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# Scenario Planning for Organizational Adaptability: The Lived Experiences of Executives

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Abstract

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MBA, University of Maryland University College, 2010

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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## Abstract

Organizational adaptability is critical to organizational survival, and executive leadership's inability to adapt to extreme disruptive complex events threatens survival. Scenario planning is one means of adapting to extreme disruptive complex events. In this qualitative interpretive phenomenological study, 20 executives who had lived experience with extreme disruptive complex events and applied scenario planning to help adapt participated in phenomenological interviews to share their experiences related to the application of scenario planning as a means adaptation to extreme disruptive complex events. Participants were from a single large organization with executives distributed throughout the United States and executives from 10 state agencies located within a single state. Using the thematic analysis process, 14 themes emerged. The themes included knowing the difference between adaptation and response, not being afraid to tackle difficult questions, scenario planning is never over because the environment constantly changes, the true measures of scenario planning value are the benefits achieved via the planning exercise versus the business application, and participation should be individuals who can or could have a direct influence on adaptation and do not get bogged down in structured and/or rigid processes, methods, or tools because while useful, they are not required to be successful. The implications for positive social change include the ability for organizations to reduce economic injury and the compound effects of disruption including the social impacts of business injury, disruption, recovery, job loss, and reduced revenue on communities and local economies.

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# Dedication

I never graduated high school because I had to drop out for reasons beyond my control, but eventually I got a GED. This study is dedicated to anyone else who never had the opportunity to finish high school but still grew up to be a doctor.

Acknowledgments

I would like to thank and acknowledge my doctoral committee (Dr. Thomas Schaefer, Dr. Scott Burrus, and Dr. Steve Roussas), my various course and residency professors, and everyone else who provided support and encouragement as I completed my doctoral program.

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# Section 1: Foundation of the Study

In this interpretive phenomenological study, I explored the lived experiences of selected executives regarding the use of scenario planning as a tool to prepare for and achieve organizational adaptability associated with extreme disruptive complex events. Organizational adaptability refers to an organization's ability to adapt to internal and external environmental changes across the full spectrum of organizational business units and business functions. Scenario planning involves the development and analysis of potential future states to support the development and implementation of business strategies as well as operational decision-making within an organization (Churchhouse, Hoffmann, Palermo, & RamÍRez, 2017; Stepchenko & Voronova, 2014). The problem is that some business leaders may lack experience, insight, and competencies regarding scenario planning as a holistic organizational adaptability tool. This study was an exploration of the lived experiences of business leaders who have engaged in scenario planning as an organizational adaptability tool during extreme disruptive complex events. Complex adaptive systems (CAS) and chaos theory were the lenses used to frame the research.

## Background of the Problem

Business executives have linked the 2001 dot com, 2008 financial, and 2012 sovereign debt crises, in part, to the failure to consider potential future environments and decision implications (Hanselman, 2012; T. C. Wilson, 2013). Haasnoot et al. (2016) and Schulaka (2017) defined scenario planning as planning based on one or more potential futures expressed as scenarios. Scenario planning as a business activity has gained

increased traction as a tool for addressing complexity, uncertainty, and the unknown (Haasnoot et al., 2016; Oliver & Parrett, 2017).

Scenario planning emerged in the 1960s and 1970s, and the RAND Corporation, Royal Dutch Shell, General Electric, and researchers such as Kahn were instrumental in the pioneering of scenario planning as a business activity (Churchhouse et al., 2017; Jafari, Shahanaghi, & Tootooni, 2015; Stepchenko & Voronova, 2014). The concept and application of scenario planning are not without issue, contention, and criticisms. Inconsistencies, conflicts, and the arguable lack of a theoretical foundation within the existing body of knowledge, coupled with the nature of addressing complexity, uncertainty, and the unknown, has rendered the scenario planning concept and application complicated, nebulous, subject to a wide array of interpretations, and, thus, difficult (Bielińska-Dusza, 2013). Moreover, Bielińska-Dusza (2013), Hanselman (2012), and Moriarty (2012) identified a need to vector the concept of scenario planning toward actual business use as a means of grounding and advancing the scenario planning concept.

## Problem Statement

A business's failure to adapt to extreme disruptive complex events threatens business survival (Churchhouse et al., 2017; Klarner & Schmitt, 2015). Furthermore, there has been a 70% failure rate among change initiatives related to the need to adapt to environmental changes, including extreme disruptive complex events (Dowling, Heckmann, & Steger, 2016). The general business problem was that leaders who have not considered potential future events have encountered negative effects due to a

diminished ability to adapt to extreme disruptive complex events (Konno, Nonaka, & Ogilvy, 2014b; Turlais, 2016). The specific business problem was that some business leaders lack the information needed regarding the application of scenario planning to adapt to extreme disruptive complex events.

## Purpose Statement

The purpose of this qualitative interpretive phenomenological study was to explore the information needed by executives regarding the application of scenario planning to adapt to extreme disruptive complex events. Twenty executives who had lived experience with extreme disruptive complex events and applied scenario planning to help adapt from a single large organization with executives distributed throughout the United States and executives from 10 state agencies participated in phenomenological interviews to share their experiences related to the application of scenario planning as a means adaptation regarding extreme disruptive complex events. The insights provided could help some business leaders develop scenario planning strategies and evaluate scenario planning efforts using an organizational adaptability lens. The achievement of organizational adaptability could have a positive effect on social change by mitigating the societal impacts associated with business economic loss and failure such as the nonlinear effects on a community associated with job loss and diminished revenue.

## Nature of the Study

I selected a qualitative research method with an interpretive phenomenological design because the intent was to provide a deeper understanding of, and explore the lived experiences of, the selected executives. Qualitative research is appropriate when the

researcher seeks to examine and explore events, activities, and/or phenomenon (Yin, 2014). A quantitative or mixed method is appropriate when the researcher seeks to test hypotheses based on measurable variables (Petty, Stew, & Thomson, 2012b). A quantitative or mixed method study was not appropriate for this study because adequate literature did not exist to construct viable hypotheses and/or reliably measure variables.

I chose an interpretative phenomenological design because extreme disruptive complex events are uncommon, unpredictable, and wrought with uncertainty and unknowns. An interpretative phenomenological design is appropriate when the researcher seeks to explore a phenomenon that does not occur on a frequent or day-to-day basis using the lived experiences of individuals who have experienced the phenomenon (C. Adams & VanManen, 2017; Moustakas, 1994). The purpose of a case study is the identification or cross-comparison of how individuals have engaged an activity (Yin, 2014). An ethnographic design is appropriate for an examination of shared experiences within a cultural group (Petty et al., 2012b). A narrative design is appropriate for studies including one or a few participants (Hawkins & Saleem, 2012). An interpretive phenomenological design was appropriate for this study because I explored in-depth the lived experiences of the selected executives.

## Research Question

What information do executives need regarding the application of scenario planning to adapt to extreme disruptive complex events?

## Interview Questions

I used the following open-ended interview questions to explore the lived experiences of the selected executives. The exploration included (a) the meaning selected executives attributed to scenario planning as an organizational adaptability tool, (b) the information needed to conduct scenario planning as an adaptability tool, and (c) perceptions regarding the application of scenario planning as a tool to enhance their ability to adapt to extreme disruptive complex events. Thus, I explored the application of scenario planning as a tool to aid organizational adaptability based on the lived experiences of participants who applied scenario planning to prepare for and adapt t, extreme disruptive complex events. Appendix A contains the interview guide. The open-ended interview questions were as follows;

1. Based on your lived experience, how can leaders use scenario planning to help an organization adapt to extreme disruptive complex events?
2. Based on your lived experience, what should executives know to engage scenario planning as a means of adapting to extreme disruptive complex events?

## Conceptual Framework

The conceptual framework was the combination of CAS theory and chaos theory. CAS and chaos theories fall under the umbrella of complexity science and have roots in physics, mathematics, life science, economics, and artificial intelligence (Proches & Bodhanya, 2015; Stacey, 2011). CAS and chaos theories gained significant traction in the 1940s through the works of researchers such as Weaver while researchers such as Boulding, Buckley, Lorenz, and Beer contributed to the evolution of CAS and chaos

theory business applications (as cited in J. S. Edwards, Hammer, & Tapinos, 2012; Hsu, 2014).

Some of the major tenets of CAS theory and chaos theory include self-organization, emergence, sensitive dependence, attractors, strange attractors, and nonlinearity (Heikkilä, Pietikäinen, Reiman, & Rollenhagen, 2015). Organizations are CAS that operate in chaotic environments and within complex internal and external ecosystems (Faggini & Parziale, 2016). Survival within a complex and chaotic environment, and the survival of a complex adaptive system itself, is the result of adaptation (Ramón & Koller, 2016). The implication is that survival depends on the ability to adapt to complex, unpredictable, and unexpected environmental changes wrought with complexities, uncertainties, and unknowns. Scenario planning is one mechanism for organizational leadership to address complexity, uncertainty, and the unknown (Amer, Daim, & Jetter, 2013; Haasnoot et al., 2016). There was a fit between scenario planning, organizational adaptability, CAS theory, and chaos theory; thus, the CAS theory and chaos theory lens were appropriate for this study.

## Operational Definitions

This study includes several key terms. The key terms appear in the scenario planning, complexity science, CAS theory, and/or chaos theory literature. I have provided a definition of the key terms to give specific contextual definitions related to the scenario planning concept as well as CAS theory and chaos theory that may otherwise be nebulous or confusing.

*Complex adaptive system (CAS):* A CAS is an open system comprised of *agents* that are autonomous, continuously interact with each other, are environmentally aware, and adapt to environmental stimuli (Aphane, Burman, & Mollel, 2016; Held, Marks, Wilkinson, & Young, 2014).

*Creative destruction:* Creative destruction refers to the destruction or cannibalization of existing structures to create new structures as part of adaptation (Poutanen, Soliman, & Ståhle, 2016).

*Edge of chaos:* The edge of chaos is the point at which an organization is subject to competing stability and instability, and where system equilibrium succumbs to irreversible disequilibrium and *bifurcation* (Houry, 2012; Poutanen et al., 2016).

*Emergence:* Emergence refers to a phenomenon where complex system patterns and behaviors emerge from the aggregate behavior of parts of the system or the collective behavior of the agents within the system (Aphane et al., 2016; Held et al., 2014).

*Nonlinearity:* Nonlinearity (nonlinear) refers to interactions and/or responses that are unpredictable and disproportionate to the stimulus that generated the interaction and/or response (Heikkilä et al., 2015; Proches & Bodhanya, 2015).

*Scenario:* A scenario is not a distinct prediction of the future (Turlais, 2016). A scenario is a hypothetical representation of one or more potential future states, situations, and/or events (Derbyshire & Wright, 2017).

*Scenario planning:* Scenario planning is a conceptual tool used to address complexity, uncertainty, and the unknown through the consideration of one to many

potential future states, activities, situations, events, decisions, and/or occurrences (Haasnoot et al., 2016).

*Self-organization:* Self-organization refers to the process of creating stable structures within a system without centralized internal or external control (Heikkilä et al., 2015; Poutanen et al., 2016).

*Sensitive dependence:* Sensitive dependence refers to a phenomenon where a change in initial conditions (no matter how large or small) sparks irreversible reactions within a system with significant long-term effects (Altindag, Cengiz, & Öngel, 2014; Heikkilä et al., 2015).

*Strange attractor:* A strange attractor is a paradoxical phenomenon where system behavior seems random on the surface; however, patterns exist within the system's dynamics and movement (Heikkilä et al., 2015; Stacey, 2011).

## Assumptions, Limitations, and Delimitations

There were three underlying assumptions. Some limitations existed based on the design. Additionally, there were some delimitations regarding the scope and boundaries of this study.

### Assumptions

An assumption is a presumed fact that a researcher cannot prove however has taken for granted (Grant, 2014). There were three underlying assumptions. The first assumption was that participants answered the interview questions honestly. The second assumption was that participants understood the interview questions and could articulate responses that accurately depicted their experiences. The third informed assumption was

that an examination of the lived experiences and perceptions of the selected executives would be useful to other business leaders via vicarious learning.

**Limitations**

A limitation is a restrictive condition or weakness based on the characteristics of the study (Humphrey, 2014). One limitation was that I had extensive experience with scenario planning as a business activity. Therefore, researcher bias was a concern. To mitigate the concern of researcher bias, I used bracketing, epoché, and study design features vectored toward a researcher who had familiarity with the phenomenon under study. For example, I took the potential for researcher bias into account by selecting an interpretive phenomenological design and the modified Stevick-Colaizzi-Keen method of phenomenological data analysis that enables the researcher to identify and be cognizant of potential bias.

A second limitation was that the conclusions emerged from the interpretation of the experiences and perceptions of the participants. Individuals who have participated in scenario planning do not experience scenario planning in the same fashion. For example, individuals engage scenario planning for numerous reasons and seek different benefits. Moreover, participants experienced different extreme disruptive complex events and defined extreme disruptive complex events, adaptability, and complexity differently. Furthermore, the degree of familiarity with the conceptual framework varied. To overcome this limitation, I ensured data saturation based on what executives need to know about the application of scenario planning as a means of enhancing organizational adaptability to extreme disruptive complex events as per the research question and

aligned with the conceptual framework. I used a Cronbach's alpha value of .70 to demonstrate data saturation.

**Delimitations**

A delimitation is an articulated and defined limit, scope, and/or boundary associated with a study (Bratu, 2014). The boundaries and scope of this study were the application of scenario planning as one means for organizational leadership to adapt to extreme disruptive complex events based on the lived experiences and perceptions of the participants throughout their entire professional careers. The scope included experiences outside of the participants' involvement with any one organization. Therefore, I did not limit the experiences of the selected executives to only their experiences with their current organization. The analysis of scenario planning applications, judgments regarding success or failure, and assessments of scenario planning utility on the part of the researcher were out of scope. Assessments of relevance regarding the use of scenario planning and the achievement of organizational adaptability beyond the experiences of the selected executives were also out of scope. Only experiences with extreme disruptive complex events in which participants applied scenario planning were within the boundaries.

