validity could be assessed by embedding a similar and/or dissimilar scale into the newly developed scale. However, we agreed that this approach had the potential to lengthen the overall survey so that survey fatigue could become an issue. Abell et al. (2009) had recommended a less invasive approach toward assessing convergent and divergent validity by stating that each can be assessed by embedding convergent and divergent item(s) with the items for each factor of the scale. Consequently, I followed Abell et al.'s (2009) approach and added seven items from related scales and used demographic data to assess convergent and divergent validity. I chose three leadership items from Lee et al.'s (2013) disaster resilience scale, one leadership item from Ozer and Beycioglu's (2013) distributed leadership scale, one leadership/learning item from Weick and Sutcliff's (2015) Mindful Organizing Survey, and two leadership trust items from Carmeli et al.'s (2011) CEO trust scale.

**Administering items to participants.** When asking the question "Who should be sampled?" Abell et al. (2009) believed that participants and respondents of a scaling study should "be drawn from a population relevant to the construct being scaled" (pp. 54–55). Considering sample size they cited general guidelines or recommendations for respondent to item ratio of between 5 and 10:1 on the low end to a high of 20:1 (p. 64) for exploratory factor analysis. However, they encouraged developers to think about the complexity of their scale and

the realities of achieving respondent to item ratios. They offered advice to shoot for a minimum sample of between 200–300 respondents. My target population included employees/professionals and those in management positions. I wrote the items so that respondents could assess how their organization’s leaders reacted during a time of crisis and if they were presently developing a resilience-thinking leadership mindset. My goal was to have 300 participants. Consequently, 341 people responded to link Survey Monkey™. Of the 341 participants who responded, 311 participants completed the entire survey, indicating a 91% completion rate. Only those who completed the full survey were included in the exploratory analysis.

### **Stage 3: Content Review of Refined RTLM Scale**

Stage 3 entailed the qualitative methodology of this mix-methods design. The primary goal for Stage 3 was to have leaders in the field of resilience management review the RTLM scale after it had been through a statistical analysis and revised as a result. This process involved asking professionals who had experience in resilience management to assess the content of the refined RTLM scale. Creswell (2014) has called attention to the fact that “qualitative research is interpretative research; the inquirer is typically involved in a sustained and intensive experience with the participants” (p. 187). Thus, the importance of “purposefully” (Creswell, 2014, p. 188) selecting the participants should benefit the researcher’s overall purpose. Consequently, these leaders in resilience management helped to further interpret and refine the RTLM scale by essentially assessing content validity on the RTLM scale after it had been through the exploratory factor analysis.

### **Ethics**

Creswell (2014) has pointed out that “Ethical questions are apparent today in such issues as personal disclosure, authenticity, and credibility of the research report; the role of researchers

in cross-cultural contexts; and issues of personal privacy through forms of Internet data collection (Israel & Hay, 2006)” (p. 92). Therefore, Creswell (2014) has recommended that ethical considerations be “actively addressed” (p. 92) as they relate to each phase of the research process. Abell et al. (2009) have emphasized that scale developers have the responsibility to ensure “informed consent and assent procedures are carefully considered and rigorously implemented” (p. 60). Thus, throughout the research process, I ensured that ethical standards were maintained and aligned with the ethical research on human subjects. Prior to data collection, I requested and received approval by Antioch University’s Institutional Review Board (IRB). An informed consent form was a part of the introductory section of the survey and all participants needed to agree to participate in order to complete the survey. Participation in Stage 1 was anonymous, voluntary, and confidential. Stage 3 participants were known, but their participation was voluntary. Anyone participating could choose to terminate his/her involvement at any time for any reason. Moreover, the survey did not ask about sensitive topics.

### **Limitations of Research Design**

This research design had several limitations. First, even though the first phase of the study was an online survey and open to anyone who met the criteria for it, it was limited to those with access to the internet. Second, while an attempt was made to engage a diverse group of participants in regard to ethnicity, gender, race, and profession, because of the nature of the application of the survey, it was not guaranteed. The RTLTM scale will also need further validation through a predictive validation process.

### **Summary**

The refined resilience-thinking leadership mindset survey was developed through the assessment of face, content, and construct validity. Construct validity was assessed through



responses of over 300 participants and a subsequent factor analysis. It was, then, further interpreted and refined by leaders in the field of resilience. Results from the statistical analysis and the feedback from the resilience managers will be shared in Chapter IV.

## Chapter IV: Results of the Study

The resilience-thinking leadership mindset (RTLTM) scale (see Appendix I) was developed as an initial step to help organizations understand or “map” their current practices and potential to cultivate resilience-thinking leadership throughout their organization. I have defined RTLTM as co-constructed relational acts among individuals and groups who enable the adaptive learning through mindful, adaptive organizing. My broad research questions sought to examine how a resilience-thinking leadership mindset could be empirically measured in an organization, and how I could create a valid resilience-thinking leadership mindset scale to assess its potential in an organization.

The goals of this study were to:

- Develop an RTLTM scale and its items
- Assess RTLTM and its theoretical factors (distributed decision-making, knowledge sharing and learning, diversity and innovation, shared purpose and commitment)
- Determine the relationship between/among these factors through an exploratory factor analysis (EFA)
- Assess to what degree these factors contribute to a RTLTM.

This chapter will describe the results. The assessment process consisted of two stages. Stage 1 included scale evaluation. Scale evaluation included assessing face, content, construct validity (including convergent and divergent). I employed an exploratory item and factor analysis process consisting of principle component analysis, a factor rotation analysis, and factor/item reliability analysis. Stage 2 involved giving the statistically assessed RTLTM scale to leaders in the field of resilience management to further interpret and refine.

I report the detailed results from both stages of scale development. Stage 1 will include the assessment of face and content validity prior to administering the initial survey and the revisions made as a result of and those assessments. It will also include the results of the assessment of construct validity after administering the survey through Survey Monkey™ to include describing the demographic information about the participants, the process of cleaning the data, and the statistical processes involved in assessing the data. I propose names for the extracted factors at the conclusion of the exploratory factor analysis process, and, finally, I report the results of the assessment of convergent and divergent validity with the simplified RTLM scale. In Stage 2, I report the results of the further refinement and interpretation by the experts who assessed the streamlined RTLM scale.

### **Stage 1: Scale Development and Assessment**

The initial RTLM survey (see Appendix E) was developed as a set of four sections consisting of 71 items whose purpose was to measure the four theoretical factors based on the following definitions. Table 4.1 defines the theoretical factors that were measured:

Table 4.1

*Definitions of the Theoretical Factors Measured*

<b>Theoretical Resilience Thinking Leadership Mindset Factors and Definitions</b>	<b><u>What Factor Intends to Measure: of What</u></b>
<b>Shared decision-making (SD):</b> Capacity of management to enable collaborative meaning making and decision-making among individuals and groups.	The level of centralized or decentralized decision-making by management in an organization.
<b>Knowledge sharing/learning (KS):</b> Capacity of management to share information across organizational boundaries with the goal of individual and group learning from information shared.	The level to which management shares information among individuals and groups for the purpose of learning.
<b>Diversity of Thought (DT):</b> Ability of management to seek information from individuals or groups in times of crisis.	The level to which management encourages individual and group autonomy to make decisions and take action.
<b>Shared Commitment (SC):</b> Commitment by management to instill a shared goal to individuals and supervisors.	The level to which management inspires commitment by individuals and groups to a shared goal or mission.

The initial survey consisted of seven demographic questions. The Section 1 consisted of six questions on a slider scale; the Section 2 consisted of one question with 25 items requiring

“Yes/No” (dichotomous) responses; Section 3 consisted of one question focusing on a specific disruption experienced by the participant with 21 items requiring a response on a six-point Likert scale; Section 4 consisted of one question focusing on how participants felt about their organizations’ present state of a resilience-thinking leadership mindset. It consisted of 19 items requiring a response on a six-point Likert scale. To begin the process to validate the RTLM scale, I assessed face and content validity.

**Face validity.** Face validity assesses the degree to which the assessment appears to measure what it claims to measure (DeVellis, 2015). To assess face validity, I asked the members of my dissertation committee, all of whom are experts familiar with survey structure and design, to look over the survey and respond as to whether they felt the survey and its items appeared to measure the factors that had been developed. Based on their feedback, I made the following revisions: First, I revised the introduction to make it clearer for the reader. I moved the definition of the construct of interest, resilience-thinking leadership, into the introduction so that the participants would immediately know what the survey was about, and I removed redundant language that made the introduction confusing as to the goal of the study. Second, I separated each question with page breaks. Finally, I revised items that had compound statements referred to as “double-barreled” so that data would be less confusing to the reader and better to assess when completing the statistical analysis.

**Content validity.** Content validity assesses the degree to which the items cover the range of the factors (Abell et al., 2009). To assess content validity, I asked two content experts, Dr. Chuck Palus, Senior Fellow, Center for Creative Leadership, and Dr. Oskarsson, Deputy Resilience Officer, Norfolk Resilience Alliance, for an initial assessment as to the survey’s

items. Dr. Palus, responding to my first question, “Do the questions and items make sense?”, stated that he believed they did, but added that

I would not predict the items cluster neatly according to the factors empirically. I think that the factors are not sharply different from each other. Especially decision, knowledge, and diversity of thought are not all that different in practice, so many of the items seem to me to go nicely with more than one factor.

He also responded to the question “Do the items relate to or explain their factors?” by stating that he thought that they were “very effective.” However, he said that it was in “the global sense of all this actually being one giant factor— resilience leadership—not in the sense that the items necessarily differentiate among the factors.” His final thoughts were on the dichotomous section.

He said,

On the survey monkey version, it strikes me that the ”best” answers on your sliding and dichotomous scales would ideally be “both/ and” rather than “either / or.” In other words, these are polarities in which some dynamic of using BOTH is ideal.

I think this is often true in times of disruption— I think “both / and” or polarity thinking is often needed. Much depends on the disruption. Sometimes the person has seen the same scenario and knows how to manage it personally, by being in charge. Other times, it requires letting go of control. Much of this is dynamic and conditional and requires BOTH command and control, as well as collaboration, at different moments.

I appreciated these insights by Dr. Palus. His views became especially relevant during the assessment of construct validity. As a result of his observations, I revised the scale to reflect a “both/and” into the sliding scale by offering a middle point that stated: “depends on context.”

Dr. Oskarsson offered the following suggestions. She said that she felt that resilience-thinking leadership mindset characteristics and factors are correct and well operationalized in your survey. I wouldn’t eliminate any items but I would encourage you to potentially add a few items. In addition to focusing on and asking questions about the time of crisis, I would encourage you to add some questions inquiring about processes/actions prior to crises —during blue skies. What you do during the blue skies in terms of planning, empowering, connecting, trust building etc. is then reflected during the time of crisis. A crisis just “tests” the effectiveness of the actions above that resilience leaders try to institutionalize before crises.

Dr. Oskarsson's work in the field underscored Mr. Perez's and my ideas of adaptive capacity and adaptive governance being two sides of the same coin. To address Dr. Oskarsson's "blue sky" suggestion, I revised the wording on some of the items related to the factor of shared commitment. Dr. Oskarsson also noticed that the survey was pointed "internally" in an organization. She cautioned to be aware that there is also an external component to resilience-thinking as well.

Two PhD candidates who are currently working on their dissertations in leadership studies also responded to the survey's content validity. Both thought the questions made sense and were "effective" or "very effective." However, one PhD candidate echoed Dr. Oskarrson's comments, stating, "I wonder if adding items that consider preventing problems or foreseeing problems before they occur would be beneficial."

Finally, I asked three employees of various organizations to take the survey. In addition, I asked three members from my cohort in Antioch University's PhD Program to take the survey and respond to the questions I had asked the content experts. They gave me excellent feedback as to what they felt were confusing statements and unclear directions. For instance, one comment was to add an additional item to the demographic question asking about employment in an organization, adding "2-4 employees" as one of the possible responses. Another cohort member questioned the need for any of the binary (dichotomous) responses since I had already identified the theoretical factors. She stated that "There is a bit of a feeling that we are being asked to do a good leader/bad leader thing here, rather than things that are specific to resilience-thinking." This observation caused me to consult with my methodologist, Dr. Chrobot-Mason, Director for the Center for Organizational Leadership at the University of Cincinnati. After a discussion of the concerns, we determined that I had, indeed, identified the initial theoretical factors in the

literature review, so that the binary items were unnecessary and should be deleted from the survey. Subsequently, I excluded Section 2, the dichotomous subscale, eliminating 25 items. It was also suggested that I revise the Introduction in order to make it clear to participants that there were three distinct sections making up the RTLTM survey. In the body of the survey I clearly delineated each section to lessen any potential confusion on the part of the participants. The revised survey consisted of three sections and 46 items (see Appendix F). Below is a complete list of the questions and items analyzed in SPSS:

Section 1: Question: Please use your cursor and mark the position on the scale YOU THINK it belongs as an essential characteristic of an organizational Leader with a resilience-thinking mindset.

Items:

*Q 1. In times of crisis*

*Q 2. During disruptions*

*Q 3. To solve day-to-day problems*

*Q 4. On a daily basis*

*Q 5. To build resilience prior to a disruption or crisis*

*Q 6. In times of uncertainty*

Section 2: Question: Thinking about a disruption in your organization, how strongly do you agree or disagree with the following statements?

Items:

*Q 7. Management encouraged us to take risks to address the issue.*

*Q 8. My supervisor encouraged us by bringing us into the decision-making process.*

*Q 9. Management made a conscious effort to ensure that critical information (e.g., staff*



*contact information, and details) was available in a number of different formats and locations.*

*Q 10. I felt that I had little input to the decision-making process.*

*Q 11. Management collaborated with employees to develop problem-solving strategies.*

*Q 12. There was a sense of shared purpose as we worked through the disruption.*

*Q 13. Employees relied on supervisor's experience and knowledge to solve the day-to-day problems.*

*Q 14. Management discouraged risk taking because it may have caused a further disruption in production.*

*Q 15. Management encouraged employees to think outside of the box.*

*Q 16. Management promoted sharing of knowledge among individuals and groups to solve problems.*

*Q 17. There was an excellent sense of teamwork and camaraderie among us.*

*Q 18. Management and employees talked about our shared goals.*

*Q 19. I had a high degree of independence in decision-making as I did my job.*

*Q 20. Management was open and up-front with my colleagues and me.*

*Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.*

*Q 22. Leaders made the decisions and I followed them.*

*Q 23. I saw my work on the problem as a contribution to the organization.*

*Q 24. Management sought out employees known for their ability to think creatively to help resolve the issue.*

*Q 25. Management attempted to create learning environment to help solve problems.*

*Q 26. Management tried to build our capabilities toward self-leadership.*

*Q 27. Employees were actively involved in all the changes that took place in the organization.*

Section 3: Question: Please reflect to the degree to which you believe your current organization demonstrates a resilience-thinking leadership mindset.

Items:

- Q 28. Management in my organization takes advantage of the unique skills of my colleagues and me.*
- Q 29. Management sees disruptions as opportunities to learn and adapt.*
- Q 30. Management respects expertise and experience over classified rank.*
- Q 31. Management includes employees at all levels in the decision-making processes of the organization.*
- Q 32. I am encouraged by my immediate supervisor to take the initiative when faced with uncertainty.*
- Q 33. We are encouraged to talk about our mistakes so that we can learn from them.*
- Q 34. All of the organization's members work toward achieving our collective goals.*
- Q 35. In my organization, we take the time to learn about situations that could go wrong.*
- Q 36. I am encouraged by management to learn new skills at work.*
- Q 37. Management encourages me to try different jobs within our department to gain experience.*
- Q 38. Upper management is responsible for developing solutions to organizational problems.*
- Q. 39. In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.*
- Q. 40. Management encourages their staff to see how their work is connected to the entire production cycle.*
- Q 41. My direct supervisor is always honest, truthful, and transparent when giving information.*
- Q 42. Management makes it clear to everyone how his/her job fits into what we are trying to do.*

*Q 43. The people most qualified to make decisions make them regardless of their status in the organization.*

*Q 44. Management in my organization collaborates with us to achieve the goals of the organization.*

*Q 45. In my organization, there is a shared sense of purpose.*

*Q 46. I believe employees would trust decisions made by management about how our organization should manage a crisis.*

**Construct validity.** Construct validity assesses the degree to which the assessment measures the intended indicators/constructs (Abell et al., 2009; DeVellis, 2015). To assess construct validity, I used SPSS to assess a statistical summary of the relationships among items for each factor and relationship/correlation among extracted factors. The sample size in scale development is important because “the factor pattern that emerges from a large-sample factor analysis will be more stable” (DeVellis, 2015, p. 203). While a sample size of 200 is considered “fair” (DeVellis, 2015), a sample size of 300 is considered “good” for ordinary factor analysis (DeVellis, 2015). I decided to use a minimum sample size of 300 participants. Rather than using a snowball approach, participants were recruited using Mechanical Turk. My goal in using this approach was to obtain as close to a representative sample as possible for scale development. Buhmester, Kwang, and Gosling (2011) evaluated the quality of the data gathered from Mechanical Turk and found that

Our analyses of demographic characteristics suggest that MTurk participants are at least as diverse and more representative of noncollege populations than those of typical Internet and traditional samples. Most important, we found that the quality of data provided by MTurk met or exceeded the psychometric standards associated with published research. (p. 4)

The survey was open for one week in May 2017. Three hundred forty-one people responded to link Survey Monkey™. Of the 341 participants who responded, 311 participants

completed the entire survey, indicating a 91% completion rate. Only those who completed the full survey were included in the exploratory analysis.