Another delimitation was that the use of a qualitative phenomenological research design gave rise to an inability to generalize the study findings to the larger business community (A. Wilson, 2015; Yin, 2014). Consequently, the results, while potentially transferable, were not generalizable to the larger business community. To compensate for the delimitation associated with an inability to generalize the findings, participants

were from a large national organization that operates across four industries as well as multiple state agencies within a single state that dealt with numerous industries.

## Significance of the Study

Bielińska-Dusza (2013), Bowman (2016), and Alexande, Larkin, Pryor, Singleton, and Taneja (2012) identified a gap in the scenario planning literature regarding a clear professional and academic understanding of how and why organizational leaders have used scenario planning. An exploration of scenario planning experiences and perceptions regarding organizational adaptability may contribute to an understanding of how and why organizational leaders have used scenario planning based on (a) the meaning some executives attach to the scenario planning concept in relation to organizational adaptability, (b) the information needed, and (c) perceptions regarding scenario planning as a tool for adaptation. Additionally, the findings may contribute to the scenario planning literature regarding experiences with the use of scenario planning as an organizational adaptability tool; thus, may contribute to business practice with implications for social change.

### Contribution to Business Practice

The findings may contribute to business practice via the exploration of scenario planning strategies that may help business leaders consider complexity, uncertainty, and the unknown. The information needed regarding the use of scenario planning as an organizational adaptability tool may help business leaders address complexity, uncertainty, and the unknown in support of organizational adaptability. Furthermore, researchers such as Bobelyn, Clarysse, and Palacio (2013) found that learning from the

experiences and perceptions of others, known as vicarious learning, was a positive source of knowledge that had a significant impact on business success. The implication is that when considering (a) the intent of scenario planning and associated meaning, (b) the utility of vicarious learning, and (c) the complex nature of organizations, the lived experiences of some executives could aid other business leaders when attempting to engage scenario planning in support of organizational adaptability. Moreover, the intent was to assist business leaders by also contributing to (a) an understanding of the need for scenario planning strategies and tactics, (b) the evaluation of scenario planning strategies, (c) the identification of additional opportunities to apply scenario planning, and (d) insight regarding what it means to use scenario planning as an organizational adaptability tool.

**Implications for Social Change**

The results may have positive implications for social change. Addressing complexity, uncertainty, and the unknown as a means of adaptation to extreme disruptive complex events and situations reduces the risk of economic injury, and the impact of business disruption (Haasnoot et al., 2016; Turlais, 2016; T. C. Wilson, 2013). The reduction of economic injury and the effects of disruption reduce the social and societal impact of business injury, disruption, and recovery such as the extended negative impacts of job loss and reduced revenue on communities and local economies (U.S. Small Business Administration, 2013).

## A Review of the Professional and Academic Literature

The characteristics of an activity or phenomenon as well as how individuals have experienced an activity or phenomenon are paramount underpinnings of how they construct meaning associated with the activity or phenomenon (Manen, 2017; Moustakas, 1994). Thus, the intent of this literature review was to examine the characteristics of scenario planning as an activity or phenomenon to provide a deep discussion of scenario planning within the constructs of the conceptual framework based on existing literature. This literature review includes a critical examination via analysis and synthesis of some of the scenario planning, CAS theory, and chaos theory literature with an eye toward organizational adaptability. I have provided a deep review and discussion of (a) the selection of CAS and chaos theories as the conceptual framework versus other theories; (b) why the combination of CAS theory and chaos theory was a suitable conceptual framework for scenario planning with an eye toward organizational adaptability; (c) relevant CAS theory, chaos theory, and scenario planning concepts including business applications; (d) the elements of the scenario planning concept; and (e) the relationship, integration, and overlap between CAS theory, chaos theory, and scenario planning business applications.

### Organization of the Literature Review

I have organized and presented this literature review using components. The first component is the development of this literature review. The development discussion includes the literature search strategy and a breakdown of the content of the literature. The second component is an overview of CAS theory and chaos theory with a critical

analysis of why the combination of CAS theory and chaos theory was a suitable conceptual framework for scenario planning with an eye toward organizational adaptability. The third component is a comprehensive critical analysis and synthesis of the scenario planning concept deconstructed into core elements. The fourth component is an integrated discussion of the relevance of CAS theory and chaos theory in relation to scenario planning as a tool to foster organizational adaptability.

**Literature Search Strategy**

I used a 5-step process to search for literature. Step 1 was to search multiple research databases, including Science Direct, Academic Search Complete, and ProQuest using a list of keywords to find peer-reviewed articles on (a) scenario planning, (b) scenario planning business applications, (c) CAS theory, (d) CAS theory business applications, (e) chaos theory, (f) chaos theory business applications, and (g) organizational adaptability. The second step was to trace the references used by the authors to find additional literature related to the concepts and conclusions presented. Step 2 also included additional searches using a combination of keywords based on the names of the authors, the titles of the articles, and the publication names of the works cited within the initial set of articles. Step 3 was to conduct a detailed review of each article. Step 4 was to identify the most relevant articles and narrow down select articles based on content and research quality. Step 5 included the synthesis of the selected articles and the repetition of Steps 1 through 4, if needed, based on the relevant concepts discussed and any gaps identified by the authors. Using this process, I found and reviewed 453 articles and 10 books and then selected 103 articles and two books for

inclusion in the literature review for a total of 105 sources. Of the 105 sources, 98% were peer-reviewed, and 85% were within 5 years of this study's completion date. Figure 1 contains a depiction of the literature search strategy.

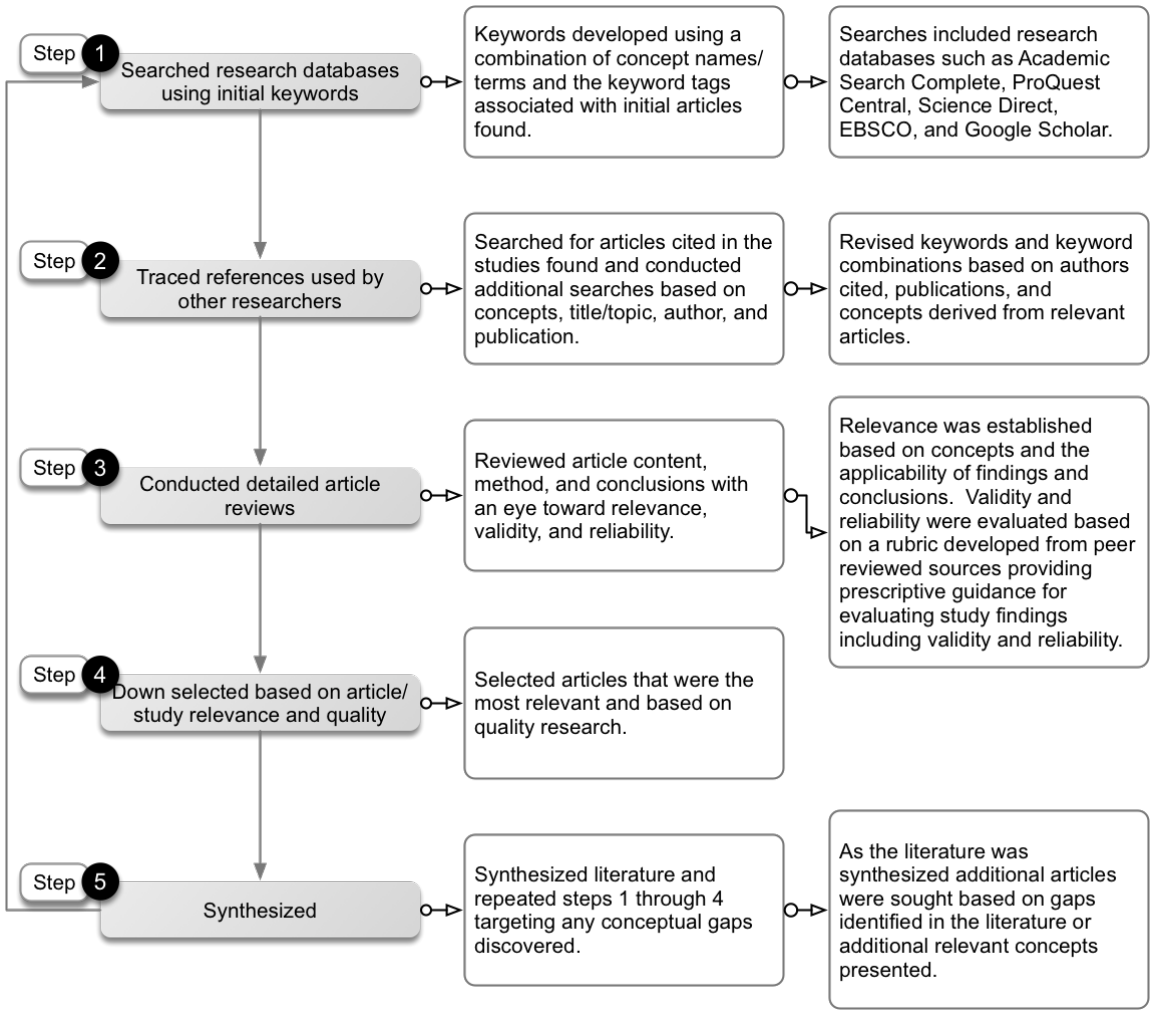


*Figure 1.* Literature search strategy.

The scenario planning literature I selected for inclusion in this literature review contained a wide spectrum of research methods and designs. Of the 103 articles, 15% of the researchers did not specify a research method and design. Fifty-seven percent of the researchers used a qualitative method within which 65% used a case study, 24% used a grounded theory, and 11% used a narrative design. Twenty-three percent of the researchers used a quantitative method where 71% used a quasi-experimental design and 29% used a survey design. Five percent of the researchers used a mixed method, all of which were qualitative then quantitative (Qual→Quan) and included combinations of case study, phenomenological, quasi-experimental, and survey designs.

The authors who used CAS theory and/or chaos theory as a conceptual or theoretical framework also used a litany of research methods and designs. All the researchers specified a method and design. Seventy-one percent of the researchers used a qualitative method within which 53% used case study and 47% used grounded theory designs. Twenty-one percent of the researchers used a quantitative method wherein 21% used a quasi-experimental design, and 79% used a survey design. None of the researchers used a mixed method.

**Content of the Literature**

Researchers provided an overview and general guidance regarding scenario planning; however, these were associated with a single type of scenario planning application or benefit. One example was innovation management, including the ways in which leaders sparked and managed innovation and the mechanisms leaders used to initiate and inspire individual and organizational innovation (Borch, De Smedt, & Fuller,

2013). A second example was organizational development, including the ways in which individuals viewed the world and how these views influenced business decision-making, values, perceptions, and individual preferences (Bradley, Chermack, Coons, Glick, & Nimon, 2015). A third example was modeling and simulation and the many ways in which leaders and scenario planners constructed and used models to simulate outcomes such as the results of decisions (Geum, Lee, & Park, 2014). A fourth example was organizational learning, including the mechanisms through which individuals collectively acquired knowledge, including double–loop and continuous learning (Andersen, Kim, & MacDonald, 2013; Harris, 2013). A fifth example was risk management and the mechanisms for identification, mitigation, and avoidance of risk such as fiscal and operational risk modeling (Ergashev, 2012). A sixth example was strategy development, including the development of business strategy from the standpoint of generating and sustaining a competitive advantage (Awino, 2013). A seventh example was technology management and mechanisms for selecting and adopting technology, such as the ability to forecast new and emerging technologies (Geum et al., 2014; Wei-Hsiu & Woo-Tsong, 2015).

Some authors provided diverse types of scenario planning concept overviews, general business applications, specific business applications, prescriptive guidance, and frameworks. Other authors addressed the use of scenarios as part of various business activities without directly addressing scenario planning. However, only two of the 453 articles I reviewed contained researcher assertions that scenario planning was a business theory in unto itself. The lack of assertions that scenario planning was a business theory

gave rise to the notion that scenario planning did not have a dedicated business theory and researchers did not consider scenario planning to be a business theory; thus, the selection of suitable business theory for use as a conceptual framework was required.

Within the business literature incorporating CAS theory and chaos theory, researchers used CAS theory and chaos theory as a lens for conducting business activities with an eye toward adaptability and/or addressing complexity within various business functions. The CAS theory and chaos theory literature included several types of general business applications, specific business applications, organizational adaptability, frameworks, and prescriptive guidance. Some of CAS theory and chaos theory literature included the use of scenarios; however, the researchers did not discuss the use of scenarios in a scenario-planning context.

As a result, an examination of the existing body of knowledge regarding the scenario planning concept, as well as business applications of CAS and chaos theory, required mapping and linking the literature to create a holistic picture much like assembling a puzzle. Once I assembled the body of knowledge puzzle using existing scenario planning, CAS theory, and chaos theory business application literature, an apparent vacant space emerged within the body of knowledge wherein researchers had not applied CAS and chaos theory to scenario planning in direct and deliberate support of organizational adaptability. Figure 2 contains an illustration of the pieces within the body of knowledge puzzle by literature type and distribution.