The final survey took from 11 to 15 minutes to complete. The average time to complete was 11 minutes and 30 seconds (Survey Monkey Dashboard Statistics). The survey required that participants respond to questions divided into three sections. Section 1 consisted of six items and asked participants to read a definition of a resilience-thinking leadership mindset and then use a slide scale to identify how they believed their organization's leadership responded "in times of crisis," "in times of disruptions," "to solve a day-to-day problems," "on a daily basis," and "to build resilience prior to a disruption." The section's purpose was to identify whether they believed their organizational leaders employed characteristics of a RTLM.

Section 2 consisted of 21 items and asked that participants reflect on a specific disruption scenario that they experienced in their organization. Participants had 17 disruptions scenarios to choose from, or they could write-in their own. Disruptions included scenarios such as "facing a natural disaster," "downsizing to survive in the market," "adopting a new technology," and "mergers with another organization." Using a six-point Likert scale participants were asked to what extent they disagreed or agreed with items including whether "Management encouraged us to take risks to address the issue," and "I felt I had little input to the decision-making process." The purpose of Section 2 was to assess how a participant's organization employed a RTLM when disruptions had occurred.

Section 3 consisted of 19 items and asked participants to reflect as to how their organization's leaders subscribed or had developed leadership characteristics similar to those defined as resilience-thinking leadership. Items included statements such as: "Management in my organization take advantage of the unique skills of my colleagues and me," "We are encouraged

to talk about our mistakes so we can learn from them,” and “In my organization, there is a share sense of purpose.” Using a six-point Likert scale, participants were asked to estimate the extent to which participants believed their organizations’ leaders acted in a manner consistent with a RTLM. The purpose of Section 3 was to assess the current level of RTLM in organization. The final survey consisted of three questions and a total of 46 items.

From Survey Monkey, the data were downloaded to an Excel spreadsheet where I cleaned and prepared the data for an upload to SPSS. Of the 341 people who responded to the survey 311 completed it (91%). I removed those who started the survey, but did not complete it. Of the 30 who did not complete the survey 17 stopped after completing the first two initial questions: “Are you employed at an organization with” and “What is your role in your organization?” Four completed questions 4 to 8, the first section of the survey. Six began Section 2, but stopped midway. Three did not answer more than one item response in the subsections of the survey. Of those who started answering the items, 96% completed the survey ( $n = 311/324$ ).

After removing the incomplete responses, the data were coded into an Excel spreadsheet for analysis in SPSS. The Excel data were then uploaded to SPSS, and the items were coded as either nominal or scale. The four inverse items were reversed so that they could be analyzed properly.

***Participant demographics.*** Of the 311 who completed the survey, 118 were women (37.9%), 192 were men (61.7%), one was transgender (.3%). All of the participants were from the United States. Of those completing the survey, the majority listed their ethnicity as White/Caucasian, 70.4%, 11% marked Black or African American, 7% listed Hispanic, 7% listed Asian or Pacific Islander. American Indian/Alaskan Native accounted for less than 1% of the

participants. Forty-four percent of the participants stated they had a bachelor's degree, 13% stated they completed High School, 15% checked Some College, 10% checked Associate degree, 6% had obtained a master's degree, and 1% stated they had advanced degrees such as a PhD, Ed, MD or JD. Table 4.2 gives a complete breakdown of the demographics.

Table 4.2

*Demographics of Survey Participants*

<u>Characteristic</u>	<u>Number</u>	<u>%</u>
<b>Gender</b>		
Male	192	61.7
Female	118	37.9
Transgender	1	.3
<b>Age</b>		
18–24	36	12
25–34	152	49
35–44	73	23
45–54	33	11
55–64	15	5
65–75	2	.6
75 +		
<b>Ethnicity</b>		
American Indian/Alaskan Native	2	.6
Asian/Pacific Islander	24	7.7
Black or African American	33	10
Hispanic	23	7
White/Caucasian	219	70
Other	7	2.3
No Answer	3	.9
<b>Education</b>		
Completed Some High School	41	13
Completed Some College	74	24
Associates Degree	32	10
Bachelors Degree	138	44
Masters Degree	20	6
PhD, Ed, MD	3	1
Other	3	1

**Role in Organization**

Employee/Professional	194	62
Middle Manager/Supervisor	62	20
Manager	39	13
Director	3	1
Associate/Assistant VP	1	.3
Senior VP	1	.3
President	10	3
Executive Officer	0	
Other	0	

**Yearly Income**

\$20, 000 - \$35, 000	122	39
\$35, 001 - \$50, 000	72	23
\$50,001 - \$75,000	73	23
\$75,001 - \$100,000	32	10
\$100,001 - \$150,000	9	3
More Than \$150,000	3	1

**Employed at an Organization with**

2–4 Employees	9	3
5–24 Employees	36	12
25–99 Employees	74	24
100–500 Employees	80	26
501–1000 Employees	33	11
1001–5000 Employees	28	9
More Than 5000 Employees	45	14
I do not work for an Organization	6	2

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(Note.  $n = 311$ )

**Descriptive statistics and correlations.** Descriptive statistics were run for each of the potential scale items. Statistics included means, standard deviations, measures of skewness, and measures of kurtosis (See Appendix E). Survey response options on section one were scaled from 1 (*more centralized*) to 6 (*less centralized*). Survey response items for section two were: 1 (*strongly disagree*), 2 (*disagree*), 3 (*somewhat disagree*), 4 (*somewhat agree*), 5 (*agree*), and 6 (*strongly agree*). Response options for the third section were: 1 (*Not at all*), 2 (*Rarely*), 3 (*To a small extent*), 4 (*To some extent*), 5 (*To a moderate extent*), and 6 (*To a large extent*).

Skewness refers to the measure of symmetry in a data set (McNeese, 2016). From Bulmer (1979), McNeese (2016) has given a general rule of thumb to assess skewedness:

- Less than -1 or greater than 1: Highly skewed
- Between -1 and .5 or .5 and 1: Moderately skewed
- Between -.5 and .5: Approximately symmetrical

All of the items were either moderately skewed or approximately symmetrical. Kurtosis is the measure of the weight of the tails “relative to the rest of the distribution” (Wheeler, 2011).

Although Kurtosis is dependent on sample size (McNeese, 2016), a measure under 3 or under -3 is usually considered acceptable. All of the items were measured under 3 or -3.

I decided to complete two bivariate correlations to assess the relationships of the items measuring the same theoretical factor and to assess the relationships of items within each section. First, I grouped the items by their theoretical factors. I analyzed correlations for each item in relation to its initial theoretical factor: Shared Decision-making (DM), Knowledge Sharing/learning (KS), Diversity of Thought (DT), and Shared Commitment (SC). Since these grouped items were intended to address the same theoretical factor, a bivariate correlation  $< .3$  would reveal if an item shared less than nine percent of its variance with the other items. An item that did not correlate with other items  $> .3$  was discarded. Q1 correlated  $< .3$  with other DM items. Q2 and Q5 correlated  $< .3$  with other KS items. Q3 correlated  $< .3$  with other DT items, and Q4 and Q6 correlated  $< .3$  with other SC items. Consequently, none of the items in Section 1 had bivariate correlations with other items sharing their theoretical factors  $> .3$ . Therefore, items 1 through 6 (Section 1) were discarded from further factor analysis.

Second, I ran a bivariate correlation analysis on the items within each section. My rationale for doing so was that each section had its own thematic emphasis, and I believed that



the items should be related to some extent. The analysis revealed that four items from Section 2 showed weak correlations with the other items. These items were Q10, Q13, Q14, and Q22. All of these items with weak correlations were negatively worded. I discarded them from the exploratory factor analysis. Likewise, one items from Section 3, Q38, showed a weak correlation to the other items in section three. It was also discarded from the exploratory factor analysis. The seven items that were to be used for assessing convergent validity with the new scale were also removed for the initial exploratory factor analysis. Convergent items included Q9, Q20, Q27, Q35, Q41, Q43, and Q46. Consequently, 28 items comprised the initial exploratory factor analysis. Below are the items with their perceived theoretical factors that were retained for factor analysis from Section 2 and from Section 3:

Section 2 Items:

*Q 7. Management encouraged us to take risks to address the issue.*

*Q 8. My supervisor encouraged us by bringing us into the decision-making process.*

*Q 11. Management collaborated with employees to develop problem-solving strategies.*

*Q 15. Management encouraged employees to think outside of the box.*

*Q 16. Management promoted sharing of knowledge among individuals and groups to solve problems.*

*Q 17. There was an excellent sense of teamwork and camaraderie among us.*

*Q 18. Management and employees talked about our shared goals.*

*Q 19. I had a high degree of independence in decision-making as I did my job.*

*Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.*

*Q 23. I saw my work on the problem as a contribution to the organization.*

*Q 24. Management sought out employees known for their ability to think creatively to help resolve the issue.*

*Q 25. Management attempted to create learning environment to help solve problems.*

*Q 26. Management tried to build our capabilities toward self-leadership.*

*Q 31. Management includes employees at all levels in the decision-making processes of the organization.*

Section 3 Items:

*Q 28. Management in my organization takes advantage of the unique skills of my colleagues and me.*

*Q 29. Management sees disruptions as opportunities to learn and adapt.*

*Q 30. Management respects expertise and experience over classified rank.*

*Q 31. Management includes employees at all levels in the decision-making processes of the organization.*

*Q 32. I am encouraged by my immediate supervisor to take the initiative when faced with uncertainty.*

*Q 33. We are encouraged to talk about our mistakes so that we can learn from them.*

*Q 34. All of the organization's members work toward achieving our collective goals.*

*Q 36. I am encouraged by management to learn new skills at work.*

*Q 37. Management encourages me to try different jobs within our department to gain experience.*

*Q 39. In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.*

*Q 40. Management encourages their staff to see how their work is connected to the entire production cycle.*

*Q 42. Management makes it clear to everyone how his/her job fits into what we are trying to do.*

*Q 44. Management in my organization collaborates with us to achieve the goals of the organization.*

*Q 45. In my organization, there is a shared sense of purpose.*

**Factor analysis.** The goal of this research project was to develop a scale that would measure the construct of interest, a resilience-thinking leadership mindset (RTLTM) in an organization. DeVellis (2015) has stated that for the process of scale development factor analysis can “help an investigator *in determining how many latent variables* [factors] underlie a set of items, . . . *condensing information, and defining the substantive content or meaning of the factors*” (p. 154). DeVellis (2015) had gone on to state that while structural equation modeling approaches such as confirmatory factor analysis and maximum likelihood estimation are useful tools,

in scale development [they] may not correspond to the goal at hand, which is to identify a small set of factors that can account for the important covariation among items. . . . What a scale developer is often after is a *parsimonious* account of the factors. That is, in the course of scale development, we often want to know about the few, most influential, sources of variation underlying a set of items, not every possible source we can ferret out. (pp. 165–166)

Neill (2017) has summed up an exploratory factor analysis in scale development as simplifying the data.

I had originally theorized that four factors explained the construct of interest:

(a) shared/distributed decision-making (DM), (b) knowledge sharing/learning (KS), (c) diversity of thought (DT), and (d) shared commitment (SC). I developed items for each theorized factor. I also added items from similar leadership scales to assess convergent validity. In order to develop a parsimonious scale that met the requirements construct validity (Abell et al., 2009; DeVellis, 2015; Neill, 2017), I chose a process that would allow for factor identification and item deletion. Neill has suggested that an item/factor analysis be an iterative process, one that continues to simplify the scale as it is developed.

I followed the process described below through multiple iterations in order to develop a simplified scale that had significant inter-item correlations—a significant Cronbach’s Alpha  $> .8$ —and moderate to strong component/factor correlations:

- A principal component analysis (PC) and/or principal axis (PA) to assess sample adequacy by using the Kaiser-Meyer-Olkin (KMO) test and Bartlett’s Test of Sphericity (BTS), to extract the factors, and to assess the eigenvalues of the factors generated
- An exploratory factor analysis using an oblique rotation (Direct Oblimin) analysis to determine the relationships of the items to those factors, and to assess the component correlation
- A scale reliability analysis that assessed the inter-item correlations of the items within each factor and the Cronbach’s Alpha for each factor and remaining items.

This approach achieved two goals. First, at an item level, the goal was to identify a small number of items with the highest loadings on each extracted factor (DeVellis, 2015) which would offer a clearer understanding of the factor(s) that had been extracted. Second, at the factor level, as a result of the analysis of the minimum number of items’ meaning (theme), the goal was to label (name) each extracted factor and define it in relation to the construct of interest, resilience-thinking leadership.

***First iteration.*** The first iteration of the principle component analysis extracted three components (factors) with a KMO of .966. KMO tests how widespread the correlations are and if they are clustering around a few variables/factors Zaiontz (2017) as specified by Kaiser (1974). KMO records the values between 0–1. Values closer to 1 indicate a “good fit for factor analysis”

while those below .5 indicate problems with the data (Zaiontz, 2017). Interpretations can be seen in Figure 4.1.

KMO	Interpretation
.9 and above	marvelous
.8 - .9	meritorious
.7 - .8	middling
.6 - .7	mediocre
.5 - .6	miserable
under .5	unacceptable

*Figure 4.1.* KMO Interpretations based on Kaiser (1974). Reprinted with permission from Zaiontz (2017).

Consequently, the KMO was interpreted as “Marvelous” and a good fit for further analysis. Bartlett’s Test of Sphericity (BTS) assesses the correlations of the variables (items) with themselves and with other variables (Zaiontz, 2017). Significance less  $< .05$  indicates a good fit for further analysis. Significance (sig) of the BTS in round one was equal to .000. Eigenvalue indicates the total variance explained by each extracted factor. A factor with an eigenvalue  $< 1$  does not have enough variance to be considered a factor (Neill, 2017), while those factors with values  $> 1$  should be considered for further analysis. Extracted factors should explain between 50%–75% of the total variance (Neill, 2017). The initial analysis indicated that 3 factors had eigenvalues  $> 1$  and accounted for 63% of the total variance.

The second step, to examine the factors using a rotation process, identified which items loaded onto each extracted factor. “The purpose of factor rotation is to find a particular orientation for the reference axes that helps us understand items in their simplest terms” (DeVellis, 2015, p. 180). Moreover, examining rotated factors can help to understand “what items in a factor have in common” and “what the underlying causal factor is that determines how the items are answered” (DeVellis, 2015, p. 180). Two principal rotation processes are recommended: orthogonal and oblique. For factors that are independent of one another an

orthogonal, or perpendicular, rotation is recommended. For factors that are believed to be correlated, an oblique rotation is recommended (DeVellis, 2015). I chose an oblique rotation because I believed that the items and factors were correlated to some extent. I also suppressed small coefficients at an absolute value  $< .4$  (Neill, 2017). 13 items loaded onto Factor 1 for the first iteration:

*Q 28. Management in my organization takes advantage of the unique skills of my colleagues and me.*

*Q 29. Management sees disruptions as opportunities to learn and adapt.*

*Q 30. Management respects expertise and experience over classified rank.*

*Q 32. I am encouraged by my immediate supervisor to take the initiative when faced With uncertainty.*

*Q 33. We are encouraged to talk about our mistakes so that we can learn from them.*

*Q 34. All of the organization's members work toward achieving our collective goals.*

*Q 36. I am encouraged by management to learn new skills at work.*

*Q 37. Management encourages me to try different jobs within our department to gain experience.*

*Q. 39. In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.*

*Q. 40. Management encourages their staff to see how their work is connected to the entire production cycle.*

*Q 42. Management makes it clear to everyone how his/her job fits into what we are trying to do.*

*Q 44. Management in my organization collaborates with us to achieve the goals of the organization.*

*Q 45. In my organization, there is a shared sense of purpose.*

Thirteen items loaded onto Factor 2 for the first iteration:

*Q 7. Management encouraged us to take risks to address the issue.*

- Q 8. My supervisor encouraged us by bringing us into the decision-making process.*
- Q 11. Management collaborated with employees to develop problem-solving strategies.*
- Q 12. There was a sense of shared purpose as we worked through the disruption.*
- Q 15. Management encouraged employees to think outside of the box.*
- Q 18. Management and employees talked about our shared goals.*
- Q 19. I had a high degree of independence in decision-making as I did my job.*
- Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.*
- Q 23. I saw my work on the problem as a contribution to the organization.*
- Q 24. Management sought out employees known for their ability to think creatively to help resolve the issue.*
- Q 25. Management attempted to create learning environment to help solve problems*
- Q 26. Management tried to build our capabilities toward self-leadership.*
- Q 31. Management includes employees at all levels in the decision-making processes in my organization.*

Two items loaded onto Factor 3 for the first iteration:

- Q 16. Management promoted sharing of knowledge among individuals and groups to solve problems.*
- Q 17. There was an excellent sense of teamwork and camaraderie among us.*

Factor and item analysis began by looking at communalities of the items (Neill, 2017), multiple loadings of the items, the component correlation matrix, and the reliability analyses (inter item correlation) of each factor. I also reviewed each item to see if there were redundancies (items in a factor saying essentially the same thing). Neill (2017) has stated that in order to help simplify, an investigator should first look at the Communalities table. “Each variable [item] has communality = the proportion of the variable’s variance explained by the extracted factor”

(p. 58). It can range between 0–1. 0 equals no variance explained while 1 equals all variance explained. Neill (2017) suggests removing items with a communality in its factor of  $< .5$  because it has “considerable unexplained variance” (p. 59). All items in Factor 1 were  $> .5$ . Q7 in Factor 2 was  $< .5$  (.400) and was discarded from further analysis. All the other items in Factor 2 were  $> .5$ . All items in Factor 3 were  $> .5$ . Q31 loaded onto both Factors 1 and 2, so it was removed from the second iteration. Q16 and Q17 were the only items loading onto Factor 3, and the component correlation showed a negative relationship with the other two extracted factors. An extracted factor should have a minimum of three items to be considered a factor (Neill, 2017; Ullman, 2013), although two items could be considered a scale. However, the Component Correlation Matrix showed a weak negative correlation between extracted Factors 1 and 3,  $-.255$ , and between extracted Factors 2 and 3,  $-.163$ . The correlation between Factors 1 and 2 was positive,  $.636$ . Table 4.3 is the Component Correlation Matrix for the three extracted factors.

Table 4.3

*Component Correlation Matrix*

<u>Component</u>	<u>1</u>	<u>2</u>	<u>3</u>
1	1.00	.636	-.255
2		1.00	-.163
3			1.00

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*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin

Consequently, I decided to discard items Q16 and Q17 from the second iteration.

Reliability analysis looks at the Cronbach’s Alpha (CA), inter-item correlation matrix among items in a factor, and the adjusted CA if an item were to be deleted. Cronbach’s Alpha is the measurement of internal consistency in a factor. It is measured on a scale from 0–1. A score .8 or greater is considered acceptable (DeVellis, 2015). The CA for Factor 1 was .945, Factor 2



had a CA of .928, and Factor 3 had a CA of .889. I considered each item in each factor. Although they had acceptable consistency loadings, I decided to delete Q34 and Q37 from Factor 1 because they were restatements of Q36 and Q45, respectively. Doing so did not significantly change the CA. Likewise, I deleted Q28 and Q33 from Factor 1 because the wording was too close to items in Weick and Sutcliff's (2015) Mindful Organizing Survey. Before deleting these items the CA was .945; afterward the CA was .939. After deleting Q7 and Q31 from Factor 2, the CA increased from .928 to .936. Below are the items retained in Factors 1, 2, and 3 for the second iteration of the factor analysis:

Factor 1

*Q 29. Management sees disruptions as opportunities to learn and adapt.*

*Q 30. Management respects expertise and experience over classified rank.*

*Q 32. I am encouraged by my immediate supervisor to take the initiative when faced with uncertainty.*

*Q 36. I am encouraged by management to learn new skills at work.*

*Q 39. In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.*

*Q 40. Management encourages their staff to see how their work is connected to the entire production cycle.*

*Q 42. Management makes it clear to everyone how his/her job fits into what we are trying to do.*

*Q 44. Management in my organization collaborates with us to achieve the goals of the organization.*

*Q 45. In my organization, there is a shared sense of purpose.*

Factor 2

*Q 8. My supervisor encouraged us by bringing us into the decision-making process.*

*Q 11. Management collaborated with employees to develop problem-solving strategies.*

*Q 12. There was a sense of shared purpose as we worked through the disruption.*

*Q 15. Management encouraged employees to think outside of the box.*

*Q 18. Management and employees talked about our shared goals.*

*Q 19. I had a high degree of independence in decision-making as I did my job.*

*Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.*

*Q 23. I saw my work on the problem as a contribution to the organization.*

*Q 24. Management sought out employees known for their ability to think creatively to help resolve the issue.*

*Q 25. Management attempted to create learning environment to help solve problems.*

*Q 26. Management tried to build our capabilities toward self-leadership.*

No items were retained from Factor 3 for further analysis.

***Second iteration.*** For the second iteration the principle component analysis extracted two factors with a KMO of .963 (Marvelous). The BTS sig = .000. The two factors had eigenvalues greater >1, and the two extracted factors accounted for 64% of the total variance. The factor rotation using an oblique rotation loaded 11 items onto Factor 1, and 9 items loaded onto Factor 2. However, the items loading onto the factors were reversed from the first iteration. This was due to the fact that principal component analysis seeks to load the largest number of items onto the first factor. Consequently, more items from Factor 2 in the first iteration loaded onto Factor 1 in the second iteration. The item loadings showed a positive relationship between factors:

Items loading onto Factor 1:

*Q 8. My supervisor encouraged us by bringing us into the decision-making process.*

*Q 11. Management collaborated with employees to develop problem-solving strategies.*

*Q 12. There was a sense of shared purpose as we worked through the disruption.*

- Q 15. Management encouraged employees to think outside of the box.*
- Q 18. There was an excellent sense of teamwork and camaraderie among us.*
- Q 19. I had a high degree of independence in decision-making as I did my job.*
- Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.*
- Q 23. I saw my work on the problem as a contribution to the organization.*
- Q 24. Management sought out employees known for their ability to think creatively  
To help resolve the issue.*
- Q 25. Management attempted to create learning environment to help solve problems.*
- Q 26. Management tried to build our capabilities toward self-leadership.*
- Items loading onto Factor 2:
- Q 29. Management sees disruptions as opportunities to learn and adapt.*
- Q 30. Management respects expertise and experience over classified rank.*
- Q 32. I am encouraged by my immediate supervisor to take the initiative when faced  
with uncertainty.*
- Q 36. I am encouraged by management to learn new skills at work.*
- Q39. In my organization, as a group, we have a good grasp of each other's areas of  
expertise and skills.*
- Q 40. Management encourages their staff to see how their work is connected to the  
entire production cycle.*
- Q 42. Management makes it clear to everyone how his/her job fits into what we are  
trying to do.*
- Q 44. Management in my organization collaborates with us to achieve the goals of the  
organization.*
- Q 45. In my organization, there is a shared sense of purpose.*

Communalities in the second iteration indicated that Q23 was  $< .5$ , so it was discarded from further factor analysis. All of other items in Factors 1 and 2 were  $> .5$  and retained for further analysis. The Component Matrix and Pattern Rotation Matrix indicated that Q42 loaded onto both factors. It was discarded from further analysis. The Component Correlation Matrix showed a positive correlation between factors and a moderate to strong correlation between them.

Table 4.4 shows the correlation.

Table 4.4

*Component Correlation Matrix*

<u>Component</u>	<u>1</u>	<u>2</u>
<b>1</b>	1.00	.663
<b>2</b>	.663	1.00

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*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization

The Reliability analysis indicated a Cronbach's Alpha of .943 for Factor 1. Neill (2017) has suggested that at some point eliminating items becomes a subjective process. To eliminate items he suggested assessing an item and consider eliminating it if:

- Main Loading is  $< .4$
- Cross Loading is  $< .3$
- The item makes contribution to the factor
- The number of items in the factor

After reviewing each item in the Reliability Analysis, I discarded two items. Items Q12 and Q18 were discarded as they did not seem to fit with the language of the other items in Factor 1. The

CA was minimally affected, CA .940. Eight items were retained from Factor 1 for the third iteration. Below is the list of items retained for the third iteration.

Factor 1:

- Q 8. My supervisor encouraged us by bringing us into the decision-making process.*
- Q 11. Management collaborated with employees to develop problem-solving strategies.*
- Q 15. Management encouraged employees to think outside of the box.*
- Q 19. I had a high degree of independence in decision-making as I did my job.*
- Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.*
- Q 24. Management sought out employees known for their ability to think creatively to help resolve the issue.*
- Q 25. Management attempted to create learning environment to help solve problems.*
- Q 26. Management tried to build our capabilities toward self-leadership.*

The CA for Factor 2 was .916. Q32 had a low correlation among the other items loading onto Factor 2, so it was discarded. Seven items were retained from Factor 2 for the third iteration.

Factor 2:

- Q 29. Management sees disruptions as opportunities to learn and adapt.*
- Q 30. Management respects expertise and experience over classified rank.*
- Q 36. I am encouraged by management to learn new skills at work.*
- Q 39. In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.*
- Q 40. Management encourages their staff to see how their work is connected to the entire production cycle.*
- Q 44. Management in my organization collaborates with us to achieve the goals of the organization.*

*Q 45. In my organization, there is a shared sense of purpose.*

**Third iteration.** The third iteration was run in order to confirm the number of extracted factors and the items loading onto each factor, to re-analyze the strength of the correlations of items within each factor, to reevaluate the component/factor correlations, to re-confirm the inter-item correlations, to name the new factors, and to conclude an assessment of construct validity by assessing convergent/divergent validity. The principle component analysis showed a KMO of .953 (Marvelous). The BTS's sig = .000. The principal component analysis again extracted two factors with eight items loading onto Factor 1 and seven items onto Factor 2. Both factors had an eigenvalue > 1 and accounted for 67% of the total variance. Guidelines for the loading of items onto a factor suggest that > .70 excellent, > .63 very good, > .55 good, > .45 fair, and < .32 poor (Comrey & Lee, 1992, as cited in Neill, 2017, p. 85). All of the items loaded onto their respective factor > .63 and were considered "very good" to "excellent." Table 4.5 lists the factors extracted from the principle component analysis and oblique (Direct Oblimin) rotation.

Table 4.5

*Pattern Matrix After Third Iteration*

<u>Item</u>	<u>Factor</u> 1	<u>Factor</u> 2
<i>Q 8. My supervisor encouraged us by bringing us into the decision-making process.</i>	0.819	
<i>Q 11. Management collaborated with employees to develop problem-solving strategies.</i>	0.844	
<i>Q 15. Management encouraged employees to think outside of the box.</i>	0.813	
<i>Q 19. I had a high degree of independence in decision-making as I did my job.</i>	0.870	
<i>Q 21. In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.</i>	0.808	
<i>Q 24. Management sought out employees known for their ability to think creatively to help resolve the issue.</i>	0.861	
<i>Q 25. Management attempted to create learning environment to help solve problems.</i>	0.761	
<i>Q 26. Management tried to build our capabilities toward self-leadership.</i>	0.776	
<i>Q 29. Management sees disruptions as opportunities to learn and adapt.</i>		0.689
<i>Q 30. Management respects expertise and experience over classified rank.</i>		0.750
<i>Q 36. I am encouraged by management to learn new skills at work.</i>		0.689
<i>Q 39. In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.</i>		0.883
<i>Q 40. Management encourages their staff to see how their work is connected to the entire production cycle.</i>		0.853
<i>Q 44. Management in my organization collaborates with us to achieve the goals of the organization.</i>		0.776
<i>Q45. In my organization, there is a shared sense of purpose.</i>		0.826

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*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 5 iterations

The Component Correlation Matrix showed a moderate to strong positive correlation between factors 1 and 2. Table 4.6 reports the correlation between factors.





Table 4.8

*Inter-Item Correlation Matrix for Factor 2*


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	<u>Q 29</u>	<u>Q 30</u>	<u>Q 36</u>	<u>Q 39</u>	<u>Q 40</u>	<u>Q 44</u>	<u>Q 45</u>
Q 29	1	.560	.547	.495	.567	.546	.534
Q 30		1	.504	.539	.573	.673	.598
Q 36			1	.525	.585	.540	.542
Q 39				1	.586	.613	.602
Q 40					1	.652	.658
Q 44						1	.731
Q 45							1

---

Devellis (2015) emphasized that

When developing a scale, one typically generates a longer list of items than are expected to find their way into the final instrument. Items that do not contribute to the major identifiable factors may end up being trimmed. Our goal is to identify relatively few items that are strongly related to a small number of latent variables [factors]. (p.166)

DeVellis (2015) and Neill (2017) have advised that there is a point of “diminishing returns” when the investigator gets toward the end of an exploratory factor analysis process to see if any further items should be discarded. Neill has suggested reviewing the descriptive statistics for items remaining in factor, checking each item’s Skewness and Kurtosis along with its meaning and contribution to the other items. A review of each item’s Skewness and Kurtosis did not indicate any anomalies. Neill also suggested that an investigator should go through to the review the items and complete an exploratory factor analysis after deleting each remaining item to see if it significantly adds to or takes away from the identified items and factors. However, DeVellis (2015) cautioned that “a margin of safety should be built into alpha when trying to optimize scale length” (p. 149) because it may decrease when used on another sample population. After completing this item deleting process, I decided to retain all of the remaining items.

***Partial confirmatory factor analysis.*** I conducted a partial confirmatory factor analysis (PCFA) on the simplified RTLM scale to give me an idea whether to gather more data in order to complete a confirmatory factor analysis (CFA). Gignac (2009) has suggested that researchers should supplement their exploratory factor analysis with a PCFA to see if there is a reason to continue to a CFA. The PCFA was completed in SPSS using the Maximum Likelihood method of extraction. The Bartlett's Test of Sphericity (BTS) was used to obtain the null model chi-squared value of 3135.903 with 105 degrees of freedom (df). I used the chi-squared Goodness of Fit test to obtain the implied model chi-square of 184.667 with 76 degrees of freedom. I used the Norm Fit Index (NFI), Comparative Fit Index (CFI), and Tucker-Lewis Fit Index (TFI) to assess whether the RTLM would be a good candidate for further data collection to complete a confirmatory factor analysis. Table 4.9 illustrates the partial confirmatory factor analysis.

Table 4.9

*Partial Confirmatory Factor Analysis*


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<b>Null Model Chi-sq</b>	3135.903	<b><u>NFI</u></b>	<b><u>CFI</u></b>	<b><u>TLI</u></b>
<b>df</b>	105	.941	.964	.950
<b>Implied Model Chi-sq</b>	184.667			
<b>df</b>	76			

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The NFI was .941, the CFI was .964, and the TFI was .950. A reading of .95 or above on the indexes indicates that one should take the next step to gather data for a CFA. Both the CFI and TFI were at or above .95. The NFI was just below, at .941. As a result of the PCFA, I concluded that more data should be collected in the future to complete a full CFA.