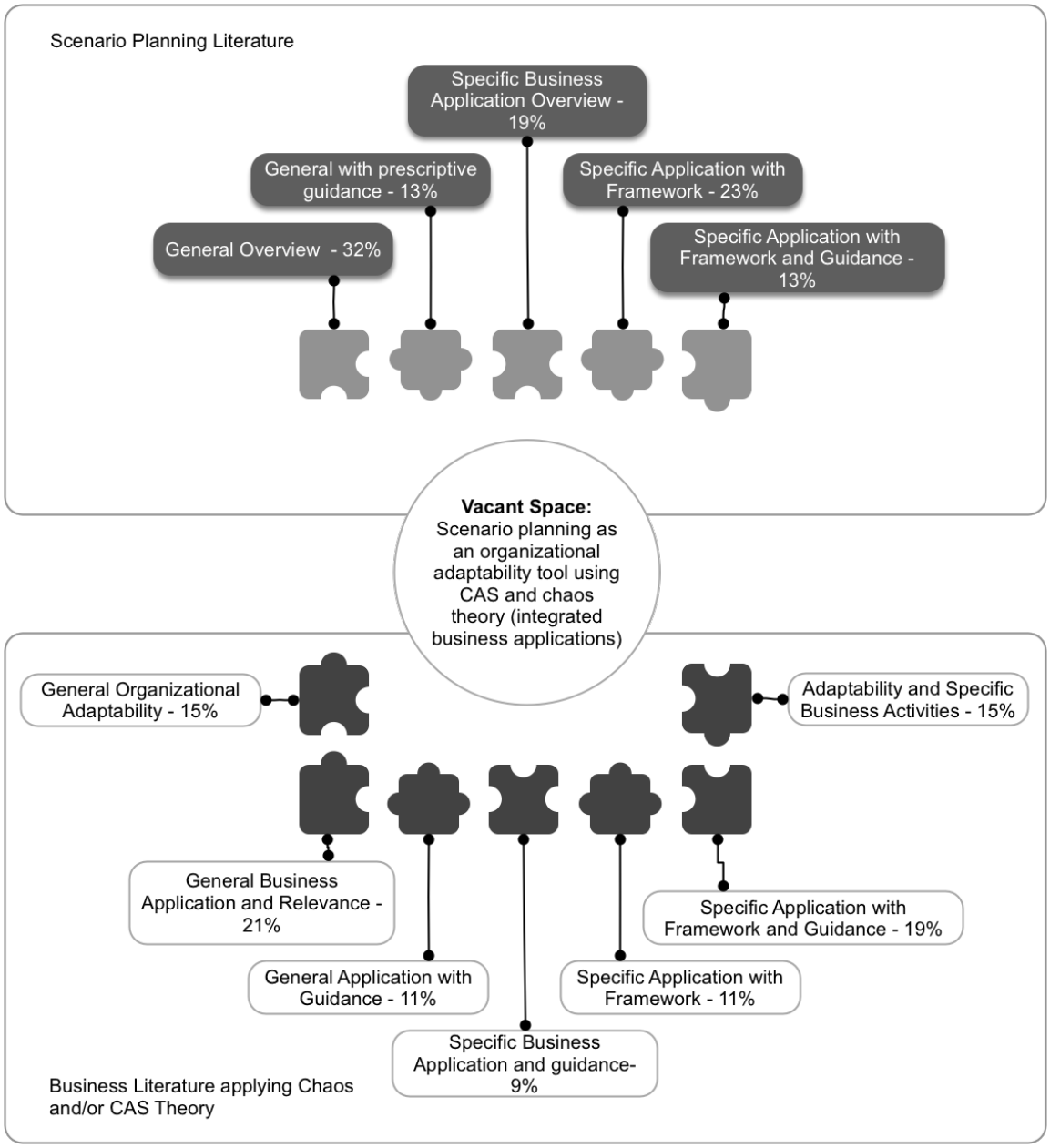


*Figure 2.* The body of knowledge puzzle by type and distribution.

**Integrated CAS Theory and Chaos Theory as the Conceptual Framework**

The purpose of this study was to explore what leaders need to know based on the experiences of the selected executives regarding the use of scenario planning as an organizational adaptability tool. However, scenario planning is not in unto itself a business theory. Furthermore, the theories used by authors within the scenario planning literature did not specifically address organizational adaptability. Therefore, I needed to select a good-fit conceptual framework for the application of scenario planning with an eye toward organizational adaptability.

I evaluated numerous business, strategy development, organizational development, systems, and network theories in support of the selection of a good-fit theory. Scenario planning has the potential to support organizational adaptability via the consideration of potential future states, uncertainty, and the unknown (Churchhouse et al., 2017). The implication is that the conceptual framework would need to support organizational adaptability while providing an appropriate lens for the application of scenario planning. Because of this implication, CAS and chaos theories represented good-fit theories.

Moriarty (2012) found that from a business perspective, one of the common criticisms of scenario planning has been organizational stovepipe application that negated some of the benefits of scenario planning. For example, some leaders used scenario planning as part of a risk management strategy which resulted in stovepipe applications because the leaders did not apply scenario planning to other business activities; thus, scenario planning efforts were arbitrarily limited (Moriarty, 2012). The implication was

that because organizational adaptability is a cross-functional holistic concept, the use of scenario planning in support of organizational adaptability required a conceptual framework that also supported native cross-functional and whole organization applications.

From a strategy development viewpoint, the strategy development theories I considered included blue ocean theory and general strategy development theories. The crux of Blue Ocean Strategy (BOS) theory is that leaders could apply a systematic and strategic approach to finding or creating industrial and market segments wherein there is little to no competition; thus, provide new opportunities for the organization (Altindag et al., 2014). General strategy development process (SDP) theories typically fell under the categories of descriptive and prescriptive. For example, J. S. Edwards et al. (2012) concluded that descriptive theories such as the typologies of Miles and Snow focused on patterns of behavior thus, tended to produce static representations. Prescriptive SDP theories centered on strategy development process tasks that represented linear activities. The potential issue was that static representations and linear processes might not lend themselves to understanding and addressing complexity, unknowns, and organizational adaptability in dynamic environments wrought with uncertainty (Baumann, 2015; J. S. Edwards et al., 2012). Furthermore, to overcome the issues associated with static representations and linear SDP approaches, strategists have applied CAS theory to strategy development or overlaid CAS theory with other strategy development theories to achieve more dynamic representations and support nonlinear strategy development processes (Baumann, 2015).

From an organizational development perspective, the theories I considered included mental model theory and learning organization theory. The crux of mental model theory is that mental models guide the way in which individuals view the world and make decisions, especially when exposed to unfamiliar situations (T. Chermack, Gauck, Glick, & Luckel, 2012; T. J. Chermack, Coons, Khatami, & O'barr, 2017). Under mental model theory, there are five predominant mental model styles including political, financial, efficiency, social, and systems styles (T. Chermack, Gauck, et al., 2012). The focus of learning organization theory is how organizational learning occurs and the effectiveness of organizational learning (T. Chermack, Coons, Haeffner, & Leone, 2012; T. J. Chermack et al., 2017). The seven dimensions of a learning organization are continuous learning, inquiry and dialog, team learning, embedded systems thinking, empowerment, system connections, and providing leadership. The higher an organization performs within and across the seven dimensions, the higher the degree of positive organizational learning (T. Chermack, Coons, et al., 2012). Chermack, Gauck, et al. found scenario planning had a positive effect on expanding participant mental models. Chermack, Coons, et al. found scenario planning had a positive effect on five of the seven learning organization dimensions; however, the researchers did not evaluate any direct connection to organizational adaptability.

From a systems theory standpoint, organizational leaders and strategists have applied systems theory to analyze internal and external environments and system dynamics (Baumann, 2015; Mittal, 2013). The implication for the application of scenario planning is that leaders and strategists could take a systems approach to understanding

environments and analyzing scenarios. The systems theories I evaluated included discrete event systems theory and CAS theory. Under systems theory, there is a distinction between system structure and system behavior. Furthermore, the understanding of structure could allow for the prediction of behavior (Mittal, 2013). Under discrete event systems (DEVS) theory, systems have a dynamic nature where there is a continuous time dimension, activity is event-based, and the structure of the system changes over time (Mittal, 2013). DEVS theory is also a mathematical theory that researchers and leaders used in modeling and simulation; however, DEVS theory and CAS theory combined, accounted for system structure, system behavior, and systems adaptation. Thus, DEVS theory enabled the modeling of a CAS and CAS theory accounts for complexity and adaptation within the various levels of DEVS (Mittal, 2013).

The network theories I considered included general network, actor-network, and complex network theory. Organizational leaders applied network theory as part of the strategy development process as a means of visualizing business network structures in support of sensemaking (Laari-Salmela, Mainela, & Puhakka, 2015). Network visualizations assisted individuals in locating, assessing, and taking advantage of strategic choices; however, network representations only provided a snapshot of the network at the time individuals created the representation. Network snapshots and views created by individuals may have been static. Thus, snapshots may not accurately reflect the true structure, actual behaviors, and fell victim to organizational mental models and *network horizons* limited by the portion of the network individuals could see (Laari-Salmela et al., 2015).

The crux of actor-network theory (ANT) is that actions are the result of a network of agents including nonhuman agents (Bueger, 2013; Montenegro, 2014). Furthermore, ANT theory is not only a type of social and network theory but also provides a theoretical framework for studying social phenomena. Under ANT theory, any agent has the potential to interact with any other connected agent; thus, change and evolve perceptions, objectives, and emergent actions (Montenegro, 2014). The concept of an actor under ANT theory insinuates that individuals may not understand who or what is acting at the time actions take place due to the complex interaction of actors, which could be anything from an emotion to a human or a document (Bueger, 2013).

Hearnshaw and Wilson (2013) asserted that complex network theory gravitates around the notion that organizations and industries are comprised of networks, and the source of complexity is that nodes enter and exit the network over time; therefore, a successful network is an open and dynamic system. Furthermore, connections within the network are directional and weighted based on the importance and level of activity between connected nodes. The focus of the network reliance concept is the network's ability to impugn change and preserve connections after a node removal without network collapse. Thus, positive adaptation would be the result of resiliency (Hearnshaw & Wilson, 2013).

Because of evaluation, I have selected CAS theory and chaos theory for multiple reasons. The reasons included (a) an analysis of why CAS and chaos theories are a better fit over some other theories, including but not limited to the business theories within the scenario planning literature; (b) the cross-comparison of some of the business

applications of CAS theory, chaos theory, and scenario planning; (c) the degree of overlap between scenario planning, CAS theory, chaos theory, and scenario planning business applications as they relate to organizational adaptability; and (d) the symbiosis of intent for applying CAS theory, chaos theory, and scenario planning regarding organizational adaptability. However, because this study is a phenomenological study and not a grounded theory study, the selection and discussion of CAS theory and chaos theory as the conceptual framework revolved around the mapping and cross-comparison of actual business applications of scenario planning, CAS theory, and chaos theory and not the theoretical potential for business application.

CAS theory and chaos theory fall under the umbrella of complexity science and have roots in the life sciences (Le Fur, 2013; Proches & Bodhanya, 2015). The growing applications of CAS theory and chaos theory have included physics, mathematics, economics, business, social sciences, and artificial intelligence (Mittal, 2013). Additionally, Stacey (2011) concluded that while there has been some contention among researchers as to whether CAS theory and chaos theory fall under other theories such as complexity theory, researchers have tended to agree that there is a direct integrative and supporting relationship between CAS and chaos theories. There is a consensus among researchers that CAS theory and chaos theory occupy separate spaces along the complexity science continuum (Stacey, 2011). Complexity science including CAS theory and chaos theory gained significant traction in the 1940s through the works of researchers such as Weaver while contributions from researchers such as Boulding, Buckley, Lorenz,

and Beer have contributed to the evolution of chaos and CAS theories (J. S. Edwards et al., 2012; Hung & Tu, 2014).

While I considered CAS theory and chaos theory individually, the combination of CAS and chaos theories provided a more holistic conceptual framework. The use of an integrated CAS theory and chaos theory lens may promote the use of scenario planning as part of an entire system, cross-functional, and cross business unit strategy development and operations management approach while striving for holistic organizational adaptability. CAS theory involves the structure and activities within a CAS as well as the mechanisms of system behavior and adaptation within a CAS whereas chaos theory revolves around equilibrium and the gravitation of systems toward stable or changing occurrences, activities, behaviors, and conditions in the internal or external environment (Altindag et al., 2014; Bogdan, Gelmereanu, & Morar, 2013 2013; Faggini & Parziale, 2016; Houry, 2012; Hung & Tu, 2014; Mittal, 2013; Wilkinson & Young, 2013). Thus, CAS theory addresses the structure and mechanics (who, what, how, when, and where) of system adaptation, while chaos theory represents the stimulus (why) that results in system adaptation (Stacey, 2011). I have combined CAS and chaos theory as the conceptual framework because of the ability to provide a comprehensive lens for the use of scenario planning in support of overall organizational adaptability based on who, what, when, where, why, and how organizational and environmental system adaptation occurs.

**Relevant CAS Theory Concepts**

The foundation of CAS theory is that a CAS is an open system comprised of *agents* that are (a) autonomous, (b) continuously interact with each other, (c) are

environmentally aware, and (d) adapt to environmental stimuli (Held et al., 2014; Poutanen et al., 2016). CAS include a complex network of agents and elements that create a system (Mittal, 2013; Proches & Bodhanya, 2015). Agent interactions and behaviors within the system are governed by rules (usually a few simple rules), reactions to the behavior of other agents, and environmental stimuli (Altindag et al., 2014). Some of the major tenets of CAS theory related to business are self-organization, nonlinearity, sensitive dependence, emergence, and creative destruction (Heikkilä et al., 2015; Poutanen et al., 2016).

Self-organization includes the process of creating stable structures within a system without centralized internal or external control (Mittal, 2013). In a self-organizing system, the creation of stable structure is the result of the interactions between agents within the system (Heikkilä et al., 2015). However, it is important to note that self-organization cannot occur under terms of *bounded instability*, which refers to constant imbalanced change because the system has neither the opportunity nor time to self-organize (Barnard & Edgren, 2012). An example of self-organization in a business organization is the formation of social networks that organizational leaders cannot centrally control (Peter & Sharicz, 2013). An example of bounded instability in a business context could be the inability of business units to adapt and self-organize due to frequent changes in business practices and organizational processes (Barnard & Edgren, 2012).

Nonlinearity is a phenomenon where system interactions and/or responses are unpredictable and disproportionate to the stimulus that generated the interaction and/or

response (Proches & Bodhanya, 2015). For example, agents within a system demonstrate nonlinearity when the result of a small interaction within one part of a system known as a *local interaction* has far-reaching effects across the entire system referred to as *remote effects* (Mittal, 2013). As Proches and Bodhanya (2015), and Stacey (2011) concluded, agents also demonstrate nonlinearity when a local interaction within one part of a system generates a disproportionately large or disproportionally small response within the same part of the system referred to as *local effects*. Researchers have referred to remote and local effects based on local system interactions as the *butterfly effect* (Altindag et al., 2014; Heikkilä et al., 2015). Nonlinearity is related to *sensitive dependence*, also known as *historical dependence* which refers to a phenomenon where a change in initial conditions (no matter how large or small) sparks irreversible reactions within a system that have significant long-term effects (Altindag et al., 2014; Heikkilä et al., 2015).