*Naming factors.* To assess the research goal as to whether the higher the levels of distributed decision-making, knowledge sharing and learning, diversity and innovation, and shared commitment by management indicate the potential for an organizational resilience-thinking leadership mindset, I looked at the items in relation to the factors they loaded onto. DeVellis (2015) and Neill (2017) have recommended naming the factors based on the meanings of the items. DeVellis (2015) stated that interpreting factors and naming them is not a “straightforward” (p. 191) process, however. Oftentimes, what the investigator thought were the latent variables (factors), are not, so the factor analysis process can help to provide clues to the latent factors. “This is done by examining the items that most strongly exemplify each factor. The items with the highest loadings are the ones that are most similar to the latent variable” (DeVellis, 2015, p. 191). In examining the items for each factor two themes emerged. While the items within each factor focused the dimensions I had theorized (shared decision-making, knowledge sharing/learning, diversity of thought, and shared commitment), the collective meaning suggested by the items in each factor seemed to focus on distinctive qualities of a resilience-thinking leadership mindset. Collectively, the items in Factor 1 tended to focus on the value of *collaborative sense and decision-making (in times of crisis)*, and the items in Factor 2 focused on the value of *building resilience-thinking leadership capacity*. Consequently, these latent factors communicate “both/and” qualities of a RTLM. While DeVellis (2015) has cautioned that how well the item set performs (p. 191) will determine the subscale’s validity, naming these factors as (a) mobilizing collaborative sense and decision-making as enhancing adaptive governance, and (b) building resilience-thinking leadership capacity as mindful organizing became the starting point for Stage 2.

**Process summary of factor analysis.** The initial survey consisted of four sections, 71 items, and 6 demographic questions. Through the process of assessing face and content validity, one section was omitted from the final draft. The final RTLM survey consisted of three sections and 46 items. 341 participants responded to the survey; 311 participants completed it. To assess construct validity, I went through several iterations of a process to assess the relationships of items to their factors and to other items within each factor. The end result was to simplify the scale. The process included (a) a principal component analysis, (b) a factor analysis using an oblique rotation, and (c) a reliability analysis. The process allowed for both item and factor analysis and to achieve the goals of identifying a small number of items with the highest loadings on each factor (DeVellis, 2015) which would, then, give a clearer understanding of the factor(s) that had been extracted, and then labeling (naming) and defining each extracted factor. Throughout each iteration items were discarded and factors reduced. The final scale consisted of two factors, (a) mobilizing collaborative sense and decision-making (in times of crisis), and (b) building resilience-thinking leadership capacity as mindful organizing. Factor 1 consisted of eight items; Factor 2, of seven items. The following sections give the results of the assessment of convergent and divergent validity with the newly developed RTLM scale.

**Convergent validity.** Convergent validity assesses the degree to which the assessment and/or factors are similar to assessments that measure similar relationships (constructs; Abell et al., 2009; DeVellis, 2015). Abell et al.'s work on developing rapid assessment instruments suggested that to assess convergent validity when developing a new scale, a researcher could include items from similar scales and compare those items to the extracted factors and the item loadings. I followed this process to assess convergent validity of the newly developed RTLM scale. Since the RTLM scale will be used to assess organizational leadership's ability to adopt a

resilience-thinking leadership mindset, I chose to assess how convergent the RTLTM scale was to similar relational leadership scales and resilience leadership indicators. Consequently, I chose three leadership items from Lee et al.'s (2013) disaster resilience scale, one leadership item from Ozar and Beyciogla's (2013) distributed leadership scale, one leadership/learning item from Weick and Sutcliff's (2015) Mindful Organizing Survey, and two leadership trust items from Carmeli et al.'s (2011) CEO trust scale.

Convergent Items:

*Q 9. Management made a conscious effort to ensure that critical information (e.g., staff contact details) was available in a number of different formats and locations.*

*Q 20. Management was open and up-front with my colleagues and me.*

*Q 27. Employees were actively involved in all the changes and development efforts that took place in the organization.*

*Q 35. In my organization, we take the time to learn about situations that could go wrong.*

*Q 41. My direct supervisor is always honest, truthful, and transparent when giving me information.*

*Q 43. The people most qualified to make decisions make them regardless of their status in the organization.*

*Q 46. I believe employees would trust decisions made by management about how our organization should manage a crisis.*

I followed the same analysis process to assess convergent validity as I followed to complete my initial exploratory factor analysis to simplify the RTLTM scale. First, I ran a bivariate correlation on all of the items to include the convergent items. All of the convergent items correlated with  $> .3$  with the RTLTM scale items with a  $p > .01$ . A principal component analysis revealed a KMO of .965 and BTS sig = .000. Communalities showed that two convergent leadership items, Q9 and Q43, were  $< .5$ , so I discarded them from further analysis.

The principal component analysis extracted two factors with eigenvalues  $> 1$ . The eigenvalue showed 62% of the variance explained by the two extracted factors. A factor analysis using an oblique rotation (Direct Oblimin) showed a negative relationship to Factors 1 and 2. This was due to the fact that the factors had reversed themselves because of the larger number of convergent leadership items loading onto one factor. Four convergent leadership items loaded onto Factor 1, building resilience-thinking leadership capacity, and one convergent leadership item loaded onto Factor 2, mobilizing collaborative sense and decision-making (in times of crisis). All of the convergent leadership items showed “very good” to “excellent,” correlations along with the RTLM scale items, demonstrating a moderate to strong relationship to the RTLM factors and their scale items. Table 4.10 shows the Pattern Matrix Rotation and factor loadings using an oblique rotation (Direct Oblimin).

Table 4.10

*Pattern Matrix Factor Loadings (Convergent Items in Red)*

---

<b>Factor</b>	<b><u>1</u></b>	<b><u>2</u></b>
Q8		-.805
Q11		-.860
Q15		-.830
Q19		-.843
<b>Q20</b>	<b>.744</b>	
Q21		-.804
Q24		-.864
Q25		-.768
Q26		-.762
<b>Q27</b>		<b>-.747</b>
Q29	.610	
Q30	.660	
<b>Q35</b>	<b>.738</b>	
Q36	.659	
Q39	.764	
Q40	.765	
<b>Q41</b>	<b>.814</b>	
Q44	.706	
Q45	.770	
<b>Q46</b>	<b>.872</b>	

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*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 7 iterations.

Likewise, the Component Correlation Matrix indicated a strong negative relationship between the factors. Again, the negative relationship was due to the number of convergent leadership items loading onto one factor. Table 4.11 shows the relationship.

Table 4.11

*Component Correlation Matrix*

<u>Component</u>	<u>1</u>	<u>2</u>
<b>1</b>	1.00	-.648
<b>2</b>	-.648	1.00

*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin

Reliability analysis showed a CA .931 for Factor 1. The inter-item correlation for Factor 1 indicated that the convergent leadership items showed moderate to strong correlations to the RTLTM scale items. The CA for Factor 2 was .929. Likewise, the inter-item correlation showed moderate to strong correlations of the convergent leadership items to the RTLTM items. Tables 4.12 and 4.13 show the respective correlations.

Table 4.12

*Inter-Item Correlation Factor 1*


---

	<u>Q20</u>	<u>Q29</u>	<u>Q30</u>	<u>Q35</u>	<u>Q36</u>	<u>Q39</u>	<u>Q40</u>	<u>Q41</u>	<u>Q44</u>	<u>Q45</u>	<u>Q46</u>
Q20	1	.468	.559	.502	.463	.469	.536	.547	.632	.617	.592
Q29		1	.557	.488	.547	.492	.563	.482	.546	.537	.514
Q30			1	.537	.504	.537	.571	.517	.673	.600	.465
Q35				1	.563	.546	.633	.466	.565	.569	.508
Q36					1	.525	.586	.551	.540	.543	.510
Q39						1	.584	.530	.613	.605	.459
Q40							1	.555	.653	.663	.507
Q41								1	.600	.589	.535
Q44									1	.731	.541
Q45										1	.576
Q46											1

*Note.* Convergent items in red



Table 4.13

*Inter-Item Correlation Factor 2*


---

	<u>Q8</u>	<u>Q11</u>	<u>Q15</u>	<u>Q19</u>	<u>Q21</u>	<u>Q24</u>	<u>Q25</u>	<u>Q26</u>	<u>Q27</u>
Q8	1	.734	.601	.558	.716	.662	.648	.611	.644
Q11		1	.609	.591	.709	.718	.633	.604	.685
Q15			1	.651	.614	.664	.649	.658	.593
Q19				1	.549	.613	.589	.617	.505
Q21					1	.724	.648	.631	.676
Q24						1	.713	.629	.656
Q25							1	.743	.709
Q26								1	.695
Q27									1

---

*Note.* Convergent item in red

**Divergent validity.** Divergent validity assesses the degree to which a scale and/or items and factors diverge from factors, items, or indicators. If there is a moderate to strong correlation with a variable that appears to be dissimilar, this could be an indication that the researcher needs to go back and reassess the scale (Abell et al., 2009). As with the assessment of convergent validity, I followed the same analysis process to assess divergent validity as I followed to complete my initial exploratory factor analysis to develop the RTLTM scale. To assess divergent validity, I incorporated four demographic questions from the original survey. These were gender, age, education and income. My rationale for choosing these variables was to assess whether these independent variables had any influence on the RTLTM scale. If, for instance, the variables of education or income correlated strongly with the RTLTM factors and/or items, it might indicate that higher or lower levels of education and/or income may affect the RTLTM scale.

First, I ran a bivariate correlation analysis with the RTLTM scale and the four demographic questions. The analysis showed that the four items in the four categories showed weak correlations  $< .3$ . However, I retained the four variables and completed a principal component analysis. It showed a KMO of .933 with a BTS sig = .000. The principal component analysis extracted four factors. Eigenvalue indicated that the four factors with eigenvalues  $> 1$  accounted for 68% of the total variance. The RTLTM scale items loaded onto Factors 1 and 3, respectively. However, the factor analysis showed that gender, age, education, and income loaded onto the two other factors. Gender and age loaded onto Factor 2. The analysis showed a negative correlation between them. Education and income loaded onto Factor 4. Table 4.14 shows the Pattern Matrix Factor Loadings using an oblique (Direct Oblimin) rotation.

Table 4.14

*Pattern Matrix Factor Loadings (Divergent Items in Red)*

<b><u>Component</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>
<b>Q8</b>	.766			
<b>Q11</b>	.835			
<b>Q15</b>	.807			
<b>Q19</b>	.842			
<b>Q21</b>	.805			
<b>Q24</b>	.850			
<b>Q25</b>	.747			
<b>Q26</b>	.762			
<b>Q29</b>			.713	
<b>Q30</b>			.800	
<b>Q36</b>			.724	
<b>Q39</b>			.870	
<b>Q44</b>			.772	
<b>Q45</b>			.822	
<b>*gender</b>				.785
<b>*age</b>				-.715
<b>*education</b>		.794		
<b>*income</b>		.807		

*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. A Rotation converged in 6 iterations. \*Divergent variables in red.

The component correlation analysis showed that while Factors 1 and 3 had a moderate to strong correlation to each other, Factors 2 and 4 had weak to very weak correlations with Factors 1 and 3. Table 4.15 is the Component Correlation Matrix for the four factors.

Table 4.15

*Component Correlation Matrix*


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<b><u>Component</u></b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>
<b>1</b>	1.00	.153	.672	.045
<b>2</b>		1.00	.156	-.055
<b>3</b>			1.00	.034
<b>4</b>				1.00

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*Note.* Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.  
\*Divergent factors in red

The Cronbach's Alpha was .920. The inter-item correlations showed very weak correlations among gender, age, education, and income and the items of the RTLM scale. The Items Total Statistics Chart showed that deleting the variables of gender, age, education and income would increase the CA. Table 4.16 shows the Items Total Statistics Chart.

Table 4.16

*Items Total Statistics Chart*

	<u>Scale Mean if Item Deleted</u>	<u>Scale Variance if Item Deleted</u>	<u>Corrected Item- Total Correlation</u>	<u>Squared Multiple Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
Q8	61.26	207.135	.764	.670	.912
Q11	61.18	208.575	.749	.689	.912
Q15	61.23	208.927	.731	.624	.913
Q19	61.36	212.209	.675	.568	.914
Q21	61.3	208.268	.757	.685	.912
Q24	61.34	206.652	.778	.702	.911
Q25	61.21	206.53	.770	.700	.911
Q26	61.29	209.343	.746	.675	.912
Q29	61.42	214.766	.641	.532	.915
Q30	60.99	213.684	.661	.557	.915
Q36	60.72	213.469	.634	.481	.915
Q39	61.01	213.539	.680	.600	.914
Q44	60.93	212.39	.723	.676	.913
Q45	60.69	212.702	.696	.641	.914
<b>*gender</b>	<b>63.49</b>	<b>240.622</b>	<b>.033</b>	<b>.100</b>	<b>.924</b>
<b>*age</b>	<b>62.61</b>	<b>240.982</b>	<b>-.022</b>	<b>.162</b>	<b>.928</b>
<b>*education</b>	<b>61.94</b>	<b>233.333</b>	<b>.157</b>	<b>.178</b>	<b>.927</b>
<b>*income</b>	<b>62.96</b>	<b>230.366</b>	<b>.267</b>	<b>.234</b>	<b>.924</b>

Note. \*Divergent variables in red

**Process summary of convergent and divergent validity.** Following a similar process to assess construct validity, I assessed convergent and divergent validity analyses. To assess convergent validity, I used four items from relational leadership and distributed leadership scales, and three items assessing resilience leadership. The principal component and factor analysis showed a moderate to strong relationship among five of the seven convergent items. Two convergent items were discarded because of low initial bivariate correlations. Likewise, the inter-item analysis showed a moderate to strong correlation among items from the RTLTM scale

and the convergent leadership items. This analysis of convergent validity suggests that the RTLM scale assesses relational and resilience leadership characteristics.

To assess divergent validity, I used four variables, gender, age, education, and income. I chose these variables because they could suggest that an independent variable may influence the RTLM scale. The bivariate analysis showed a weak correlation between the variables and the RTLM items. The principal component and factor analysis extracted four factors. Items from the RTLM scale loaded onto two factors, while the variables gender and age loaded onto one factor and education and income loaded on the other. The component correlation matrix suggested a very weak correlation among the factors consisting of gender and age variables, the education and income variables and the two factors consisting of the RTLM items. An inter-item correlation showed weak inter-item correlations between the four divergent variables and the RTLM items. A total items statistics analysis suggested discarding the four variables would increase the overall Cronbach's Alpha. Stage 2 will give the qualitative results of the semi-structured interviews with leaders in the field of resilience management.

## **Stage 2: Interpretation and Refinement**

**Requesting reviewers.** For Stage 2, I utilized The Rockefeller Foundation's website and their resilience initiative 100 Resilient Cities as a starting point to contact persons in resilience management positions. I sent queries out to 10 Chief Resilience Officers (CRO) from cities across the United States (see Appendix G). I received six responses back. Five of the respondents affirmed that they would be willing to help or have one of their resilience managers look over the RTLM scale and make comments. One CRO responded and said that his office was inundated with work, so he did not feel he had the time to look over the scale, but he thanked me for

reaching out to him. Resilience managers from Oakland, CA, Denver, CO, Atlanta, GA, and Tulsa, OK agreed to look over the refined RTLM scale and give me feedback as to its content.

To those who agreed to look over the RTLM scale and offer feedback, I sent a follow-up email giving some background information that would give them some context as to the nature of the research and my preliminary findings through a factor analysis (see Appendix H). I stated that for this stage, I was assessing content validity on this refined resilience-thinking mindset scale. I asked them to respond to three primary questions:

1. Would you remove or re-word any questions or statements?  
Why?
2. What statements might you add?
3. What recommendations do you have for future development or use?

**Reviewers' feedback.** I followed a similar process to respond to the reviewers' feedback. Once respondents replied to the questions I had outlined, I completed a follow up either through email or by phone to clarify responses, if needed. Respondents offered valuable feedback for further refinement of the RTLM scale. One respondent expressed concern that most resilience programs in cities focus on Urban Resilience. The Reviewer stated, "Our definition of Resilience is quite different than the one you are using in your research. It seems to me that your questions are more related to participatory leadership. Urban resilience is our field of work." After having a conversation with the respondent where I highlighted the City Resilience Framework and the seven qualities of the leadership domain within the framework, the respondent agreed that "Your questions make sense from the inclusiveness and integration perspectives as far as they are supported by your literature review."

Another respondent offered a general overview of the scale and gave very specific feedback to consider as I move forward to refine the RTLTM scale. The respondent offered four suggestions:

- You mentioned that you would eventually want your survey to become a tool to be used by consultants and organizations, but for instance, 'consultant' is not listed as an option in question 2.
- Do you have different versions of surveys for people in different roles and/or seniority? This might help tailor your questions more specifically so that their responses can be relevant to questions you ask them. Depending on the size of the organization, for instance, the management team may not be a relevant term.
- The language you use in your survey, such as the 'management team' implies that your study will have a very specific bias for interpreting organizational resilience. If this is intentional that is fine, but I think it's worth thinking about what you also mean by 'leadership' (there are many times), because sometimes the drivers of an organization's behavior and management approach can come from outside the organization through various external stakeholders (who they serve, who they collaborate with, who funds them, etc.).
- If you haven't already (through your confirmatory factor analysis framework), be clear about what your questions measure—the questions generally seem to gauge general attitudes rather than behaviors or results—and how they will be validated so that you can calibrate for bias.

Based on my conversation with the reviewer, I concluded that two areas should be reconsidered to refine the RTLTM scale: (a) The term “management team” does specifically target a particular

group of organizational leaders; does targeting this leadership group bias the scale?; and (b) More clarification of the initial questions might help participants to deepen their understanding of the relationship of the items to the questions.

A third respondent echoed the concern about limiting the language of the item statements to “management team.” The reviewer stated:

Thinking about how this and a few of the other questions are worded—“Management encouraged us . . . ” If the survey respondent is someone say at the C-Suite level, management won't be encouraging anything to them. Maybe need to include an N/A choice? Same goes for the first section, thinking about question #3.

Likewise, the respondent felt that the questions needed to be more specific: “As I'm reading the questions related to this section, it's unclear to me if the questions are just general about the office culture, or if they're about a specific moment in time, i.e., during a disruption.” The reviewer also felt that defining a “disruptive event” would be helpful to the survey taker.

Two respondents wrote a joint response. Instead of focusing on the content, they completed the survey to see how it aligned with their organization. They pointed out that two of the initial demographic questions did not adequately reflect the size of their organization and their role, stating that “There is a huge gap in that we have 3,000 employees which is more than 1,000 and less than 5,000,” and they were both managers and directors. Their responses to the survey seemed to reflect their organization’s efforts in regard to build resilience and work toward collaborative decision-making.

The intent of the RTLM survey was to give an organization’s leaders a means of mapping or assessing the level of resilience-thinking leadership in their organizations. It was also my intent to focus the assessment on the leaders’ actions in an organization. It is clear from the responses of the participants in the field of resilience management that leadership has multiple meanings and exists at multiple levels for multiple purposes. And the hierarchical configuration



of most organizations makes a resilience-thinking leadership assessment multi-faceted. For example, as pointed out C-suite leaders have management responsibilities different from those leaders who have responsibilities over direct report such as supervisors, and supervisors have responsibilities to upper management and to employees. Thus, the nature of the RTLM assessment needs to be focused on the perceptions of resilience-thinking leadership by various levels within the organizational hierarchy. The present RTLM does not.

Secondly, participants pointed out in slightly different language that the current survey's factors have a tenuous relationship. One participant said, "the questions generally seem to gauge general attitudes rather than behaviors or results," and another commented, "it's unclear to me if the questions are just general about the office culture, or if they're about a specific moment in time, i.e., during a disruption." First, both participants pointed out a struggle I have had in delineating the difference between actions and behaviors in writing the items. Because I have based the construct of a resilience-thinking leadership mindset as a social construction, I believe the scale should assess leadership actions, not behaviors. However, there is a fine line between the two, and it comes down to the readers' perspective of leadership as a trait or as an emergence of interactions. Second, both indirectly pointed out detailing the relationship between building resilience-thinking leadership capacity and mobilizing collaborative sense and decision-making as survey items. It has caused me to rethink the adaptive governance model (discussed in Chapter V). Moreover, their observations serve as the foundational goal of a future study as the second iteration of the RTLM to assess a confirmatory factor analysis.

### **Process Summary: Stage 2**

I contacted 10 people who were involved in resilience management asking if they would help to refine the RTLM scale by reviewing it and making suggestions for further refinement.

Nine of the 10 people contacted were Chief Resilience Officers for their particular city. Seven of the 10 responded, either responding to my query directly or putting me in contact with one of their resilience managers. Of the six, two said that they could not help review the RTLM survey because of their work schedule and loads. I received positive responses to review the RTLM scale from five resilience managers in Oakland, CA, Denver, CO, Atlanta, GA, Tulsa, OK. Each resilience manager reviewed the RTLM scale and responded to initial questions given to them suggesting potential revisions and/or refinements. One group completed the RTLM survey to see if it assessed where they felt their organizations “mapped.” A follow-up conversation by email or phone clarified questions I had about their responses.

The following chapter discusses the meaning of the results, offers a refinement of the RTL model based on the results of the research, offers a possible use of the RTLM scale to map the level of an organization’s resilience-thinking leadership mindset, discusses future research possibilities, and summarizes limitations of the research study.

## Chapter V: Discussion and Conclusions

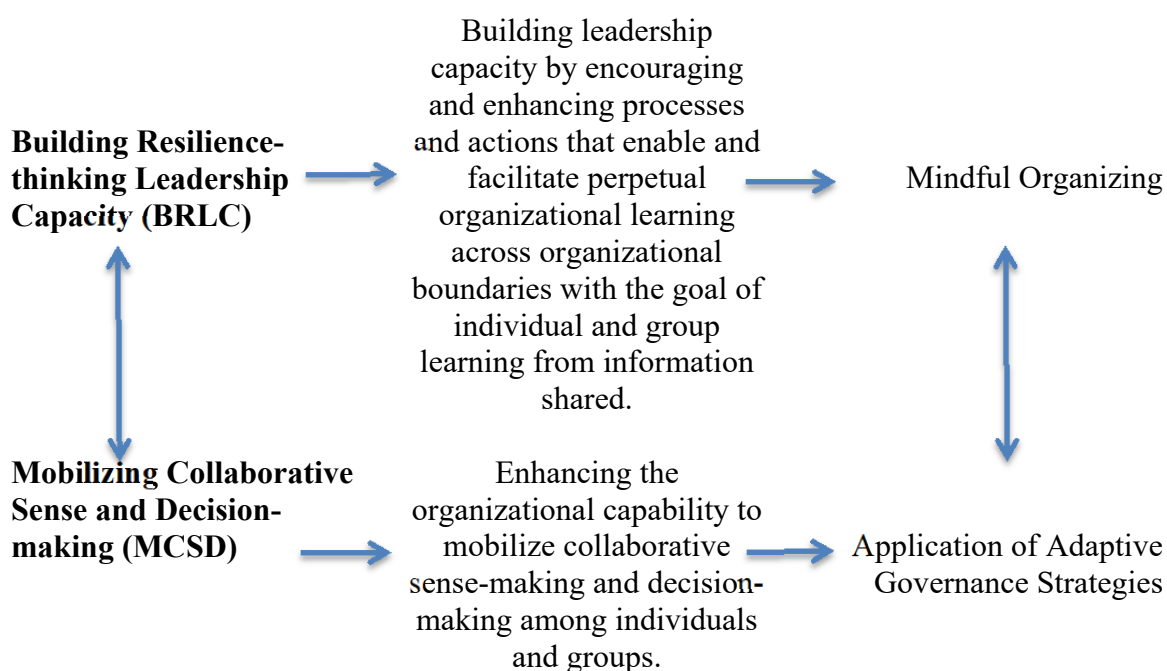
The primary goal of resilience-thinking leadership is to take full advantage of an organization's capacity to adapt—especially during times of disturbances and uncertainty—and to create a knowledge sharing and learning environment. The purpose of a resilience-thinking leadership mindset scale is to assess, or map, the level and the form of resilience-thinking leadership an organization exhibits. This concept of resilience-thinking leadership has become more important as many organizations have begun to appreciate the fact that they are both complex adaptive systems in their own right and embedded in other complex adaptive systems (Gunderson & Holling, 2002). And as such, organizations are seeing the profound impacts that both internal and external disruptions and uncertainty can have on their strategic planning, employees, culture, and bottom line.

Forward resilience-thinking organizations stand to benefit in numerous ways by adhering to a resilience-thinking leadership (RTL) model. First and foremost, a RTL model reflects the fact that as complex adaptive systems, organizations create risks, become vulnerable to those risks, and, most importantly, can mitigate the effects of risks and vulnerabilities. Consequently, organizations that take advantage of their ability to map their state of resilience-thinking leadership mindsets will be in a better position to develop organizational leaders who have the aptitude and mindfulness to build resilience-thinking leadership capacity day-to-day.

This research study was the first step in a process to create a resilience-thinking leadership mindset scale with which to map an organization's state of resilience-thinking leadership in the domain of adaptive governance. This study has shown that two factors help to explain the construct of interest. One factor puts an emphasis on the building of resilience-thinking leadership capacity through actions that facilitate organizational learning

across boundaries through knowledge sharing across all levels of an organization. Simply put, it reveals the level of mindful organizing (Weick & Sutcliffe, 2015) taking place day-to day.

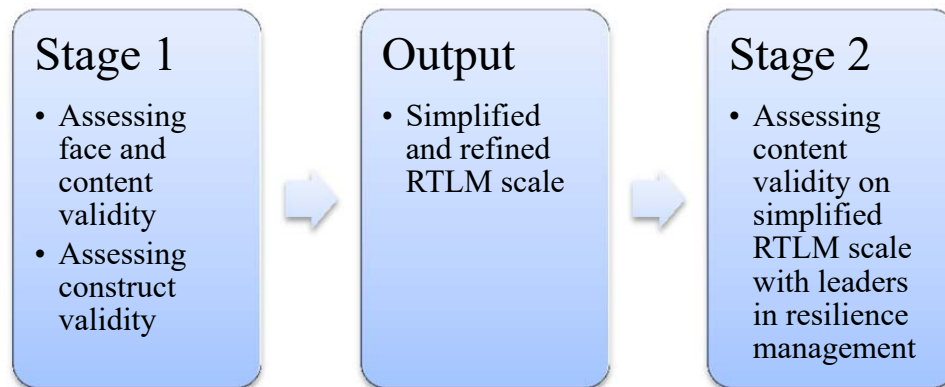
The second factor—complementing the first—underscores how management mobilizes collaborative sense-making activities that are vital for a wide-range of decision-making purposes, especially during periods of disruption. In essence, this factor looks at how adaptive governance strategies are applied. Figure 5.1 is a representation of the theme-based factors:



*Figure 5.1.* Representation of theme-based factors.

### Summary of Findings

Developing this initial RTLTM scale took place in two stages of validity assessment. Figure 5.2 illustrates these stages. Stage 1 involved scale development of questions and items, which were initially assessed for face and content validity in order to refine the initial scale.



*Figure 5.2.* Summary of validity process.

To assess construct validity, 341 adults responded to the survey that consisted of three sections and 46 items. First, participants were asked to assess their organization's response during a time of disruption; then, they were asked to assess their organization's current state of resilience-thinking leadership. Through the process of factor analysis, the initial scale was refined and simplified, factors were identified, and items were reduced to more effectively describe the latent constructs. Two factors were named by evaluating the items loading onto each factor. These were (a) building resilience-thinking leadership capacity (mindful organizing), and (b) mobilizing collaborative sense and decision-making resources (applying adaptive governance strategies). The exploratory factor analysis was followed by a partial confirmatory factor analysis (PCFA) on the refined RTLM survey. The PCFA showed that more data should be collected in order to complete a confirmatory factor analysis. The output of Stage 1 was a simplified RTLM scale consisting of two factors.

Stage 2 looked at the simplified and refined RTL scale in order to further interpret and refine it. Five leaders in the field of resilience management were asked to review the survey and respond to three questions:

- Would you remove or re-word any questions or statements? Why?
- What statements might you add?
- What recommendations do you have for future development or use?

The resilience managers' analyses were, essentially, an assessment of content validity of the refined RTL scale. Responses included recommendations to revise the questions to better align behaviors and actions with items more closely, to think about whether to specifically focus on one group, i.e., management or to create multiple options, to be mindful that the scale does have a bias in that it focuses exclusively on management, to be aware of the fact that there are external stakeholders who influence internal leadership, and to offer more options on the first two demographic questions.

### **Revisiting the Resilience-Thinking Leadership Model**

While models are simplifications of reality, the purpose of a model is to create dialogue about the phenomenon of interest (Brit, 2014) and attempt to further explore the relationships between the construct of interest and the factors that measure it. The resilience-thinking leadership (RTL) model posits that two primary domains make up RTL. These are the interplays between adaptive capacity and adaptive governance. Adaptive capacity (AC) refers to the strength and level of an organization's social networks—the social ambidexterity an organization possesses and enhances. Adaptive governance (AG) refers to the level of a resilience thinking leadership mindset an organization possesses and the amount of capacity building and

collaborative decision-making management supports. Figure 5.3 illustrates the resilience-thinking leadership model.

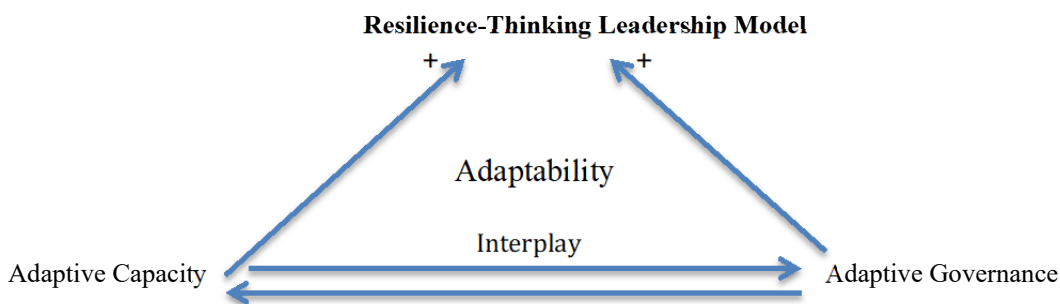


Figure 5.3. Resilience-thinking leadership model.

This dissertation has focused exclusively on the right side of the RTL model to further explore the adaptive governance domain. Initially, I posited a model of the adaptive governance domain that consisted of the interplay between a resilience-thinking leadership mindset (RTL) and four theoretical factors. These theoretical factors included shared decision-making (DM), knowledge sharing/learning (KS), diversity of thought (DT), and shared commitment (SC). Figure 5.4 illustrates my initial adaptive governance model.

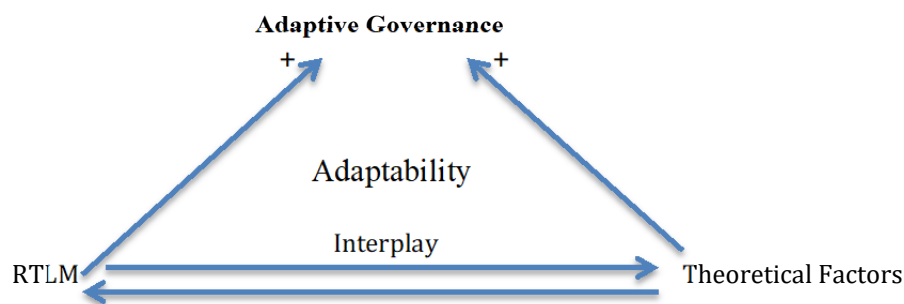


Figure 5.4. Initial adaptive governance model.

However, rather than consisting of four theoretical factors, my research study has shown there are two significant thematic or theme-based factors that serve to explain and measure a RTL within an organization. I named them (a) building adaptive governance capacity, and (b) mobilizing collaborative sense and decision-making capabilities. The theoretical factors I had

originally posited appear to be interrelated indicators of these two theme-based factors. This analysis and interpretation prompted me to rethink and subsequently refine the adaptive governance model in order to reflect a more up-to-date illustration of the interplays. Figure 5.5 is the revised model based on research results.