Emergence is a phenomenon where complex system patterns and behaviors emerge from the aggregate behavior of parts of a system or the collective behavior of the agents within the system (Heikkilä et al., 2015). Held et al. (2014) pointed out that emergent system behavior might be dramatically different from the behavior of individual agents or individual parts of the system. Therefore, emergence is the product of the behavior of the entire system (Heikkilä et al., 2015; Held et al., 2014). Furthermore, an *attractor* as discussed later under the chaos theory heading may provide the catalyst for initiating and affecting system patterns and behavior (Aphane et al., 2016). An example of emergence is the emergence of overall system adaptive behavior as agents within various business units interact at the local level in response to internal

and external environmental stimuli (Held et al., 2014). While local agent interaction may be response-centric, the cumulative effect of the response-centric behavior could be the emergence of organizational adaptation (Mittal, 2013).

Creative destruction refers to the destruction or cannibalization of existing structure due to adaptation (Poutanen et al., 2016). Poutanen et al. concluded that the process of creative destruction might involve the destruction of system structure that has become outdated or irrelevant. Conversely, creative destruction may involve the transformation and/or cannibalization of existing structures to create new structures in response to new environmental stimuli. An example of creative destruction could be a change in the organization's innovation strategy based on emerging opportunities within the industry that spawns a new project, while leaders terminate other projects due to loss of relevance. In the process of new project initiation and existing project termination, the organization redistributes the resources assigned to the terminated projects among the remaining projects and the new project. Another example of creative destruction may be the cannibalization of existing project resources to support emergent projects in response to external stimuli such as new product development projects or existing product enhancement projects (Coulombe, 2015).

**Relevant Chaos Theory Concepts**

Major components of chaos theory include attractors, strange attractors, and the edge of chaos. An attractor is an event, occurrence, or circumstance that affects one or more system elements, the entire system, and/or an entire ecosystem (Aphane et al., 2016; Mason, 2014). Affected system elements, entire systems, and/or ecosystems

gravitate toward attractors (Stacey, 2011). Attractors influence systems by (a) maintaining stability, (b) creating instability, and/or (c) influencing the behavior of system entities under conditions of stability or instability that could have further stabilizing or destabilizing effects (Altindag et al., 2014; Stacey, 2011).

A strange attractor is a paradoxical phenomenon where system behavior seems random on the surface; however, a pattern exists within the system's dynamics and movement (Stacey, 2011). A strange attractor exists when the system pattern represents conditions where irregularity and instability are normal and steady conditions. As a result, the system is predictably unpredictable (Hung & Tu, 2014). An example of a strange attractor is the loss of competitive marketing advantage due to the launch of an innovative marketing campaign by a competitor after which, instability becomes a steady condition as an organization struggles to regain their competitive marketing advantage (Mason, 2014).

On the industrial ecosystem level, an example of a strange attractor could be competition within the ecosystem (Mason, 2014). Carbonara and Giannoccaro (2011) found that when looking at the organizations within an industrial ecosystem individually, the development, launch, and delivery of products and services could seem random and destabilizing such as the introduction of disruptive technology. However, when considered collectively, a pattern of competition may emerge representing irregularity and instability as steady states on the ecosystem level as organizations within the ecosystem compete (Carbonara & Giannoccaro, 2011).

The edge of chaos is the point at which an organization is subject to competing stability and instability; where system equilibrium succumbs to irreversible disequilibrium and *bifurcation* (Houry, 2012). Houry described bifurcation as reaching points of no return where permanent change and adaptation occur. An organization's movement toward the edge of chaos and navigating the edge of chaos is positive when the organization successfully adapts, and adaptation represents opportunities such as an opportunity to innovate (Stacey, 2011). Houry (2012) and Stacey (2011) concluded that failure to adapt at the edge of chaos leads to destruction and threatens organizational survival. For example, an organization may reach the edge of chaos due to a loss of competitive advantage where the organization must permanently change and adapt to remain viable and regain their competitive advantage. Table 1 contains a summary of the core concepts within CAS theory and chaos theory that are relevant to this study.

Table 1

*Relevant CAS and Chaos Theory Concepts With Business Implications*

| Concept | Definition | Business implication |
|---|---|---|
| Creative destruction | The destruction of outdated/irrelevant structures to create a new structure in response to change and adaptation (Poutanen et al., 2016). | Existing organizational structures will be destroyed and new ones created as change occurs (Poutanen et al., 2016). |
| Edge of chaos (EOC) | The point at which a system is subject to competing stability and instability and equilibrium succumbs to irreversible disequilibrium and *bifurcation* (Houry, 2012). | Adaptation at the EOC is positive when the organization successfully adapts and capitalizes on opportunities such as innovation while failure to adapt leads to destruction and threatens survival (Stacey, 2011). |
| Bifurcation | Reaching points of no return where permanent change and adaptation occur (Houry, 2012). | There are positive or negative tipping points where change becomes permanent (Houry, 2012). |
| Emergence | System patterns and behaviors emerge from the cumulative behavior of agents that might be dramatically different from individual behavior (Held et al., 2014). | The sum of individual interactions determines organizational behavior and not individual behavior (Aphane et al., 2016). |
| Nonlinearity (nonlinear) | Small interactions within one part of a system have far-reaching effects, and/or interactions within one part of a system generate disproportionate responses elsewhere (Heikkilä et al., 2015). | Interactions and/or responses may be unpredictable and disproportionate to the stimulus that generated the interaction and/or response (Proches & Bodhanya, 2015). |
| Self-organization | The process of creating stable structures within a system without centralized internal or external control (Heikkilä et al., 2015). | Stability is the result of agent interactions (Chertow & Ehrenfeld, 2012). Stability cannot occur during constant imbalanced change because the organization has neither the opportunity or time to self-organize (Poutanen et al., 2016). |
| Sensitive / Historical dependence | A change in initial conditions (no matter how large or small) sparks irreversible reactions that have significant long-term effects (Altindag et al., 2014). | The butterfly effect may have significant and permanent effects (Heikkilä et al., 2015). |
| Strange attractor | Behavior seems random, but close examination of dynamics and movement reveals a pattern that irregularity and instability are normal and steady conditions (Hung & Tu, 2014). | Organizational and environmental change, as well as cumulative behavior, may be predictably unpredictable (Stacey, 2011). |

**CAS Theory and Chaos Theory Business Applications**

Adcroft, Lee, Skipp, and Winnard (2014), Cristancho (2016), and Hung and Tu (2014) concluded that businesses are, and behave like, CAS and that concepts within CAS theory and chaos theory inform business leadership and management efforts. Cristancho also asserted that leaders and strategists could enhance the discovery organizational structure, dynamics, and evolution by considering the organization from multiple perspectives. Furthermore, organizations are CAS, but exist within complex chaotic environments and ecosystems (Adcroft et al., 2014; Chung-An, 2014).

A chaotic organization is an organization that is self-organizing, self-governing, adaptive, nonlinear, and is capable of merging order with disorder (M. G. Edwards, 2014). These characteristics are consistent with studies wherein researchers applied chaos and CAS theory to organizations from multiple perspectives. For example, the chaotic organization characteristics identified by M. G. Edwards were consistent with the findings of other researchers. For instance, nonlinearity, sensitive dependence, self-organization, and emergence as well as assertions that organizations behave like CAS that demonstrate chaotic behavior such as gravitation toward attractors (Adcroft et al., 2014; Aphane et al., 2016; Hung & Tu, 2014).

Houry (2012) concluded that various researchers and business leaders have considered industries and markets to be CAS. On the industry and market level, the organizations and consumers within an industry are agents within an environmental CAS ecosystem wrought with complexity that can prepare for, influence, and adapt to

fluctuating stability and instability within the industry (Houry, 2012). Some business applications of CAS and chaos theories have included strategy development, operations management, organizational development, innovation management, change management, technology management, program management, risk management, crisis management, business process management, and contingency planning.

**Strategy development.** J. S. Edwards et al. (2012) examined several mainstream strategy development theories including prescriptive models, descriptive models, and strategy development tools as compared to CAS theory. J. S. Edwards et al. found that traditional strategy development approaches such as the typologies of Miles and Snow used by leaders to examine patterns of behavior as part of strategy development tended to yield representations of static behavior patterns. Furthermore, when considering the activities associated with strategy development processes, mainstream theories implied a linear relationship between the elements of strategy development and the activities associated with the strategy development process. However, when leaders overlaid and integrated CAS theory with more traditional strategy development processes, a dynamic view of the organization's environment emerged. As a result, leaders could create a view of how things work taking into account complexity that (a) helped identify uncertainty, (b) aided in the identification of unknowns, and (c) provided leaders with a sold nonlinear and dynamic foundation upon which they could build future-oriented strategies with an eye toward adaptability. Moreover, a CAS lens allowed for the possibility of anticipating and exposing potential positive and negative barriers during strategy development and provided a view into potential future directions (J. S. Edwards et al., 2012; Stacey, 2011).

Spencer (2014) concluded that leaders could significantly enhance both strategy development efforts and the resulting business strategies when the organization integrated complexity theories into their development processes because of the enhanced robust views created that aid in the identification of complexity, uncertainty, and the unknown. Baumann (2015) found that leaders can identify complexity, the origins of complexity, measure complexity, and quantify strategies to address complexity and in so doing enhance adaptability and performance. Wilkinson and Young (2013) found that leaders who integrated CAS and chaos theories into their strategy development processes could produce *soft strategies* that were more dynamic and adaptive to environmental change than more traditional rigid strategies. Houry (2012) found that while leaders cannot completely control complexity, leaders could influence complexity using CAS theory and chaos theory lenses. Furthermore, leaders could incorporate the ability to influence complexity into organizational strategies and could use statistical models for forecasting probability (Baumann, 2015; Houry, 2012).

**Business operations management.** Organizational leaders have integrated CAS and chaos theory into day-to-day business operations. For example, reducing complication means limiting hierarchal structures while ensuring organizational structure including planning and policy making, is dynamic and adaptive without being overly restrictive (Haasnoot, Kwakkel, Ter Maat, & Walker, 2013). Peter and Sharicz (2013) presented a bi-modal organization concept based on CAS theory. The focus of the bi-modal organization concept was to provide adequate structure to guide the organization and apply some rules, but simultaneously encourage and enable fluid agent networks that

also drive innovation, forward momentum, and change. Moreover, Altindag et al. (2014) concluded that leaders that applied chaos theory and blue ocean theory within their day-to-day management framework were more adaptive than leaders that employed other theories and processes, such as six sigma and traditional crisis management theory.

A second example of the application of CAS and chaos theories to operations management is the use of CAS and chaos theory as part of an organization's marketing tactics. Mason (2014) concluded that in a stable environment, successful companies used stabilizing marketing tactics. However, successful companies in turbulent environments used destabilizing marketing tactics (Mason, 2014).

A third example is the application of CAS and chaos theories to supply chain management. Hearnshaw and Wilson (2013) found that a complex network approach to supply chain management enabled leaders to view supply chains as complex network scale-free open systems. A scale-free open system supply chain view fosters an organization's ability to build and manage adaptive supply chains that had the ability to self-organize, change configuration, and alter behavior based on fluctuating complex conditions. Furthermore, a complex network view overcame the challenges associated with linear views that often led to oversimplification and supply chain failures (Hearnshaw & Wilson, 2013).

**Organizational development.** Barnard and Edgren (2012) concluded that one way leaders have applied CAS theory to organizational learning and development has been the realization that often business operations cannot be successful using a top-down hierarchical approach and that success depends on the local agent interactions within

business units and between consumers and their point of interaction with the organization. As a result, a CAS approach to organizational leadership and development provided an alternative paradigm for enhancing organizational performance based on sensemaking, information sharing, and team building as a means of enhancing the interactions within the organization. Moreover, the use of a CAS-based organizational development paradigm had the potential to not only enhance system agent interactions but help promote new interactions that would contribute to organizational success (Barnard & Edgren, 2012). Newer organizational development paradigms have focused on organizational attempts to adapt, self-organize, and respond to environments that are complex, dynamic, and constantly changing (Beeton, Halog, & Nguyen, 2015).

**Innovation and technology management.** Hung and Tu (2014) found that researchers and leaders have applied CAS theory and chaos theory to innovation management and technology management. One reason has been the organizational and environmental butterfly effect based on CAS theory and the destabilizing effect based on chaos theory of technological advancement, including the introduction of disruptive technologies that have required business adaptation. For example, the introduction of minor internal or external innovations had major implications and nonlinear effects on organizations, industries, and markets (Hung & Tu, 2014). Additionally, innovation in unto itself is nonlinear and has the potential to be unpredictable and unforeseen based on complex innovation networks within organizations and industries (Ahrweiler & Keane, 2013). One implication is that future-oriented adaptive innovation and technology management strategies and practices are critical to an organization's ability to be

innovative and adapt to innovation, technological change, and disruption (Hung & Tu, 2014).

**Change management.** Researchers and leaders have applied CAS and chaos theory to change management. For example, Marshak (2016) concluded that change leadership in the face of chaos requires a 360-degree approach relative to the leader's position within the system wherein, leaders have vertical leader and follower as well as horizontal peer responsibilities. Thus, change leadership needs to be omnidirectional and omnidirectional leadership gives rise to questions and challenges regarding the selection of optimal change leadership styles relative to an agent's interactions in any one or multiple directions because traditional top-down approaches in chaotic situations are ineffective (Marshak, 2016).

Ramón and Koller (2016) found that within an organization there are two ways in which leaders can leverage some tenets of chaos theory to understand and influence change. The first means is change based on small or gradual changes within business units from which organizational transformation emerges, and institutionalization is inherent. The second means is the introduction of major or radical changes at the organizational level in between periods of stability that enable the organization to self-organize around and institutionalize the change (Ramón & Koller, 2016).

**Business process management.** One method of developing business processes that (a) provide structure, (b) are not overly constraining, (c) capitalize on the positive characteristics of a CAS, and (d) target adaptability is the development and implementation of dynamic adaptive policy pathways (Haasnoot et al., 2013). Dynamic

adaptive policy pathways are policies that incorporate the potential need for adaptation by incorporating process and policy branches based on attractors that may result in a need for adaptation. Leaders have used CAS and chaos theory to identify and assess the attractors that may require adaptation to build multiple future-oriented policy and process pathway branches. The intent of implementing dynamic adaptive policy pathways is to provide a policy and process framework that provides structure but also enables the flexibility required for rapid adaptation (Haasnoot et al., 2013).