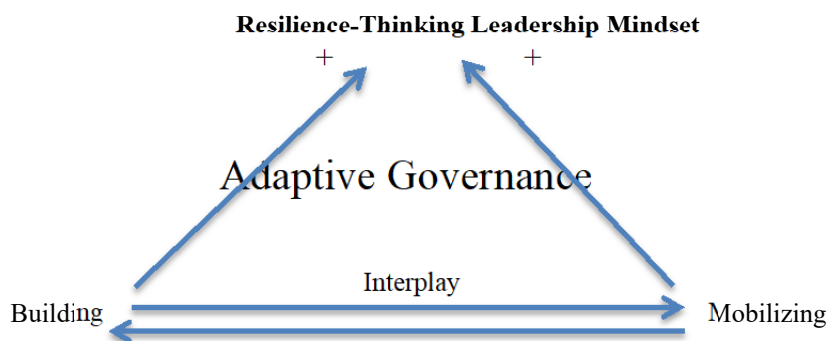


Figure 5.5. Revised model based on research results.

At this stage, research indicates that a resilience-thinking leadership mindset can be measured from the output of the interplay(s) between two factors: building resilience-thinking capacity (BRLC) and mobilizing collaborative sense and decision-making (MCSD). Consequently, a refined adaptive governance model underscores the interplay between these two factors so that they reflect a RTLM. Ultimately, this entire process is the essence of adaptability and adaptive governance.

### **Building Resilience-Thinking Leadership Capacity (BRLC)**

Building resilience-thinking leadership capacity is a foundational characteristic of mindful organizing and, accordingly, of a robust complex adaptive governance system (Folke, 2006). What had become clear through the factor analysis is that the items I believed to be independent measures of each of the theoretical factors were interrelated indicators of larger latent thematic variables. My sense-making process is similar to what Maitlis and Lawrence (2007) have described as “first-order conditions” (p. 64) or domains which “yield second-order



themes” (p. 64). For example, the items measuring BRLC consist of forms of exhibiting knowledge sharing/learning, diversity of thought, and shared commitment: “Management sees disruptions as opportunities to learn and adapt” (KS), “Management respects expertise and experience over classified rank” (DT), and “Management in my organization collaborates with us to achieve the goals of the organization” (SC). Each individual item expresses a general indicator that, subsequently, supports the larger or second-order theme of building resilience-thinking capacity.

In the same vein, this second-order theme supports similar resilience leadership qualities posited by 100 resilient cities. Resilience stems from adhering to seven qualities that create an adaptive environment (“Understanding City Resilience,” 2015, p. 5). Two qualities, “inclusive and integrated” (“Understanding City Resilience,” 2015, p. 6), relate to the mindful process of governance and effective leadership (“Understanding City Resilience,” 2015, p. 6). *Inclusiveness* seeks to create a “sense of shared ownership or joint vision” (“Understanding City Resilience,” 2015, p. 5) while *integrated* speaks to bringing resources together for collaborative purposes (“Understanding City Resilience,” 2015, p. 6). Mindfully building resilience-thinking capacity supports these qualities in that BRLC assesses knowledge sharing, learning, collaboration, and a sense of shared vision or purpose as indicated by the items assessing this factor. Building resilience-thinking leadership capacity is an on-going activity, one that needs to be a part of the day-to-day routines and interactions.

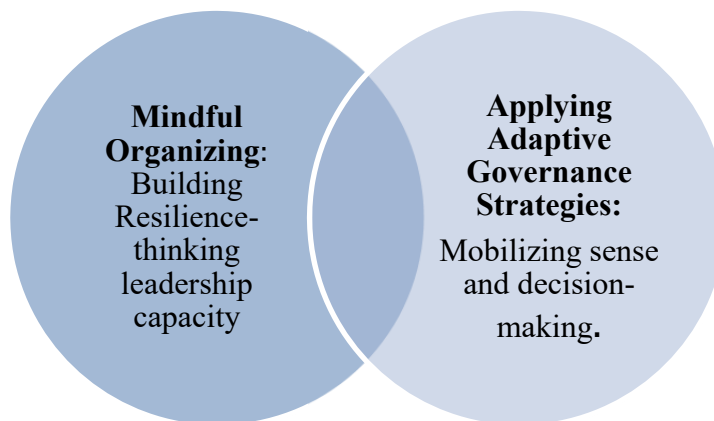
### **Mobilizing Collaborative Sense and Decision-Making (MCSD)**

Mobilizing collaborative sense and decision-making may be seen as the application of resilience-thinking (adaptive) governance strategies or actions that are more reactive processes (at least in terms of this study). Similarly, the MCSD items indicate first-order conditions:

diversity of thought (DT) “Management encouraged us by bringing us into the decision-making process,” shared decision-making (DM), “In the process of solving the problem, management ensured that all the affected department members participated in the decision-making,” and knowledge sharing (KS), “Management attempted to create a learning environment to help solve problems.” These items (actions) collectively demonstrate a second-order theme of leaders mobilizing a collaborative sense and decision-making process. “Understanding City Resilience” (2015) lists “robustness, redundancy, and flexibility” (p. 7) as essential qualities of a resilience framework. While the qualities of robustness and redundancy focus on preparedness, the quality of *flexibility* in this context points to the “willingness to adopt alternative strategies in response to changing circumstances or sudden crisis” (“Understanding City Resilience,” 2015, p. 5). Thus, leaders who put the quality of flexibility into practice are mobilizing collaborative sense and decision-making as an adaptive governance strategy.

### **Resilience-Thinking Leadership Mindset: Re-Conceptualized**

I had originally defined a resilience-thinking leadership mindset (RTLTM) as a construct that combines ideas of relational leadership, sensemaking, and resilience thinking: co-constructed relational acts among individuals and groups who promote the adaptive/learning nature of individuals and groups in systems through mindful organizing. However, as a result of this research study, I believe that RTLTM should be re-defined to be understood as mindful organizing by management that promotes and enables building resilience-thinking leadership capacity and applies adaptive governance strategies to mobilize collaborative sense and decision-making capabilities among individuals and groups. These two theme-based factors are interdependent with considerable overlap.



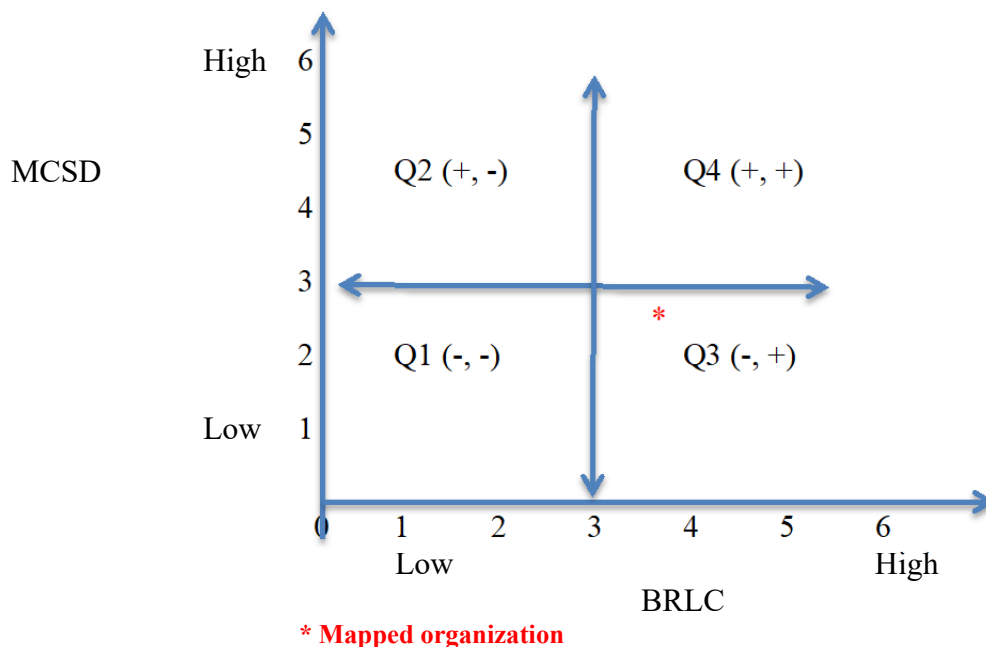
*Figure 5.6.* Interdependence of theme-based factors.

### **How the Current RTLM Scale Might Be Used**

Resilience-thinking leadership can be operationalized as long as leaders have the situational awareness to pay attention to context. A resilience-thinking leadership mindset draws attention to becoming more mindful as to the level and the form of resilience an organization establishes, reveals and exhibits in its day-to-day operations, its planning, and its responses to disruptions. The current RTLM scale has the potential to be used at two levels: the organizational level and/or group level. At each level, the RTLM scale could be utilized as a diagnostic tool to assess the levels of building resilience-thinking capacity and mobilizing collaborative sense and decision-making as perceived by those within the organization or group.

**RTLM as a diagnostic tool.** As a diagnostic tool, the RTLM scale offers a way to quickly “map” the nature of resilience-thinking leadership that exists internally in an organization in order to assess where the organization may want to adjust or commit resources to become more integrative, inclusive, and flexible. Mapping these two theme-based factors can assess where an organization’s resilience-thinking leadership mindset is supportive of building resilience-thinking capacity and mobilizing collaborative sense and decision-making or where it is wanting. To map these theme-based factors, I have developed a resilience-thinking leadership

grid (below) that attempts to illustrate how a mapping assessment might evaluate the levels of building resilience-thinking capabilities (BRLC) and mobilizing collaborative sense and decision-making (MCSD). I have divided the resilience-thinking leadership grid into four quadrants. Figure 5.7 illustrates a resilience-thinking leadership mindset grid.



*Figure 5.7.* Resilience-thinking leadership mindset grid.

I have modeled each of the quadrants to reflect qualities found in the fore-loop and back-loop phases of an adaptive cycle as illustrated by Holling and Gunderson (2002). Aspects of the fore-loop are characterized by incremental growth and accumulation of resources, while aspects of the back-loop can include, innovation, reorganizing, and restructuring. (See Figure 2.5 for an illustration and definitions of Holling and Gunderson's (2002) fore-loop and back-loop of an adaptive cycle.) For my purposes, however, I have mapped these fore-loop and back-loop characteristics in terms of resilience-thinking leadership mindsets onto these quadrants.

For example, quadrants 1, 2, and 3 of the resilience-thinking leadership grid map a resilience-thinking leadership mindset in both the exploitative, growth, and conservation phases of an adaptive cycle—the fore-loop. The management of resilience in each of these quadrants is characterized less by the ability to adapt, learn, and mindfully organize and more by the capacity to maintain processes and procedures or to adhere to the various forms of status quo thinking. More specifically, quadrant 1 characterizes an organization or group in the conservation phase, which is distinguished through its rigidity in building resilience-thinking leadership capacity and mobilizing collaborative sense and decision-making. Organizations and groups in quadrant 1 possess neither the adaptive governance structures to build resilience-thinking capacity nor the ability to mobilize collaborative sense and decision-making. Those mapping into quadrant 1 may not be able to adapt without a major governance transformation or a “triggering” event, which would cause them to lose their tightly connected behaviors.

Correspondingly, both quadrants 2 and 3 illustrate organizations or groups whose major foci are on optimization of resources and/or competition, internally or externally. Although organizations or groups in quadrants 2 and 3 possess adaptive resilience-thinking leadership in the areas of mobilizing collective decision-making (quadrant 2) and building adaptive resilience-thinking capacity (quadrant 3), respectively, they also show a paucity of resilience-thinking leadership in the other areas which could potentially leave them exposed to certain risks or vulnerabilities. Risks and vulnerabilities could include shortsighted planning, a desire to remain the same, being siloed, or an inconsistent communication flow. Lack of communication and teamwork may expose the organization to both internal and external vulnerabilities.

In contrast, quadrant 4 illustrates high resilience-thinking leadership that both builds resilience-thinking capacity and creates ways to mobilize collaborative sense and decision-making when necessary—the back-loop. It reveals a highly interconnected organization, individual or group with high potential for adapting, learning, and change. It also indicates a high potential for novelty and risk-taking. Those mapping into quadrant 4 assess risk and vulnerabilities from multiple vantage points and are mindful of the level and type of resilience-thinking leadership needed to adapt to the situation.

Using the RTLM scale to map or assess where an organization places on the resilience-thinking leadership grid begins by plotting the sum score (mean) of the BRLC on the X axis and the sum score (mean) of the MCSD on the Y axis. The point where these sums intersect maps the organization into one of the four quadrants. For example, if an organization's sum BRLC were 3.5 and its MCSD 2.75, it would map into quadrant 3 (see the red asterisk on the resilience-thinking leadership mindset grid).

As a rapid assessment tool, then, the RTLM scale could be used to map an organization's, individual's or group's current state in order to see where resources need to be utilized. For example, organizations mapping into quadrant 3 might want to put resources into developing more contexts for collaborative learning opportunities, and inclusive activities to strengthen collaborative sense and decision-making processes. Those mapping into quadrant 1 may want to look at contexts which will serve to transform the organizational culture. In either case the RTLM scale would serve as an initial starting point in order to effect these changes.

### **Future Research and Further Testing**

Three areas of further research should continue to be explored. First, I have two high priority long-term goals for further research. First, a key area of research I plan to continue to

explore is within an organization (or organizations) to further develop the RTLM scale. I would like to provide the RTLM survey to a number of organizations in order to further evaluate the scale and experiment with the Resilience-thinking Leadership grid. This research would not only contribute to further refinement of the RTLM scale, but also help to advise a company as to where resources should be developed and what those resources should include. Additionally, this data would hopefully lead to assessing predictive validity through a confirmatory factor analysis.

Secondly, my colleague, Eddie Perez, and I want to eventually combine our independent scales in order to create a more comprehensive organizational resilience-thinking leadership scale that assesses not only a resilience-thinking leadership mindset, but also a resilience network. Doing so should offer a more comprehensive view of an organization's resilience-thinking leadership. However, we will need to complete an assessment of face, content, construct, and predictive validity on this combined scale as well.

While those are two high priority long-term goals, an area of a more immediate nature is to follow up on this research study. I plan to focus on the development of the current RTLM scale. One avenue, as suggested by a reviewer in Stage 2, is to create multiple levels of the RTLM scale because leadership is not exclusive to positions of authority (Heifetz, Grashow, & Linsky, 2009). Consequently, in order to use it as a mapping tool as outlined in the section above, I need to assess whether the RTLM scale should be adapted for various user groups or whether the question of "job status" can suffice to assess multiple levels: the organization, individuals within the organization, and groups within the organization. It might be advantageous to assess individuals and groups within an organization. A second immediate goal is to refine the questions on the RTLM scale so they are less general and more specific.

Another area of further research is to revisit the factors I have identified. After reviewing the data, it is clear there is a positive correlation between the factors. Further research could look to see if there is some level of connecting correlation between the building resilience-thinking leadership capacity and the level of mobilizing of collaborative sense and decision-making. Currently, I am working with a research professor to try to answer the research question: Does building resilience-thinking leadership capacity lead to more collaborative sense and decision-making during periods of disruption? Preliminary findings indicate that one factor tends to precede the other. If this is indeed the case, it would have an impact on how the scale would/could be used and the mapping of the factors, the definitions of quadrants, and how resilience-thinking leadership might be assessed. For instance, a resilience-thinking leadership mindset mapping grid would become a more linear assessment with correlations from low to high and the quadrants in relation to the mean. It might look something similar to Figure 5.8

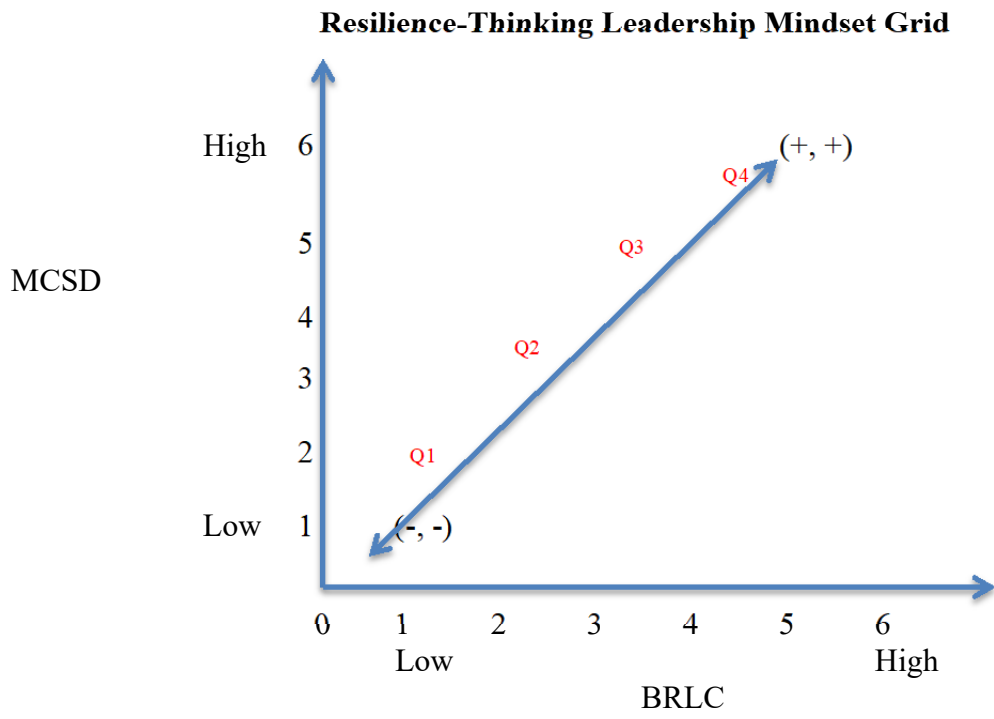


Figure 5.8. Linear resilience-thinking leadership grid.



However, this research falls into the area of further refinement of the RTL model which is beyond the scope of this dissertation.

### **Contributions to the Field of Adaptive Governance**

There has been an explosion of research in the field of adaptive governance in relation to complex adaptive systems and social ecological systems (Folke et al., 2010; Holling & Gunderson, 2002; Walker & Salt, 2006, 2012). In addition, there is a flourishing body of research into the diverse realms of resilience in relation to disaster management (Cutter et al., 2010; Rodin, 2014; Tierney, 2014). Moreover, the concept of relational leadership and mindful organizing has expanded to include diverse relational aspects such as integrative leadership, adaptive leadership, complexity leadership, boundary spanning leadership and organizational scholars (Chrobot-Mason et al., 2014; Cunliffe, 2009; Ernst & Chrobot-Mason, 2011; Ladkin, 2009; Ospina & Uhl-Bien, 2012; Weick & Stuecliff, 2015). Most exciting, the Rockefeller Foundation has promoted a worldwide resilience-thinking movement referred to as 100 Resilient Cities. They have developed a resilience framework that includes a leadership domain and leadership qualities. While 100 Resilient Cities primarily focuses on urban centers and public and private collaboration, there is plenty of carryover into organizational dynamics.

The RTL model consisting of adaptive capacity and adaptive governance places leadership into the realm of the social ecological systems (SES). Resilience-thinking leadership supports how complex systems interact, adapt, and learn (Folke et al., 2010). While the model is far from definitive, it does allow for dialogue on how resilience-thinking leadership can become a part of the larger discussion of “What is leadership?” and serve as a dynamic way to rethink and advance leadership using the framework of resilience thinking.

Likewise, the RTLTM scale can be used as a rapid assessment tool to help organizations map their levels and potential to build resilience-thinking capacity and mobilize collaborative sense and decision-making. The RTLTM scale can be used by practitioners, researchers, consultants, and organizational leaders to assess the resilience-thinking leadership potential in order to better allocate organizational resources. The RTLTM scale may also become a valuable tool as a rapid assessment of organizational employee attitudes or as a precursor to strategic planning processes.

This research study helped to present a straightforward assessment tool and to identify two factors that express the “both/and” nature of resilience-thinking leadership. On one hand, the RTLTM scale assesses the importance of incorporating and building a resilience-thinking leadership mindset into day-to-day activities. On the other hand, it also assesses the value of collaborative decision-making when it is warranted.

### **Limitations of Research**

The development process for the RTLTM scale is just that: a development process. The initial RTLTM survey went through a series of steps to assess face and content validity. Construct validity through an exploratory factor analysis helped to simplify and define the latent factors and reduce the number items measuring those factors. A partial confirmatory factor analysis assessed whether gathering more data could lead to a confirmatory factor analysis. Stage 2 provided an assessment of face and content validity of the refined RTLTM scale and offered specific recommendations to further refine the RTLTM scale.

However, several more studies are needed to assess predictive validity. Moreover, this study has focused on assessing the internal resilience-thinking leadership mindset factors of an organization. It has been pointed out by resilience experts both in Stage 1 and Stage 2 of the

research study that external stakeholders play an integral role in resilience-thinking leadership within an organization as well. So, since this research had a narrow focus of study in assessing resilience-thinking leadership within an organization, it has to be tempered by the fact that it offers an incomplete picture of the entire scope of how resilience-thinking leadership is manifested throughout an organization.

Another limitation of the research has to do with explicitly detailing the actions and behaviors that constitute building resilience-thinking leadership capacity and exercising collaborative sense and decision-making. This limitation is another example of first-order conditions leading to second-order themes—except in reverse (Maitlis & Lawrence, 2007). While the RTLTM scale assesses actions and behaviors, it does not go to the level of specificity to literally describe what an action entails. For example, the building resilience-thinking leadership capacity item “Management encourages their staff to see how their work is connected to the entire production cycle” is more of a second-order theme addressing how management acts, but it does not address the specific first order action of encouragement, e.g., “My manager spends an hour each week walking us individually through the production line.” Consequently, a limitation of the current RTLTM scale is that it does not go to the level of specificity as to detail what specific actions or behaviors illustrate words like “encouragement” or “enables.” Creating items that address this level of specificity is an area of future refinement.

### **Final Thoughts**

The form and level of resilience is a natural part of complex adaptive systems and cycles (Gunderson & Holling, 2002) as are risks and vulnerabilities (Tierney, 2014), but they can be manipulated, managed, and mitigated (Rodin, 2014; Walker & Salt, 2006, 2012). As technologies advance, as global climate change threatens worldwide disruptions, as leaders seek

to influence change, organizations of all types will continue to confront uncertainty and disruptions. I began my dissertation by offering three scenarios concerning leaders who faced disruptions. Each leader unwittingly magnified the disruption through his actions, and the ripple effect was far-reaching in each instance. As I write this final section, I am reflecting on the events of the past two weekends. First, last Friday evening white supremacy groups, the KKK, and the alt-right held an evening rally in Charlottesville, North Carolina. The following day, violence erupted. As the crowds were breaking up, a car rammed into a crowd of anti-(counter) white supremacist protesters, injuring several and killing one woman. President Trump's words on the tragedy were that both sides were to blame for the violence and the tragedy that unfolded. Watching President Trump speak, I could not help but think how some people believe great leadership resides in authoritarians, strong individuals or embedded in charismatic personas. In fact, many supporters of the president pointed to his "leadership" in calling out "both sides." In many ways, it seems that some people feel safe from uncertainty by following such leaders who offer simple binary yes/no, right/wrong answers and solutions to problems.

Similarly, it has often been written in articles in the media, the *New York Times*, *Washington Post*, *National Public Radio*, *Reuters*, that President Trump is a disrupter and is not adverse to chaos. While I agree that he disrupts, looking at Trump's leading from a complex adaptive systems and resilience-thinking leadership perspective, I see him more as one who adheres to the manner of resilience characterized by the resilience-thinking leadership grid in quadrant 1: ridged, hierarchical, resistant to change, building boundaries. His disruptions might stem from his resistance to adapting and transforming. What we have seen over the past six months are examples of minor disruptions creating major impacts because he views the system in binary terms and does not tolerate or adapt to change. His leadership reminds me of a character

in Isaac Asimov's second book in his science fiction *Foundation Trilogy*: "The Mule." The Mule is a mutant who can control the emotions of rivals; he conquers the Foundation and threatens to destroy it, but the system is larger than his limited view.

Second, over the weekend Hurricane Harvey hit the coastline of Southern Texas. The city of Houston and its surrounding area have been inundated by floodwaters. The disaster is continuing to unfold as I write. Television, radio, and media analysts are already discussing the preparedness, or lack of, by city, state, and federal government officials. Already, many National Public Radio commentators are saying this catastrophe will change the region for years to come. Whether Houston "bounces" back or whether it transforms remains to be seen, but in either case it underscores the importance of thinking about disruptions and building the capacity to prepare, respond, and learn from them.

Most complex issues are not either/or propositions, and cannot be solved with yes/no answers. The essentials of resilience-thinking leadership reside in mindfulness and situational awareness, in building capacity and mobilizing collaborative sensemaking—creating order through framing an event and taking action based on the frame. If this is indeed the case, then those in leadership positions need resilience-thinking leadership mindsets more than ever. If organizations seek to become more adaptive and able to withstand disruptions and prosper, then their focus on developing building resilience-thinking capacity during blue skies and enhancing and mobilizing collective sensemaking techniques during times of disruptions may create organizations that look beyond the traditional strength, weakness, opportunity, threats (SWOT) strategic planning processes. Consequently, it may lead them toward analyzing contexts where they can develop mindful organizing approaches through the building of resilience-thinking leadership capacity and the application of adaptive governance strategies through enhancing

collaborative decision-making practices. My contribution to the pursuit of developing resilience in an age of uncertainty is the resilience-thinking leadership mindset construct and scale. My hope is that this scale will be useful to practitioners, researchers, and organizations that are interested in advancing resilience-thinking, mindful organizing and adaptive governance.

## Appendix

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March 20, 2017

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## Appendix B: Permission to Use KMO Figure

September 20, 2017

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.8 - .9	meritorious
.7 - .8	middling
.6 - .7	mediocre
.5 - .6	miserable
under .5	unacceptable

*Figure 4.1* KMO Interpretations. Used by permission from Zaiontz (2017)

September 21, 2017

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Kaiser, H. 1974. An index of factor simplicity. *Psychometrika* 39: 31–36.

Charles

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Dear Lloyd Duman,

As Chair of the Institutional Review Board (IRB) for 'Antioch University Ph.D., I am letting you know that the committee has reviewed your Ethics Application. Based on the information presented in your Ethics Application, your study has been approved.

Your data collection is approved from 03/29/2017 to 03/28/2018. If your data collection should extend beyond this time period, you are required to submit a Request for Extension Application to the IRB. Any changes in the protocol(s) for this study must be formally requested by submitting a request for amendment from the IRB committee. Any adverse event, should one occur during this study, must be reported immediately to the IRB committee. Please review the IRB forms available for these exceptional circumstances.

Sincerely,

Lisa Kreeger

## Appendix D: Descriptive Statistics

<u>Item</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Skew.</u>	<u>Kurt.</u>
In times of crisis	3.63	1.394	-0.224	-0.97
During disruptions	4.73	1.195	-0.887	0.323
To solve day-to-day problems	3.2	1.912	-0.221	-1.198
On a daily basis	3.5	1.459	-0.163	-1.033
To build resilience prior to a disruption or crisis	3.64	1.864	-0.496	-0.951
In times of uncertainty	3.79	1.854	-0.544	-0.877
Management encouraged us to take risks to address the issue.	3.25	1.403	0.026	-1.061
My supervisor encouraged us by bringing us into the decision-making process.	3.86	1.463	-0.447	-0.811
Management made a conscious effort to ensure that critical information (e.g., staff contact details) was available in a number of different formats and locations.	4.32	1.303	-0.753	-0.029
I felt that I had little input to the decision-making process.	3.52	1.578	-0.075	-1.191
Management collaborated with employees to develop problem-solving strategies.	3.93	1.423	-0.408	-0.749
There was a sense of shared purpose as we worked through the disruption.	4.17	1.409	-0.629	-0.432
Employees relied on supervisor's experience and knowledge to solve the day-to-day problems.	2.87	1.225	0.481	-0.169
Management discouraged risk taking because it may have caused a further disruption in production.	3.37	1.453	0.035	-1.022
Management encouraged employees to think outside of the box.	3.88	1.432	-0.393	-0.684
Management promoted sharing of knowledge among individuals and groups to solve problems.	4.39	1.317	-0.723	-0.078
There was an excellent sense of teamwork and camaraderie among us.	4.31	1.298	-0.618	-0.341

Management and employees talked about our shared goals.	4.19	1.328	-0.576	-0.455
I had a high degree of independence in decision-making as I did my job.	3.76	1.375	-0.284	-0.644
Management was open and up-front with my colleagues and me.	4.46	1.182	-0.662	0.053
In the process of solving the problem, management ensured that all the affected department members participated in the decision-making.	3.81	1.412	-0.367	-0.707
Leaders made the decisions and I followed them.	2.73	1.328	0.577	-0.359
I saw my work on the problem as a contribution to the organization.	4.08	1.372	-0.613	-0.291
Management sought out employees known for their ability to think creatively to help resolve the issue.	3.79	1.452	-0.391	-0.794
Management attempted to create learning environment to help solve problems.	3.93	1.461	-0.39	-0.833
Management tried to build our capabilities toward self-leadership.	3.85	1.397	-0.434	-0.623
Employees were actively involved in all the changes and development efforts that took place in the organization.	3.91	1.455	-0.463	-0.798
Management in my organization takes advantage of the unique skills of my colleagues and me.	4.21	1.226	-0.528	-0.171
Management sees disruptions as opportunities to learn and adapt.	3.71	1.311	-0.107	-0.563
Management respects expertise and experience over classified rank.	4.14	1.337	-0.481	-0.472
Management includes employees at all levels in the decision-making processes of the organization.	3.63	1.512	-0.139	-0.964
I am encouraged by my immediate supervisor to take the initiative when faced with uncertainty.	4.2	1.395	-0.543	-0.485
We are encouraged to talk about our mistakes so that we can learn from them.	4.28	1.381	-0.675	-0.241
All of the organization's members work toward achieving our collective goals.	4.49	1.234	-0.781	0.201
In my organization, we take the time to learn about situations that could go wrong.	4.25	1.202	-0.543	-0.079
I am encouraged by management to learn new skills at work.	4.39	1.398	-0.78	-0.164
Management encourages me to try different jobs within our department to gain experience.	4.01	1.504	-0.453	-0.725
Upper management is responsible for developing solutions to organizational problems.	4.48	1.169	-0.606	-0.172

In my organization, as a group, we have a good grasp of each other's areas of expertise and skills.	4.38	1.214	-0.796	0.304
Management encourages their staff to see how their work is connected to the entire production cycle.	4.11	1.317	-0.507	-0.385
My direct supervisor is always honest, truthful, and transparent when giving me information.	4.48	1.311	-0.755	0.04
Management makes it clear to everyone how his/her job fits into what we are trying to do.	4.4	1.203	-0.654	-0.032
The people most qualified to make decisions make them regardless of their status in the organization.	3.78	1.369	-0.245	-0.597
Management in my organization collaborates with us to achieve the goals of the organization.	4.19	1.299	-0.602	-0.156
In my organization, there is a shared sense of purpose.	4.42	1.327	-0.724	-0.136
I believe employees would trust decisions made by management about how our organization should manage a crisis.	4.48	1.225	-0.791	0.378
Are you employed at an organization with	4.24	1.729	0.362	-0.763
What is your role in your organization	1.7	1.263	2.68	8.096

## Appendix E: Initial RTLM Scale

## Introduction page: Informed consent

Organizational leaders are faced with uncertainty and disruptions on a daily basis. The purpose of this research study is to understand how resilience-thinking leadership approaches are developed and used to both adapt to and learn from disruptions.

A resilience-thinking leadership mindset is defined as becoming more aware of looking at options when disruptions do occur, adapting to changing environments, and learning from disruptions for future opportunities.

In this study you are asked to reflect on a leader's actions that support adapting and learning, the level to which leaders support resilience thinking, and the level to which your organization uses a resilience-thinking leadership mindset.

Participating in this study requires completing an online survey that will take approximately 20 minutes of your time. The information you provide will be confidential. Reasonable measures will be taken to protect your identity, and all data collected will be stored digitally in a password-protected location. Results from this study may be published and/or referenced/utilized in future research studies. Participation in this survey is completely confidential and you may withdraw from the study at any time without consequence.

If you have any questions about the research study, you may contact the researcher Lloyd Duman by email at [lduman@antioch.edu](mailto:lduman@antioch.edu) or the supervising faculty Dr. Mitchell Kusy by email at [mkusy@antioch.edu](mailto:mkusy@antioch.edu). If you have questions regarding your rights as a research participant, please contact the Institutional Review Board Chairperson, Dr. Lisa Kreeger, by email at [lkreeger@antioch.edu](mailto:lkreeger@antioch.edu).