Multi-objective robust optimization is one means of developing adaptive policies based on CAS and chaos theories (Hamarat, Kwakkel, Loonen, & Pruyt, 2014). Multi-objective robust optimization is a modeling tool that leaders have used to discover and examine (a) future-oriented scenarios, (b) critical uncertainties, (c) unknowns, and (d) attractors that may emerge that would require adaptation and the circumstances under which attractors may emerge. Through application of the multi-objective robust optimization model, leaders could assess and determine adaptive policy pathways and process branches in support of adaptation (Hamarat et al., 2014)

**Program, project, and portfolio management.** One application of CAS theory to program, project, and portfolio management has been the use of CAS theory to understand and promote the resilience and adaptability of program, project, and portfolio management teams. Through the application of CAS theory and Chaos theory leaders can understand and model complexity within programs, projects, and project portfolios. For example, Maylor, Murray-Webster, and Turner (2013) found that leaders could use CAS theory and Chaos theory concepts to identify, understand, and anticipate structural

complexity within programs, projects, and project portfolios. The mechanism through which managers and management teams identified complexity was the continuous examination of the interactions and dependencies between elements such as resources, tasks, and individuals. Furthermore, the continuous examination of complexity was effective at understanding sociopolitical (conflicting agendas and shifting priorities) and emergent (environmental change) dimensions associated with program, project, and portfolio management that have the same if not more impact than structural complexity (Maylor et al., 2013). Schlick, Duckwitz, and Schneider (2013) echoed some of the conclusions of Maylor et al. and found that models such as the vector auto-regression models of cooperative work were effective at examining complex program, project, and portfolio dynamics involving CAS.

**Risk management, crisis management, and contingency planning.** Leaders have used CAS theory and chaos theory as part of their risk management approach. Thamhain (2013) concluded that leaders could still manage risk even though environments were complex. However, under terms of complexity, risk management had to extend beyond linear and pure analytical methods. Risk management within complex environments required a complexity lens that engaged agents throughout the organizational system to (a) identify and understand unknowns, (b) reduce the impact of potential risk manifestations based on uncertainty and unknowns, and (c) manage risk scenarios to mitigate risks before the potential risks become crises as part of contingency planning (Thamhain, 2013). I have provided a synopsis of some CAS and chaos theory business applications in Table 2.

Table 2

*CAS Theory and Chaos Theory Business Applications*

| Theory | | Application | Purpose/Description |
|---|---|---|---|
| CAS | Chaos | | |
| • | • | Strategy development | Enhance views based on complexity to build strategies accounting for complexity, uncertainties, and unknowns (Baumann, 2015; Spencer, 2014; Wilkinson & Young, 2013). |
| • | • | Operations management | Incorporate adaptability into daily operations (Altindag et al., 2014; Haasnoot et al., 2013; Mason, 2014; Peter & Sharicz, 2013). |
| • | | Organizational development, leadership, and learning | Enhance nonlinear systems thinking and agent interactions while emphasizing adaptability (Beeton et al., 2015). |
| • | • | Innovation and technology management | Enhance innovation capacity and adapt to destabilizing innovation (Ahrweiler & Keane, 2013; Hung & Tu, 2014). |
| • | • | Change management | Implement and embrace minor and/or radical nonlinear 360-degree change and management approaches (Ahrweiler & Keane, 2013; Marshak, 2016; Ramón & Koller, 2016). |
| • | • | Business process management | Develop dynamic adaptive policies and processes (Haasnoot et al., 2013; Hamarat et al., 2014). |
| • | • | Program, portfolio, and project management | Identify, understand, anticipate, and adapt to structural, sociopolitical, and emergent complexity (Maylor et al., 2013; Schlick et al., 2013). |
| • | • | Risk management, crisis management, and contingency planning | Whole system and environmental risk assessment and mitigation before crises emerge including adaptive contingency planning (Thamhain, 2013). |

## Scenario Planning Overview

Leaders have used scenario planning as a concept and tool for addressing complexity, uncertainty, and the unknown through the consideration of one to many potential future states, activities, decisions, and/or occurrences (Churchhouse et al., 2017; Oliver & Parrett, 2017; Schulaka, 2017). Stepchenko and Voronova (2014) concluded that within the concept of scenario planning, complexity relates to an organization's ability to identify and understand a myriad of internal and external variables using scenarios. Uncertainty relates to the organizational ability to address and make sense of

variables when leaders cannot predict variables because leaders cannot predict the future (Haasnoot et al., 2016; Konno et al., 2014b). The unknown refers to the organizational ability to address the emergence and/or discovery of new variables, the existence of which leaders cannot foresee or are nonobvious (Bielińska-Dusza, 2013). A scenario is a hypothetical representation of a potential future state (Gunter et al., 2017). A scenario is not a specific prediction of the future (Turlais, 2016).

The history of scenario planning business application lacks a clear consensus. Churchhouse et al. (2017) asserted that scenario planning business applications originated in the efforts of the RAND Corporation and Royal Dutch Shell between 1960 and 1970. However, Bielińska-Dusza (2013) asserted that General Electric and Royal Dutch Shell were the first to introduce the concept of scenario planning. Various researchers such as Kahn led to the transfer of the scenario planning concept to business by applying scenario planning as a tool for business forecasting (Stepchenko & Voronova, 2014). Furthermore, Jafari et al. (2015) asserted that the scenario planning concept emerged as a tool used in weapons system development. Regardless of the specific origin of scenario planning within business, the consensus among numerous researchers is that scenario planning emerged during the 1960s and is a modern concept with several generalized benefits (Chakraborty & McMillan, 2015; T. J. Chermack et al., 2017; Oliver & Parrett, 2017).

**Metaphoric Scenario Planning Conceptual Examination**

Some of the main scenario planning criticisms included contention, inconsistency, and conflict within the scenario planning literature, (Moriarty, 2012). Additionally,

critics have deemed the concept of scenario planning complicated and nebulous with a lack of documented successes and evidence-based support (T. J. Chermack et al., 2017). Moreover, authors had different opinions and study findings varied regarding scenario planning business applications, benefits, scenario types, tools, participants, scenario development processes, criteria, principles, and analysis methods. However, when I considered the various assertions collectively, a consistent pattern emerged. The pattern that emerged was that within each article, authors consistently mapped one or more processes and methods (based on specific criteria and principles) to business applications geared toward achieving a specific benefit/s using one or more tools. The source of variation was the desired benefit. The pattern that emerged coupled with the array of scenario planning options within the existing body of knowledge gave rise to the notion that organizational leaders had the ability to construct and adapt their scenario planning efforts and applications by selecting from an extensive array of scenario planning options versus strict adherence to a rigid application. Leaders could adapt their application of scenario planning via mapping the litany of options to the desired benefit based on best-fit.

As the scaffolding for the critical synthesis of the scenario planning literature, I have used an original scenario planning machine metaphor. Chenail (2012) found that researchers have acknowledged the use of metaphors as a strong mechanism for understanding and relaying complicated and complex concepts during qualitative research (Chenail, 2012). The intent of the machine metaphor is to provide a holistic critical synthesis of the components within the scenario planning literature. The concept

of scenario planning includes business applications, benefits, tools, participants, scenario types, scenario development tactics, processes, and analysis method components (Amer et al., 2013; Cairns, Goodwin, & Wright, 2016; Derbyshire & Wright, 2017; Freeth & Drimie, 2016; Vacík & Zahradníčková, 2014). For examination and discussion, I considered each of the scenario planning components to be gears in a scenario planning machine and depicted the scenario planning machine concept in Figure 3.

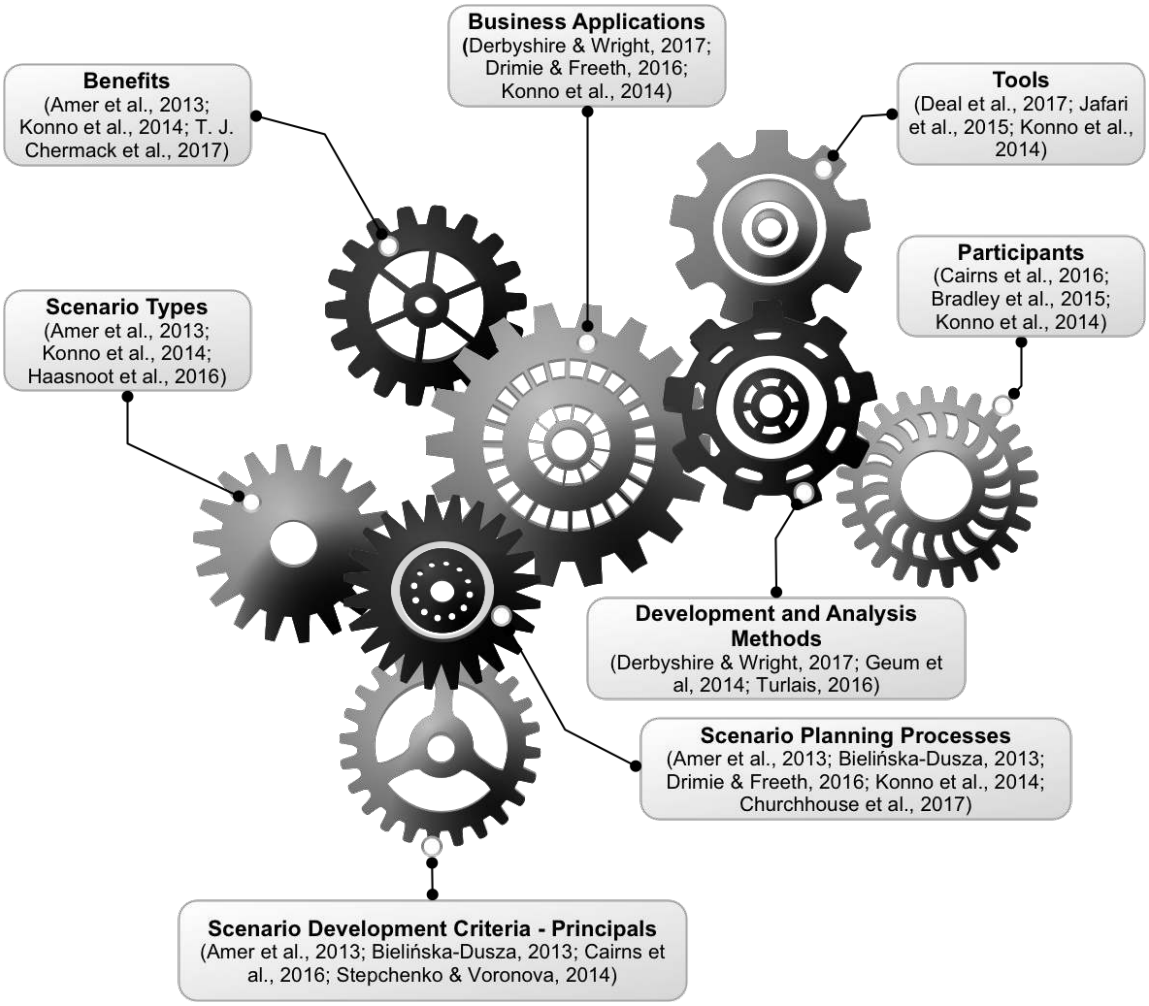


*Figure 3.* Scenario planning machine components.

**Scenario Planning Benefits and Business Applications**

The benefits attributed to scenario planning (machine outputs) relate to an organization's ability to gain corporate foresight, deal with complexity, plan for uncertainty, develop contingencies, make robust decisions (advantageous decisions that address multiple futures and variables), and improve organizational performance (T. J. Chermack et al., 2017; Churchhouse et al., 2017). For example, leaders have used scenario planning for operational risk management wherein scenario planning provided a mechanism to evaluate, manage, and mitigate risks including operational risk modeling and risk assessment (Ergashev, 2012; Hanselman, 2012; Vacík & Zahradníčková, 2014). Another application has been crisis management where leaders used scenario planning to manage and prevent organizational crises, which may be the result of economic, technological, physical, human resource, loss of reputation, or criminal act issues (Alexande et al., 2012). Leaders have used scenario planning for emergency management to prepare for, respond to, and recover from disasters including the analysis of capabilities and the development of plans, tactics, and strategies as well as structure exercises and training (Alexande et al., 2012; Federal Emergency Management Agency, 2014). Leaders have used scenario planning to articulate, manage, adjust, and improve internal and cross-functional business processes as part of business process development and management (Alexande et al., 2012). Leaders have used scenario planning as part of their contingency planning efforts to address uncertainty and the unknown while developing strategies that apply to the widest array of possibilities to foster ability and adapt to internal or external environmental changes (Churchhouse et al., 2017; Oliver &

Parrett, 2017). Leaders have used scenario planning to support business transformation wherein leaders attempt to alter situations, circumstances, and/or achieve a desired future state where volatility exists, a complete system approach is required, and direct transformation may not be possible (Freeth & Drimie, 2016). Leaders have applied scenario planning to program and project management to identify, select, develop, and execute programs as well as project portfolios while understanding dependencies (Liesiö & Salo, 2012). Another business application has been change management where leaders have sought to identify signals of change, assess impact, and develop change implementation strategies (Geldenhuys & Veldsman, 2011). Organizational leaders have applied scenario planning as part of their organizational development efforts including (a) organizational learning; (b) changing employee mental models; (c) leveraging the positive impact of scenario planning on dialog and inquiry, team learning, embedded systems thinking, leadership, system connection, and empowerment; (d) double-loop learning; (e) changing and enhancing individual worldviews including the reduction of political while enhancing efficiency, social, and systems-oriented thinking; (f) bolstering creative organizational climates; and (g) increasing resilience (Andersen et al., 2013; Bradley et al., 2015; T. Chermack, Coons, et al., 2012; T. J. Chermack et al., 2017; Harris, 2013). Leaders have used scenario planning as part of innovation management to identify and assess opportunities, guide efforts, and develop innovative innovation strategies (Borch et al., 2013). Organizational leaders have applied scenario planning to technology management to help identify, select, develop, and implement technology based on emerging requirements (Geum et al., 2014; Wei-Hsiu & Woo-Tsong, 2015).