By clicking "Next" below, you confirm that you are at least 18 years old, have read and understand this survey introduction, and agree to participate in this research study. Please note that for any reason, at any time during the process, you may elect not to click the "Finished" button."

## Prepping Questions

1. Are you employed at an organization with

- 2 – 4 employees
- 5 - 24 employees
- 25 – 99 employees
- 100 – 500 employees
- 501 – 1000 employees
- 1001 – 5000 employees
- More than 5000 employees
- I do not work for an organization

2. What is your level of Education?

- Completed high school
- Some College
- Associate's degree
- Bachelor's degree
- Master's degree
- Ph.D; EdD; MD
- Other (please specify)

3. What is your role in your organization?

- Employee/ Professional
- Middle manager/Supervisor
- Manager
- Director
- Assistant/Associate Vice President
- Senior Vice President
- President
- Executive Officer
- Other (please specify)



## Part One: Exploration of Factors

On a daily basis, employees at all organizational levels are confronted with disruptions and face states of uncertainty. For example, a disruption could include a change in leadership or a natural disaster. Uncertainty could include a merger with another company or a change in production processes.

To address the issues that arise as a result of disruptions and uncertainty, organizations that adopt a resilience-thinking mindset tend to focus their attention toward acknowledging that disruptions and uncertainty are inevitable, but manageable.

And they can possibly lead to future opportunities. The following section asks you to quickly identify the actions you believe fit the definition of a resilience-thinking leadership mindset.

*A resilience-thinking leadership mindset is defined as becoming more aware of looking at options when disruptions do occur, adapting to changing environments, and learning from disruptions for future opportunities.*

Please drag the slider to the point where YOU THINK it belongs on the scale as an essential characteristic of an organizational leader with a resilience-thinking mindset during times of crisis.

### 4. In times of crisis

Takes control of all decision-making	Depends on context	Expands a distributed process of decision-making to others.
<input type="range"/>		

### 5. In times of crisis

Restricts the flow of vital information	Depends on context	Shares vital information
<input type="range"/>		

## 6. To solve day-to-day problems

Seeks out those with  
expertise

Depends on context

Trusts own experience and  
knowledge

## 7. During times of disruption or uncertainty

Provides the vision

Depends on context

Promotes shared vision

## 8. To mitigate the effects of disruptions

Enables employees to gain  
working knowledge of  
production processes

Depends on context

Relies on self to manage  
working knowledge of  
production processes

## 9. In times of uncertainty

Works with employees

Depends on context

Oversees employees

## Dichotomous section

A resilience-thinking leadership mindset is defined as becoming more aware of looking at options when disruptions do occur, adapting to changing environments, and learning from disruptions for future opportunities.

10. Thinking about the definition above, which of the following ACTIONS would you ascribe to a *resilience-thinking leader* during episodes of disruption or uncertainty?

	Yes	No
Encourages the participation of everyone involved in the process of solving a problem.	<input type="radio"/>	<input type="radio"/>
Identifies those people most qualified to make decisions regardless of job title.	<input type="radio"/>	<input type="radio"/>
Takes control of the situation by giving directions.	<input type="radio"/>	<input type="radio"/>
Talks about mistakes with employees so that everyone can learn from them.	<input type="radio"/>	<input type="radio"/>
Values expertise over job title.	<input type="radio"/>	<input type="radio"/>
Promotes a high degree of interdependence in decision-making processes.	<input type="radio"/>	<input type="radio"/>
Collaborates with employees to develop problem-solving strategies.	<input type="radio"/>	<input type="radio"/>
Distributes information as only as needed.	<input type="radio"/>	<input type="radio"/>

A resilience-thinking leadership mindset is defined as becoming more aware of looking at options when disruptions do occur, adapting to changing environments, and learning from disruptions for future opportunities.

11. As a reminder, thinking about the definition above, which of the following ACTIONS would you ascribe to a resilience-thinking leader during episodes of disruption or uncertainty?

	Yes	No
Makes sure knowledge is shared among those responding to unexpected problems that arise.	<input type="radio"/>	<input type="radio"/>
Disciplines those who made mistakes to make sure they don't happen again.	<input type="radio"/>	<input type="radio"/>
Encourages risk-taking by employees.	<input type="radio"/>	<input type="radio"/>
Creates a learning environment throughout the organization.	<input type="radio"/>	<input type="radio"/>
Standardizes processes for efficiency.	<input type="radio"/>	<input type="radio"/>
Encourages the sharing of information	<input type="radio"/>	<input type="radio"/>
Relies on experienced employees to solve urgent problems.	<input type="radio"/>	<input type="radio"/>
Maintains strict chain of command in decision-making processes.	<input type="radio"/>	<input type="radio"/>

A resilience-thinking leadership mindset is defined as becoming more aware of looking at options when disruptions do occur, adapting to changing environments, and learning from disruptions for future opportunities.

12. Again, thinking about the definition above, which of the following **ACTIONS** would you ascribe to a resilience-thinking leader during episodes of disruption or uncertainty?

	Yes	No
Encourages employees to think outside of the box.	<input type="radio"/>	<input type="radio"/>
Relies on own expertise to solve problems.	<input type="radio"/>	<input type="radio"/>
Advises against taking of risks because of the chaos that might result.	<input type="radio"/>	<input type="radio"/>
Seeks out employees known for their ability to use their expertise in creative ways.	<input type="radio"/>	<input type="radio"/>
Works toward achieving a shared vision.	<input type="radio"/>	<input type="radio"/>
Gives detailed plans for employees to follow.	<input type="radio"/>	<input type="radio"/>
Trusts decisions made by upper management about how the organization should manage a crisis.	<input type="radio"/>	<input type="radio"/>
Insists employees abide by the rules.	<input type="radio"/>	<input type="radio"/>
Talks to employees about shared goals.	<input type="radio"/>	<input type="radio"/>

### Set up for Matrix questions

13. Consider the following disruption scenarios. As you think about a situation where you and your organization faced a disruption or uncertainty, read through the list and identify one that you and your organization have experienced. Please use the button to identify it. It will be used for your own reference throughout this survey.















## Demographics

20. What is your gender?

- Female
- Male
- Transgender
- Other

21. What is your age?

- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 – 64
- 65 – 74
- 75 or older

22. Which of the following best describes your current occupation?

23. What is your yearly income?

- \$20,000 – \$35,000
- \$35,001 - \$ 50,000
- \$ 50,001 - \$ 75,000
- \$75,001 - \$100,000
- \$100,001 - \$150,000
- More Than \$150,000

24. Which race/ethnicity best describes you?

- American Indian or Alaskan Native
- Asian or Pacific Islander
- Black or African American
- Hispanic
- White/Caucasian
- Other

25. Thank you for taking the survey. Your participation in this study will contribute to the creation of an assessment instrument that will identify an organization's resilience-thinking leadership capacity. If you have additional feedback you would like to share, please provide it in the space below

## Appendix F: Revised RTLTM Scale Completed by Participants

## Introduction page: Informed consent

Organizational leaders are faced with uncertainty and disruptions on a daily basis. The purpose of this research study is to understand how resilience-thinking leadership approaches are developed and used to both adapt to and learn from disruptions.

A resilience-thinking leadership mindset is defined as preparing for and adapting to changing environments, becoming more aware to look at options when disruptions do occur, and learning from them to create future opportunities.

In this study you are asked to reflect on a leader's actions that support adapting and learning, the level to which leaders support resilience thinking, and the level to which your organization uses a resilience-thinking leadership mindset.

Participating in this study requires completing this online survey that will take approximately 15 minutes of your time. The information you provide will be confidential. Reasonable measures will be taken to protect your identity, and all data collected will be stored digitally in a password-protected location. Results from this study may be published and/or referenced/utilized in future research studies. Participation in this survey is completely confidential and you may withdraw from the study at any time without consequence.

If you have any questions about the research study, you may contact the researcher Lloyd Duman by email at [lduman@antioch.edu](mailto:lduman@antioch.edu) or the supervising faculty Dr. Mitchell Kusy by email at [mkusy@antioch.edu](mailto:mkusy@antioch.edu). If you have questions regarding your rights as a research participant, please contact the Institutional Review Board Chairperson, Dr. Lisa Kreeger, by email at [lkreeger@antioch.edu](mailto:lkreeger@antioch.edu).

By clicking "Next" below, you confirm that you are at least 18 years old, have read and understand this survey introduction, and agree to participate in this research study. Please note that for any reason, at any time during the process, you may elect not to click the "Finished" button."

### Prepping Questions

1. Are you employed at an organization with

- 2 – 4 employees
- 5 - 24 employees
- 25 – 99 employees
- 100 – 500 employees
- 501 – 1000 employees
- 1001 – 5000 employees
- More than 5000 employees
- I do not work for an organization

2. What is your role in your organization?

- Employee/ Professional
- Middle manager/Supervisor
- Manager
- Director
- Assistant/Associate Vice President
- Senior Vice President
- President
- Executive Officer
- Other (please specify)



## Part One: Exploration of Factors

On a daily basis, employees at all organizational levels are confronted with disruptions and face states of uncertainty. For example, a disruption could include a natural disaster a change in production processes. Uncertainty could include a merger with another company or a change in leadership.

To address the issues that arise as a result of disruptions and uncertainty, organizations that adopt a resilience-thinking mindset tend to focus their attention toward acknowledging that disruptions and uncertainty are inevitable, but manageable.

And they can possibly lead to future opportunities.

This survey is divided into three short, distinctive sections. The first section asks you to assess the actions of a resilience-thinking leader under various conditions. Section two asks you to reflect on a disruption your organization has faced. Finally, section three asks you to "map" the level to which you believe your organization already practices a resilience-thinking leadership mindset.

The following section asks you to quickly identify the actions you believe fit the definition of a resilience-thinking leadership mindset.

*Remember: A resilience-thinking leadership mindset is defined as preparing for and adapting to changing environments, becoming more aware to look at options when disruptions do occur, and learning from them to create future opportunities.*

Please use your cursor and mark the position on the scale where YOU THINK it belongs as an essential characteristic of an organizational *Leader* with a resilience-thinking mindset.

### 3. In times of crisis

Takes control of all decision-making	Depends on context	Expands a distributed process of decision-making.
<input type="radio"/> 		

## 4. During disruptions

Limits the flow of vital information to other managers

Depends on context

Shares vital information with all affected groups

## 5. To solve day-to-day problems

Seeks input from those with expertise

Depends on context

Trusts own experience and knowledge

## 6. On a daily basis

Reminds employees to see how their jobs contribute to the organization

Depends on context

Ensures organization is always ahead of the curve

## 7. To build resilience prior to a disruption or crisis

Enables employees to gain working knowledge of production processes

Depends on context

Relies on self to manage working knowledge of production processes

## 8. In times of uncertainty

Works with employees

Depends on context

Oversees employees

**Matrix questions**

9. Now, for section two, consider the following disruption scenarios. As you think about a situation where you and your organization faced a disruption or uncertainty, read through the list and identify one that you and your organization have experienced. Please use the button to identify it. It will be used for your own reference throughout this survey.















### Demographic information

16. What is your gender?

- Female
- Male
- Transgender
- Other

17. What is your age?

- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 – 64
- 65 – 74
- 75 or older

18. What is your level of Education?

- Completed high school
- Some College
- Associate's degree
- Bachelor's degree
- Master's degree
- Ph.D; EdD; MD
- Other (please specify)

19. Which of the following best describes your current occupation?

20. What is your yearly income?

- \$20,000 – \$35,000
- \$35,001 - \$ 50,000
- \$ 50,001 - \$ 75, 000
- \$75, 001 - \$100,000
- \$100,001 - \$150,000
- More Than \$150,000

21. Which race/ethnicity best describes you?

- American Indian or Alaskan Native
- Asian or Pacific Islander
- Black or African American
- Hispanic
- White/Caucasian
- Other

22. Thank you for taking the survey. Your participation in this study will contribute to the creation of an assessment instrument that will identify an organization's resilience-thinking leadership capacity. If you have additional feedback you would like to share, please provide it in the space below

## Appendix G: Letter to Resilience Managers Requesting Help Assessing Refined RTLM Scale

Hello, \_\_\_\_\_,

I am Lloyd Duman, a PhD candidate in Antioch University's Leadership and Change Program.

I am in the process of developing an instrument to measure resilience-thinking leadership in organizations. I define a resilience-thinking leadership mindset as relational acts among organizational leaders and groups to enable adaptive learning through mindful organizing.

My ultimate goal is to create a rapid assessment measurement tool intended to "map" an organization's current practices and potential to cultivate a resilience-thinking leadership mindset. My dissertation chair is Dr. Mitchell Kusy, and my committee members/mentors are Dr. Donna Chrobot-Mason and Dr. Elizabeth Holloway.

At this point I have concluded an assessment of construct validity by completing a statistical analysis on an initial RTLM survey. As a result, I have refined a statistically significant Resilience-thinking Leadership Mindset scale, consisting of two factors: 1) *Building resilience-thinking leadership capacity (during blue skies)* and 2) *Exercising collaborative sense and decision-making (in times of crisis)*.

For this next stage of scale development, I am seeking input from persons familiar with resilience management and leadership. I was wondering if you or someone in your office would be willing to look over my survey and offer me some feedback. It shouldn't take more than 10 – 15 minutes. I would be happy to share my findings when I finish my research.

Sincerely,

Lloyd Duman

## Appendix H: Follow Up Letter to Resilience Managers

Hello, \_\_\_\_\_,

Thank you for helping me out.

Here's a little background. My resilience-thinking leadership model has been developed through complex adaptive systems theory, disaster resilience research, and relational leadership theories. I began with four domains: shared/distributed decision-making, knowledge sharing and learning, diversity of thought, and shared commitment.

My initial survey consisted of three sections and 48 items. I completed an assessment of construct validity by completing both an exploratory and a partial confirmatory factor analysis. As a result, I have refined a statistically significant scale, consisting of two factors: 1) *Building resilience-thinking leadership capacity* and 2) *Mobilizing collaborative sense and decision-making (in times of crisis)*.

My goal is to eventually develop a rapid assessment instrument that consultants or organizations could use as a diagnostic tool to “map” the level and type of resilience-thinking leadership that exists in an organization. (The survey really deals with the perceptions by individuals in the organization about how they see their leaders.) I have not given it to a group yet; that is a next step.

For this stage, I am assessing content validity on this refined resilience-thinking mindset scale. As you look over the survey, I have three primary questions for you to consider:

1. Would you remove or re-word any questions or statements?  
Why?
2. What statements might you add?
3. What recommendations do you have for future development or use?

If possible, I would like to have a short follow up with you and discuss your insights. I would be happy to share my findings in an executive summary when I complete my study.

Attached is a copy of the survey as one would see it in Survey Monkey.

## Appendix I: Refined RTLM Scale Reviewed by Resilience Managers

### Introduction

Hello, \_\_\_\_\_,

I am Lloyd Duman, a PhD candidate in Antioch University's Leadership and Change Program.

I am in the process of developing an instrument to measure resilience-thinking leadership in organizations. I define a resilience-thinking leadership mindset as relational acts among organizational leaders and groups to enable adaptive learning through mindful organizing.

This survey is divided into two brief sections. Section one asks you to consider how you view your organization in the context building resilience-thinking leadership capacity. Section two asks you to reflect on how your organization exercises collaborative sense and decision-making especially during times of disruption.

## Getting Started

1. Are you employed with an organization with:

- |   |   |
|---|---|
| <input type="radio"/> 2 - 4 employees     | <input type="radio"/> 501 - 1000 employees              |
| <input type="radio"/> 5 - 24 employee     | <input type="radio"/> More than 5000 employees          |
| <input type="radio"/> 25 - 99 employees   | <input type="radio"/> I do not work for an organization |
| <input type="radio"/> 100 - 500 employees |   |

2. What is your role in your organization?

- |   |  |
|---|--|
| <input type="radio"/> Employee/Professional     | <input type="radio"/> Assistant/Associate Vice President |
| <input type="radio"/> Middle Manager/Supervisor | <input type="radio"/> Senior Vice President              |
| <input type="radio"/> Manager                   | <input type="radio"/> President                          |
| <input type="radio"/> Director                  | <input type="radio"/> Executive Officer                  |
| <input type="radio"/> Other (please specify)    |  |







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