Some additional scenario planning business applications include general strategy development, implementation of social change initiatives, marketing, and brand management, as well as financial management (Alexande et al., 2012; Awino, 2013; Dickson-Green, 2013; Hanselman, 2012; Kahane, 2012).

There may be a reciprocal and reinforcing relationship between scenario planning applications and benefits. For example, if the intent is to achieve organizational development benefits including continuous learning, identifying unknowns, understanding unknowns, dealing with uncertainty, and expanding mental models, while enhancing workforce perceptions of being a learning organization with a creative organizational climate, there is an opportunity for leaders to do so by applying scenario planning to any one of the various business applications (Bradley et al., 2015; T. Chermack, Gauck, et al., 2012; Harris, 2013). The implication is that the act of scenario planning enables the achievement of desired benefits or side benefits via the selected business applications. Furthermore, the relationship between applications and benefits is not one to one. One scenario planning business application may facilitate multiple benefits such as organizational learning, double-loop learning, and enhanced resilience (Andersen et al., 2013; T. Chermack, Coons, et al., 2012; T. J. Chermack et al., 2017). Additionally, the use of scenario planning within a given application is an effective tool for reducing bias and enhancing organizational decision-making (Meissner & Wulf, 2013). Thus, a reciprocal, cyclical, and reinforcing relationship exists between benefits and business applications. I have depicted some of the scenario planning benefits and applications in Figure 4 using the scenario planning machine concept.

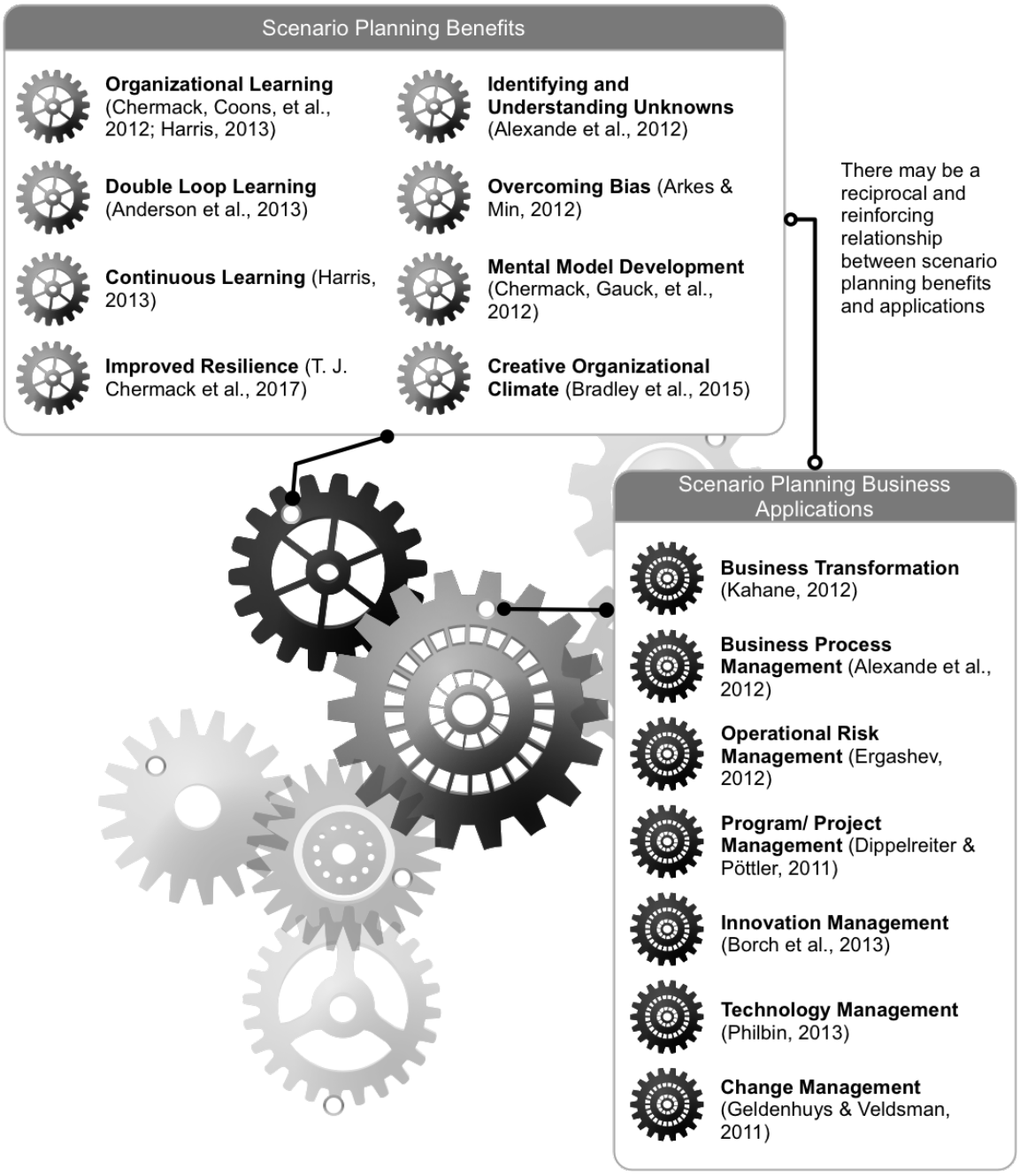


*Figure 4.* Scenario planning benefits and applications.

**Scenario Classifications and Validation**

Amer et al. (2013) asserted four primary scenario classifications. Under the continued growth classification, existing trends and conditions expand and continue to grow. Conversely, under the collapse classification, continued growth does not occur, contradictions exist, and unknowns manifest in diverse ways. Scenarios that fall under the steady state classification are scenarios where growth does not occur; however, variables stabilize, and balance emerges. The fourth scenario classification is transformation. Under the transformation classification, future structure and foundations change, assumptions change, and the future internal and external change drive transformation (Amer et al., 2013).

Within the four basic scenario classifications, there are several scenario types. These types of scenarios include research, anticipatory, descriptive, normative, exploratory, inductive, and deductive. Each scenario type is bound to the intended purpose of the scenario and scenario planning effort. For example, planners use an anticipatory scenario to uncover relationships and anticipate the effect of the variables included in the scenario (Bielińska-Dusza, 2013).

On the other hand, planners use a normative scenario to discover events and actions required to achieve a future state as well as variables that should or should not exist (Bielińska-Dusza, 2013; Haasnoot et al., 2016). Therefore, a normative scenario under the steady state classification would be a scenario where participants examine what events and actions should or should not occur under the assumption that growth will not occur, and the environment will stabilize. I have illustrated some of the scenario

classifications and types with intended purposes as gears within a scenario planning machine in Figure 5.

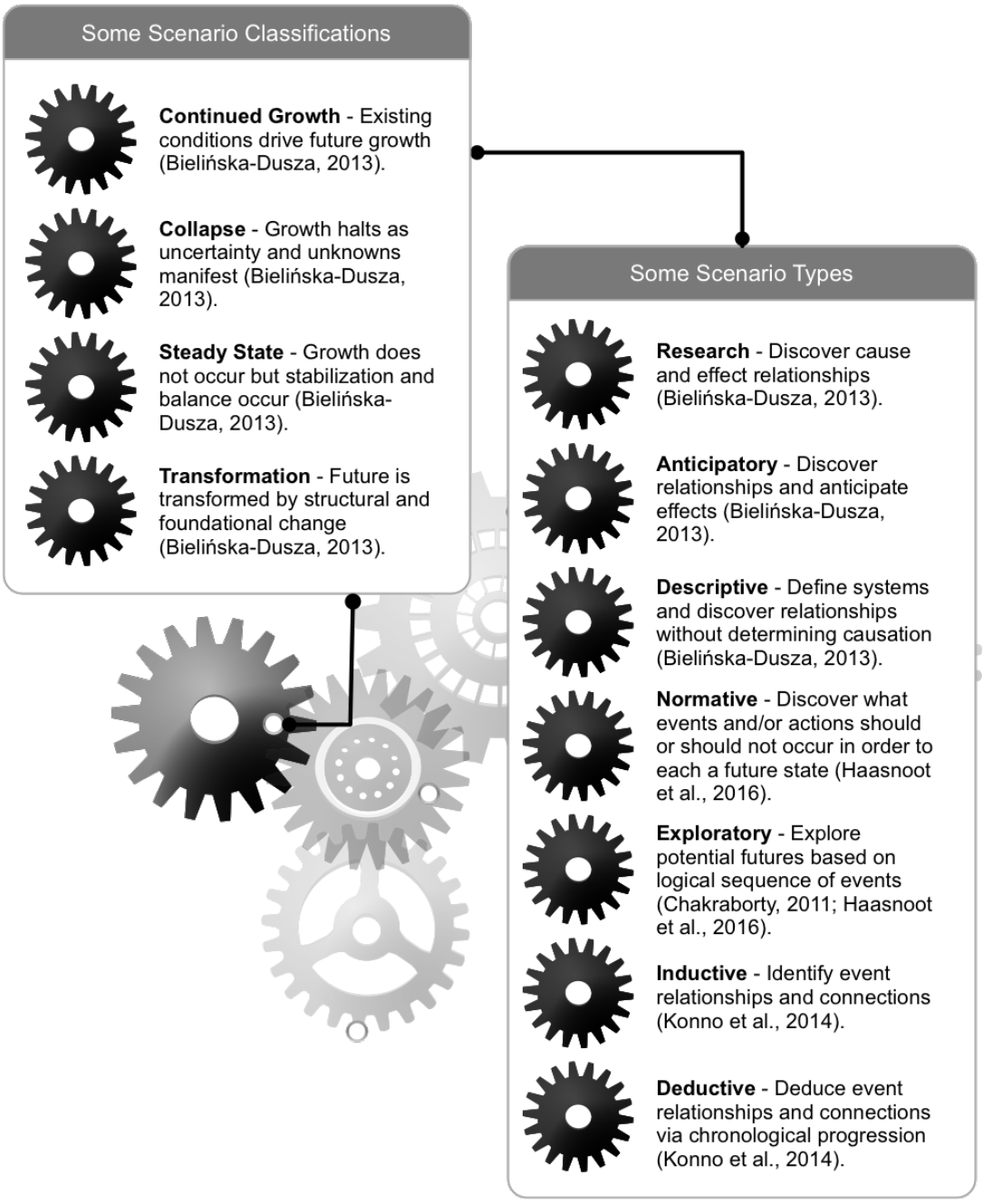


*Figure 5.* Scenario types.

Within the scenario planning literature, there is no clear consensus or authoritative guidance regarding the number of scenarios that planners should generate. However, quasi-conflicting prescriptive recommendations exist. For example, Amer et al. (2013) concluded that between one and five scenarios are necessary to support adequate scenario planning. Moreover, Amer et al. pointed out that numerous researchers have asserted that between two and four scenarios are necessary for scenario planning to be meaningful and successful.

Amer et al. (2013) found that the use of one scenario equated to the use of a most likely scenario, which is convenient but insufficient to consider alternative potential future states and alternative actions, possibilities, and interactions. The use of two scenarios tended to focus on positive and negative scenarios providing opposing potential future states; however, overly positive and negative scenarios could impugn sensemaking and planning effectiveness. Furthermore, at least two scenarios were required for planners to detect uncertainty. Three scenarios tended to include a positive, negative, and middle ground (most likely) scenarios, but leaders need to take care to avoid shifting the focus to the middle ground scenario. To overcome the issues associated with one to three scenarios, four is a suitable number because leaders and planners could avoid pitfalls while maintaining acceptable cost, benefit, and risk ratios (Amer et al., 2013).

There is a tendency among authors to ground the number and type of scenarios on the scenario planning application. For example, Ergashev (2012) asserted that leaders only needed a few scenarios with a focus on worst-case scenarios for financial operations risk modeling. When determining the number and type of scenarios the driving decision-

making variable is sensemaking. Historical sensemaking refers to how individuals construct meaning based on experience while prospective sensemaking is focused on individuals considering the past and conceptualizing the present while visualizing the future (Ramírez & Selin, 2014). If leaders do not use enough valid scenarios for participants to make complete sense of potential future states, scenario planning efforts will be impugned (Moriarty, 2012). However, too many scenarios burden the scenario planning effort and diminish sensemaking due to quantity, and the amount of information participants can process (Amer et al., 2013).

Researchers have identified several scenario planning guiding principles that when successfully implemented arguably yield valid scenarios and enhance scenario planning efforts. Bielińska-Dusza (2013) found nine guiding principles that leaders could use to generate useful scenarios and facilitate scenario planning success. One such principle was the principle of accuracy and objectivity. The intent of adherence to this principle is to yield scenarios that are thorough, realistic, and objective. Furthermore, when leaders developed multiple scenarios, the application of the principle of accuracy and objectivity aided leaders in the development of independent scenarios rather than multiple permutations of the same scenario (Bielińska-Dusza, 2013).

A second principle aimed at enhancing the overall scenario planning effort is the principle of significance. Under the principle of significance, leaders must strategically align scenario planning efforts with other strategy development processes and relevant to the organization, the organization's environment, and intended outcomes (Bielińska-Dusza, 2013). Amer et al. (2013) underscored the principle of significance as a vital to

ensure that scenario planning efforts remain inherently relevant and relevant in relation to any other tools used within an organization.

Organizational leaders have used scenario validation criteria to help ensure scenarios in unto themselves are relevant. Thus, leaders and scenario planners have used validation criteria to help ensure that the scenarios developed are useful to the overall scenario planning effort. Some scenario validation criteria include plausibility, consistency, utility, challenge, and differentiation (Amer et al., 2013).

Plausibility and probability are the most important scenario validation criteria. Under the plausibility and probability criteria, scenarios need to be realistic and based on potential future states that could realistically occur (Alexande et al., 2012; Amer et al., 2013; Moriarty, 2012). However, the rigid application of the plausibility and probability criteria could undermine scenario planning efforts because rigid application could unduly encourage participants to focus solely on what is known and available data; thus, prevent participants from identifying unknowns and considering alternative futures based on variables that have not yet emerged (Ramírez & Selin, 2014).

Alexande et al. (2012), Amer et al. (2013), and Moriarty (2012) identified consistency and coherency, as important scenario validation criteria. Under the consistency and coherency criteria, the logic and flow built into the scenarios should be consistent and not contradictory. The implication is that scenarios that do not represent future states that could occur and/or scenarios constructed without coherent, logical foundations are not useful (Alexande et al., 2012; Amer et al., 2013; Moriarty, 2012).

Amer et al. (2013) identified the utility criterion that referred to scenario relevance and ensuring scenarios are relevant to the intended application of scenario planning. Utility also involves ensuring leaders align scenarios with the desired scenario planning benefits. Under the utility criterion, scenarios should include variables and drivers that support the discovery of unknowns, understanding complexity, and addressing uncertainty in a way that is insightful and can support strategy development and organizational decision-making (Amer et al., 2013).

Organizational leaders and scenario planning participants should apply the challenge criterion to ensure scenarios challenge the status quo as well as traditional wisdom and thinking (Amer et al., 2013). Under the challenge criterion, scenarios developed by participants should force the participants to challenge their assumptions and think about situations and potential future states differently (Amer et al., 2013). Leaders and scenario planning participants should use the differentiation and creativity criterion to help ensure scenarios represent creative thinking and are foundationally different, not just minor variations of the same theme and/or scenario (Amer et al., 2013).

**Scenario Development and Analysis**

There is no one-size-fits-all approach to scenario development and analysis (Amer et al., 2013). However, scenario analysis is predominately qualitative and therefore, relies on the knowledge and experience of the participants (Amer et al., 2013; Derbyshire & Wright, 2017). There are at least five classifications of scenario planning approaches (Amer et al., 2013).

One classification is the intuitive logistics approach. Under intuitive logistics approach, the underlying assumption is that complex and complicated relationships exist between economic, political, technological, social, resource, and environmental variables that affect an organization (Amer et al., 2013; Cairns et al., 2016). Furthermore, under the intuitive logistics approach, leaders and participants explored both potential futures and multiple paths to those futures (Derbyshire & Wright, 2017). Derbyshire & Wright also found that the intuitive logistics approach has been useful in the development of flexible and internally consistent scenarios that have enabled the discovery and understanding of relationships between variables; thus, enhanced organizational decision-making.

Derbyshire and Wright (2017) asserted that there are eight stages to scenario development under the intuitive logistics approach. Stage 1 is for scenario developers to determine the questions to examine and/or the concerns to address. Stage 2 is for developers to determine driving forces in the form of a multiplicity of causes. Stage 3 is the clustering of driving forces. Stage 4 is for developers to determine potential causal relationships between the clusters of driving forces. Stage 5 is the creation of an impact and uncertainty matrix to identify how driving forces could affect each other as well as identify uncertainty as it relates to cross-impacts. Stage 6 is framing the scenarios via the identification of critical and extreme outcomes based on the uncertainties previously identified. Stage 7 is the scoping of scenarios. Stage 8 is the development of specific scenarios (Derbyshire & Wright, 2017).

A second classification is the probabilistic modified trends approach. Amer et al. (2013) found that the probabilistic modified trends approach incorporates trend impact analysis and cross-impact analysis under the belief that leaders and planners should consider the ramifications of unknown future events in tandem with historical data. Furthermore, it is inadequate to base future predictions and forecasts solely on historical events and data. Thus, leaders have used the probabilistic modified trends approach to extrapolate trends with probability-based modifications (Amer et al., 2013).

A third classification is the French School - La Prospective approach. The La Prospective approach is an analytical outcome-oriented approach with a primary focus on quantitative analytics using complex computer models (Amer et al., 2013; Moriarty, 2012). Under the la prospective approach, scenarios contain a narrow scope, but participants examine a wide range of variables (Moriarty, 2012).

A fourth classification is the extreme worlds approach. The crux of the extreme worlds approach is to create opposing positive and negative (polar extreme) future scenarios based on a focal issue or uncertainty (Moriarty, 2012). Once participants construct the opposing scenarios or extremes, participants identify the points of convergence including plausibility and probability to create plausible scenarios for further analysis. Thus, participants start with constructing two extremes and then work toward the middle (Moriarty, 2012).

A fifth classification is the driving forces approach. The driving forces approach involves the scenario planning team's (a) identification of uncertainties, (b) identification of the variables that may be related to the uncertainties, (c) categorization of the variables

based on impact and probability, and (d) search for the underlying driving forces related to each variable, across variables, and the interactions between the variables (Moriarty, 2012). Once the search is complete, planners cluster the driving forces, examine for coherence, and then build the driving forces into scenario narratives for analysis (Moriarty, 2012).

Leaders have used several qualitative development and analysis methods within any one or more of the five approach classifications. Collaborative analysis such as the Delphi method is one method of qualitative scenario development and analysis (Harris, 2013). The Delphi method is a structured method designed to enable a group to process, understand, and develop solutions to complex problems. Key elements of the Delphi method include individual knowledge contributions, feedback, group view and judgment assessment, and the opportunity to revise views that may involve conditions of anonymity and confidentiality (Borch et al., 2013; Harris, 2013). Participants use the Delphi method to produce relevant scenarios and as a form of scenario analysis (Borch et al., 2013)

The multiple-axes method is a second form of qualitative scenario development and analysis. Under the multiple-axes method, participants create four contrasting scenarios associated with an area of interest or outcome (Borch et al., 2013). Participants use four quadrants to categorize variables based on impact and uncertainty. Scenario planners derive scenario narratives from each quadrant taking into account events and trends relevant to the variables within each quadrant (Borch et al., 2013).

Deal, Pallathucheril, Pan, and Timm (2017) identified back-casting is a third method of qualitative scenario development and analysis. Back-casting involves the definition of a desired end state, and then participants develop scenarios by working backward to the current state to identify the variables involved in achieving the future state. Participants identify preconditions to link the present to the future including the strategies that leadership could use to manipulate the variables; therefore, achieve the desired future state (Deal et al., 2017).

Conversely, Deal et al. (2017) identified past-casting as a fourth method for scenario development and analysis. Past-casting is the reverse of back-casting wherein participants start from the current state and recast the past and work backward from the present to the past. The intent is to understand how the organization got to the present as part of the identification of variables and drivers that could affect getting to a future state. Past-casting is an act of learning from the past to achieve a desired future (Deal et al., 2017).

There are numerous quantitative methods that leaders have used during scenario development and analysis based on historical and statistical data (Stepchenko & Voronova, 2014). Some quantitative scenario development and analysis methods include cross-impact analysis, interactive future simulation, trend impact analysis, loss distribution approach, and emulation (Amer et al., 2013; Ergashev, 2012). Leaders have geared the application of quantitative methods toward data-driven scenario development, analysis, and validation including the identification of variables and the establishment of

relationships between variables while evaluating predictability and plausibility (Amer et al., 2013).

Cross-impact analysis (CIA) represents a set of processes leaders have used to determine strings of potential future events and the potential impact each string could have on the other potential strings (Amer et al., 2013). Thus, the crux of CIA is the determination of the probability of event occurrence based on the occurrence of other events. The mechanism for determination is the development of statistical probability models that include causal relationships and trends (Amer et al., 2013).

Amer et al. (2013) asserted that interactive future simulation (IFS) is a quantitative scenario development and analysis method with a focus on customer orientation and business dynamics based on cause and effect relationships. The statistical models leaders have used as part of IFS are both correlational and predictive. The intended result of using IFS is an understanding of relationships in support of contingency planning and the identification of early warning signs associated with existing and future changes in the environment (Amer et al., 2013).

Trend impact analysis (TIA) involves the systematic integration of statistics including extrapolations and probability (Amer et al., 2013). TIA includes the combination of statistical models, historical data, and probabilities. Via the use of TIA, participants can consider the impact of unpredictable or unprecedented future events and future states (Amer et al., 2013).

The loss distribution approach (LDA) is an operational risk modeling method that includes a statistical framework for modeling the severity and frequency of losses

(Ergashev, 2012). By measuring the frequency and distribution of losses across two distributions, such as worst in a given day and worst in a given year, participants calculate a total loss distribution. Monte Carlo simulation is the primary tool associated with the LDA method (Ergashev, 2012).

Emulation is a quantitative scenario analysis method that involves the use of computer simulations based on statistical models. Blaker, Goldstein, and Williamson (2012) found that within the emulation method, participants develop complex simulations and the integration of emulation enables participants to inject uncertainty into simulations by altering the parameters associated with the variables built into the simulation model. The crux of emulation is enabling a simulation to take into account uncertainty and variation within a statistical modeling framework that can natively cope with uncertainty (Blaker et al., 2012).

Leaders and planners could integrate most scenario development and analysis methods; therefore, create a mixed method, the multi-criteria decision analysis (MCDA) framework is an inherently mixed method. MCDA is a rigorous approach to decision-making where multiple evaluation criteria and decision variables exist, and leaders consider the interaction of the evaluation criteria and decision variables as part of the decision-making process (French, Rios, & Stewart, 2013; Montibeller & Ram, 2013). French et al. and Montibeller & Ram found that the application of MCDA assisted with goal clarification, value-focused thinking, decision modeling, and structured evaluation while mitigating the risk of overlooking concerns, interests, important criteria, and the relationships between criteria. Additionally, the quantitative modeling and forecasting

equations built into the MCDA framework can compensate for uncertainties. However, MCDA is a tool for making decisions where multiple criteria exist, but MCDA does not contain a framework for leaders to determine the decisions that individuals need to make and initial evaluation criteria (French et al., 2013)

The application of MCDA to scenario analysis enables participants to evaluate the validity, value, depth, and comprehensiveness of strategies and options as part of scenario analysis post scenario development (Montibeller & Ram, 2013). The main benefit is encouraging thought regarding how leaders can improve strategies to mitigate risk and consequences while also identifying opportunities based on single scenarios and across scenarios where deep uncertainty exists. MCDA includes the qualitative identification of strategic questions, uncertainties, priorities, and variables based on experience and the assessment of historical information as well as research leading into scenario development. Post scenario development, participants apply quantitative statistical analysis using the variables and weights derived qualitatively to each scenario and across scenarios and identify options and the value of each option. Participants then calculate cost equivalents and the potential for regret related to each option across multiple scenarios (Montibeller & Ram, 2013). Using the scenario planning as a machine metaphor, I have summarized and represented some of the qualitative, quantitative, and mixed method scenario development and analysis methods as gears in Figure 6.

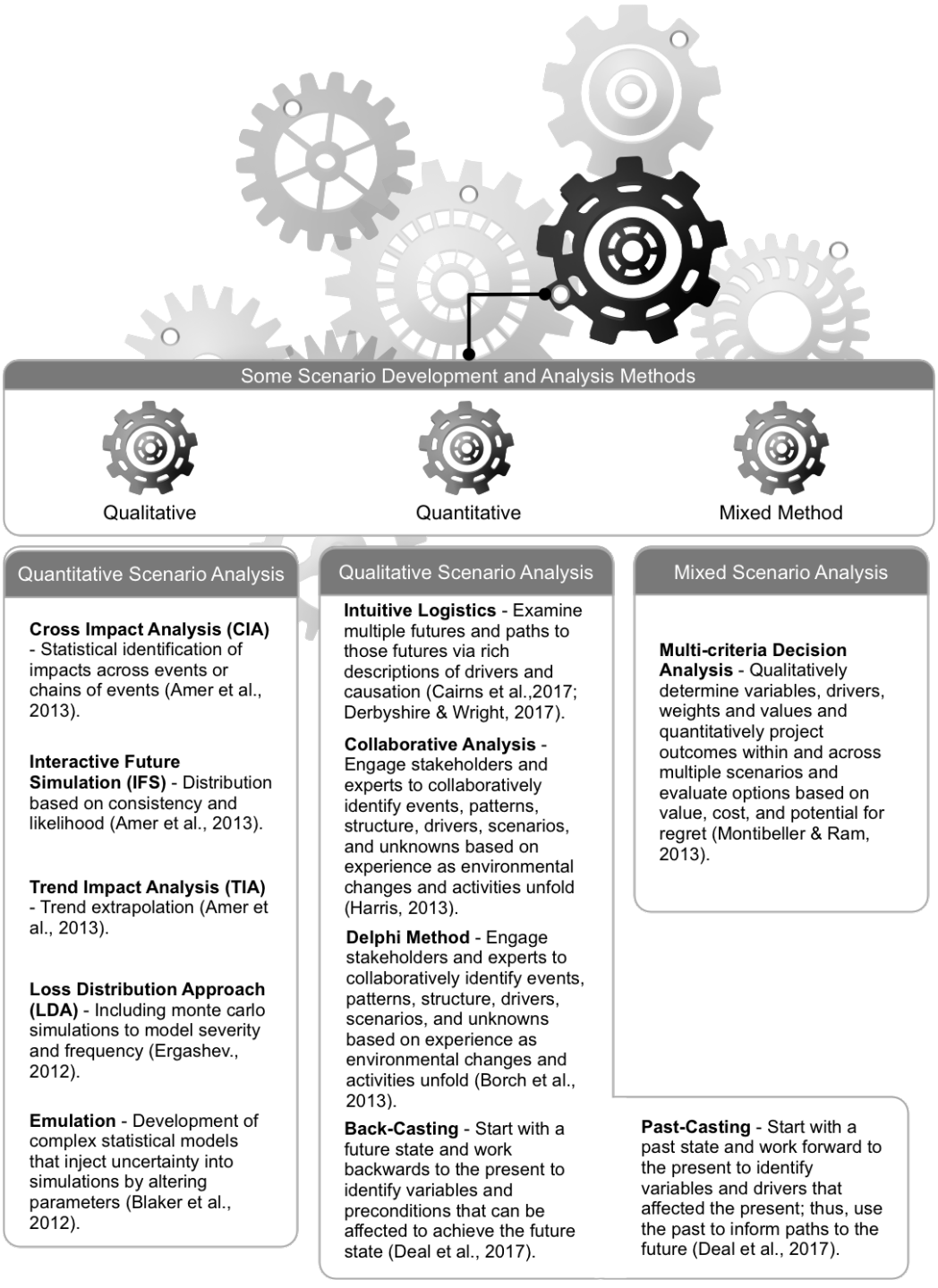


*Figure 6.* Scenario development and analysis methods.

**Scenario Planning Participants**

Scenario planning is a team sport facilitated by individuals capable of thinking under scenario terms. Several scenario planning participant thinking patterns and thought processes increase the potential for scenario planning success. For example, scenario planning participants capable of long-term, future-oriented, and big-picture thinking enhanced scenario planning efforts (Konno, Nonaka, & Ogilvy, 2014a).

Predictive thinking is another important scenario planning participant trait. Predictive thinking involves the ability to identify situational and environmental variables, indicators, and drivers to identify things that may or will occur coupled with the likelihood of occurrence (Borch et al., 2013). Borch et al. concluded that predictive thinking is critical to scenario planning because scenario planning requires an ability to assess the current environment and identify not only what may drive future events, but the likelihood related to how future events may unfold.

Borch et al. (2013) asserted that scenario planning requires participants that can think in eventualities. Eventualities thinking involves thought process where participants are open and able to envision diverse types of events and future states that may include a high degree of divergence. The implication for scenario planning is that eventualities thinking is foundational to the ability to look at the current environment and visualize different divergent potential futures (Borch et al., 2013).

Moreover, Borch et al. (2013) found that visionary thinking is another essential participant trait. Visionary thinking is rooted in a scenario planning participant's ability to identify conditions, variables, and uncertainties while considering how leaders could

influence and achieve desired future outcomes. Visionary thinking provides a foundation for the participant's ability to identify environmental drivers and uncertainties as well as understand how leaders can influence drivers to achieve desired outcomes (Borch et al., 2013).

Ogilvy (2014) concluded that successful scenario planning hinges on participants who are balanced thinkers and possess an ability to overcome the challenges associated with positive and negative thinking. Scenario planning teams generate negative scenarios when thinking of what could potentially go wrong which can lead to pessimism. Scenario planning teams generate positive scenarios via the consideration of what could go well which can lead to optimism. Ogilvy identified a trap associated with negative and positive scenarios wherein negative scenarios were too easy for scenario planning teams to write and intellectually accept whereas scenario planning teams may dismiss positive scenarios as lacking plausibility or as wishful thinking. Leaders facilitated useful scenario planning when participants could consider negative scenarios based on fears, concerns, and what could go wrong without falling into pessimism traps. Trap avoidance was contingent upon participants considering positive scenarios based on desired future states while avoiding overly optimistic views (Ogilvy, 2014).

Balanced thinking requires an open mind with a holistic view where participants balanced negative future thinking and scenarios with positive thinking and scenarios (Konno et al., 2014a; Ogilvy, 2014). The implication is that leaders should avoid predominately pessimistic individuals because they may be dismissive of the positive; thus, drag a team down. However, leaders need to avoid primarily optimistic individuals

with a tendency to downplay the negative (Ogilvy, 2014). To achieve the required balance, leaders should select knowledgeable individuals that can accept and desire the positive while respecting the potential for the negative (Konno et al., 2014b).

Konno et al. (2014a) found that in addition to participant thinking patterns that lend themselves to successful scenario planning, existentialism was critical. The philosophy of existentialism is rooted in the notion that who someone is results from what someone does as well as the choices someone makes. Furthermore, someone's present existence and current/future choices determine the future versus who someone was and past choices. Existentialism is also underscored by participant acceptance of the premise that any thoughts of what someone always will be, based on what someone has been, are limiting and constraining regarding what someone could become (Konno et al., 2014a).

The implication of existentialism is that the present is not like the past, but the present is the result of past choices; thus, the future will not be like the present as determined by current choices (Konno et al., 2014a). Moreover, creativity and novelty are always possible, prospects and priorities are finite, but creative choices and actions create opportunities that would not otherwise exist. The implication of existentialism regarding scenario planning is that a philosophy among participants where an organization's future is not limited by the past, current choices dictate the future, and creative choices and actions create opportunity results in the ability to envision and plan based on the consideration of potential future states that were not preordained (Konno et al., 2014a).

Optimal scenario planning teams are comprised of diverse, imaginative, and knowledgeable individuals that embrace creativity and innovation as well as recognize scenarios as pictures of potential future states that provide context for future-oriented planning (Konno et al., 2014a). Konno et al. (2014b) concluded that an effective scenario planning team would be comprised of 15 to 25 individuals because less than 15 may result in too little diversity while more than 25 may equate to too many diverse opinions that could impugn the process. Borch et al. (2013) expanded on the need for diversity and found that the broader the team, the better the odds of producing rich descriptions of potential future states expressed as scenarios. The inclusion of individuals that can envision the future differently, see relationships differently, and connect concepts in new ways is of paramount importance to scenario planning (Konno et al., 2014b).

As leaders seek to construct successful scenario planning teams, it is important to include diverse types of individuals (Freeth & Drimie, 2016). Specifically, it is important to include individuals with the authority to make decisions, the means and temperament to be effective change agents, external experts, consultants, senior leadership, as well as internal and external stakeholders, (Freeth & Drimie, 2016; Konno et al., 2014a). Leaders should avoid grandstanders, as well as individuals that are domineering, cynical, argumentative, and pompous as these types of individuals, can seriously impugn and undermine success (Konno et al., 2014b). In Figure 7, I have represented some successful scenario planning thinking patterns and recommended participants as gears in a scenario planning machine.

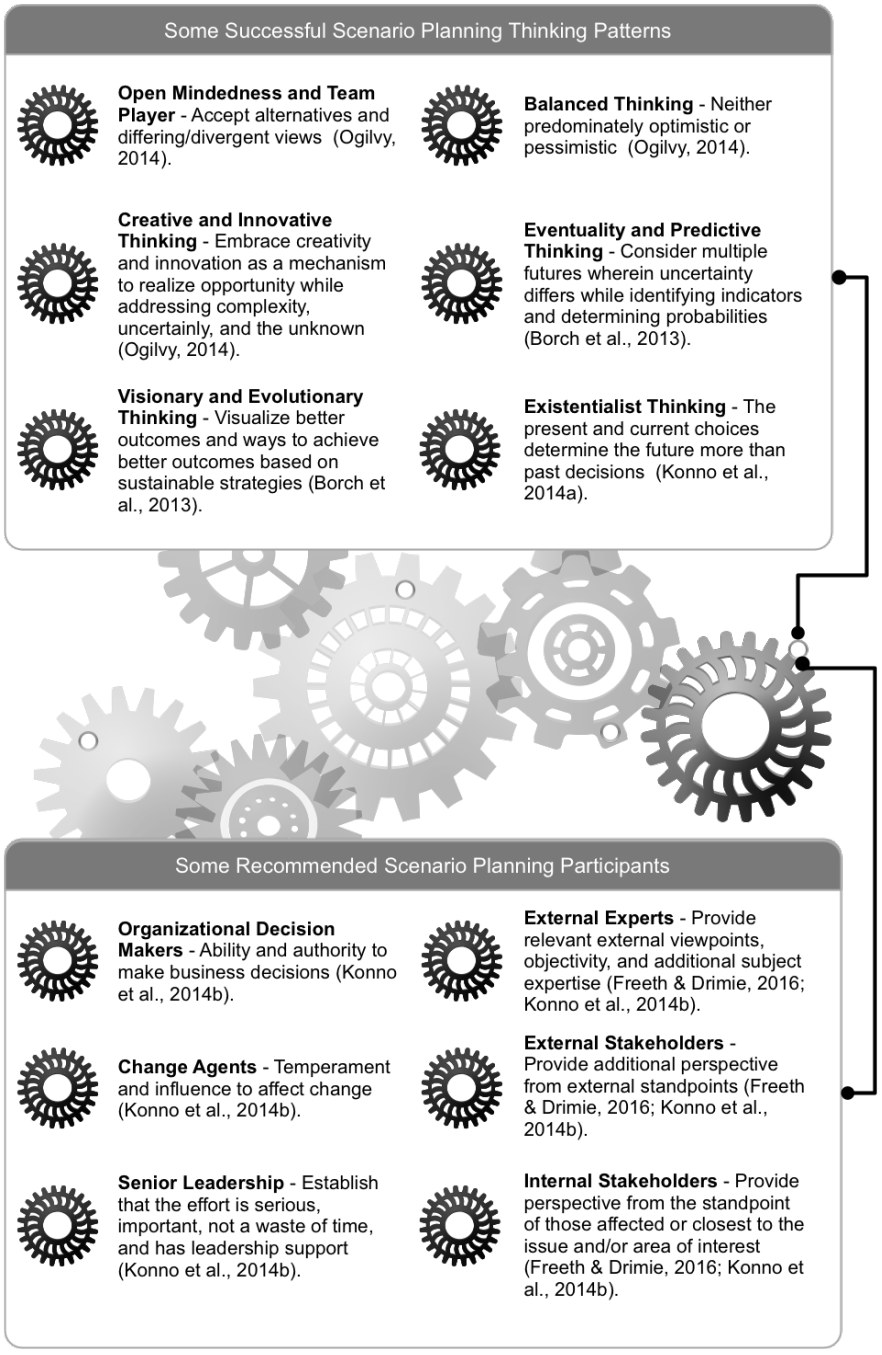


*Figure 7.* Scenario planning thinking patterns and participants.

Discussion of the type and nature of individuals to include in scenario planning efforts and team composition may give rise to questions regarding how to find and screen scenario planning candidates. Konno et al. (2014b) concluded that leaders could use in-person interviews to set the stage for scenario planning. Leaders could use an interview process to prescreen participants because conducting interviews could build trust and provide an opportunity to observe the potential participant's work environment, interaction tendencies, and body language (Konno et al., 2014b).

**Scenario Planning Processes**

Numerous assertions exist within the scenario planning literature regarding optimal scenario planning processes. Some assertions involved a general scenario planning process, while others involved a process related to a specific application of scenario planning (Wei-Hsiu & Woo-Tsong, 2015). The degree of guidance within the various process assertions varies, which may reinforce organizational perceptions that the process is nebulous and confusing. However, when compared side by side, a pattern emerged. To illustrate the pattern, I have compared four scenario planning processes. Two of the scenario planning processes were general processes, one of the scenario planning process involved performance-based scenario planning, and one was a transformative scenario planning process.

The first scenario planning process was a three-phase eight-step general scenario planning process identified by Konno et al. (2014b). Under the general process, the first phase included two steps. Step 1 was to select participants, and Step 2 was to conduct

requisite research. Phase 2 included conducting the first scenario planning workshop and included Step 3 through Step 6. Step 3 was to identify the central issue and purpose for the specific scenario planning effort. Step 4 was to identify key factors. Step 5 was to identify environmental forces and determine the critical uncertainties coupled with the identification of known unknowns. Step 6 was to determine the scenario logic such as what type of scenarios, the number of scenarios, and general development tactics. Step 6 concluded with actual scenario development. Phase 3 involved conducting a second workshop and included Step 7 and Step 8. Step 7 involved scenario analysis, the identification of implications, and strategy development. Step 8 was the identification of the early indicators the organization could use to determine which scenario/s were unfolding (Konno et al., 2014b).

Stepchenko and Voronova (2014) identified a second general scenario planning process. The general process was a six-step process. Step 1 was to define the objective and scope of the scenario planning effort including the definition of the issues for incorporation and the critical variables. Step 2 was to define key drivers including external drivers, internal drivers, and the relationship between drivers. Step 3 was to collect and analyze qualitative and quantitative data including appropriate measures and assessment of degrees of predictability. Step 4 was to develop scenarios that included constructing the scenarios, generating the narratives, testing the scenarios against the data collected, updating scenarios, and establishing the scenario evaluation criteria. Step 5 was to analyze and apply the scenarios, which incorporated (a) testing the sensitivity of various strategies and plans under the terms of each scenario, (b) constructing new and

adapting existing strategies, and (c) communicating the new and/or updated strategies. Step 6 was to maintain and update scenarios while integrating indicators with performance metrics, refreshing and updating scenarios as the future unfolded, and repeating the planning process as needed (Stepchenko & Voronova, 2014).

A third scenario planning process was a performance-based scenario planning process identified by Chermack, Gauck, et al. (2012). The performance-based process was a seven-step process. Step 1 was for leaders to gather inputs regarding the need for scenario planning, issues for participants to examine, problems, and history surrounding the issue and/or need. Step 2 was preparation which included leadership defining the purpose, scope, timeframe, participants, and expected outcomes. Step 3 was exploratory and involved participants conducting external environment analysis, internal environment analysis, and deep forces analysis all of which may include the use of strategy development tools such a strengths, weaknesses, opportunities, and threats (SWOT) analysis. Step 4 was scenario development including (a) brainstorming; (b) identification of forces; (c) identification of uncertainties; (d) identification of complexities; (e) identification of unknowns; (f) establishing the scenario logics such as types, processes, and analysis methods; then (g) writing the narratives. Step 5 was scenario implementation that revolved around participant examinations of the questions, immersion, testing, strategy analysis, and strategy development. Step 6 was for participants to conduct a scenario planning assessment which included (a) reexamination of the purpose, (b) assessment of the degree of satisfaction with the scenario planning effort, (c) assessment of the knowledge gained, (d) assessment of expertise acquired by

the team, and (e) assessment of the system and financial measures developed. Step 7 was for participants to generate the scenario planning outputs that included (a) an increased understanding of dynamics, (b) new insights, (c) shared understanding, (d) aligned systems, and (e) robust strategies (Chermack, Gauck, et al.).

The fourth process was a transformative scenario planning wherein the intent was to leverage the act of scenario planning to start conversations and expand the views of the participants (Freeth & Drimie, 2016). The transformative scenario planning process articulated by Kahane (2012) was a 5-step process. Step 1 was to convene a complete organizational system scenario planning team. Step 2 was to observe the current state of the organization and the environment. Step 3 was to construct the scenarios. Step 4 was to discover what leadership could and should do to achieve the desired transformation. Step 5 was to take action (Kahane, 2012).

I examined the four processes side by side and considered them collectively and a common pattern emerged. For example, all four of these processes involved (a) the selection of participants, (b) analysis, (c) developing an understanding of the current environment, (d) actual scenario development, (e) scenario analysis, and (f) the development and execution of resulting strategy. The implication is that organizational leaders have the option to choose a scenario planning process and/or customize an existing process to meet the needs of the organization within the confines of the resources and knowledge available. As a result, leaders could consider the scenario planning process a gear in a scenario planning machine. I have illustrated the four scenario planning process and pattern identified between the process using the scenario planning

machine metaphor in Figure 8.

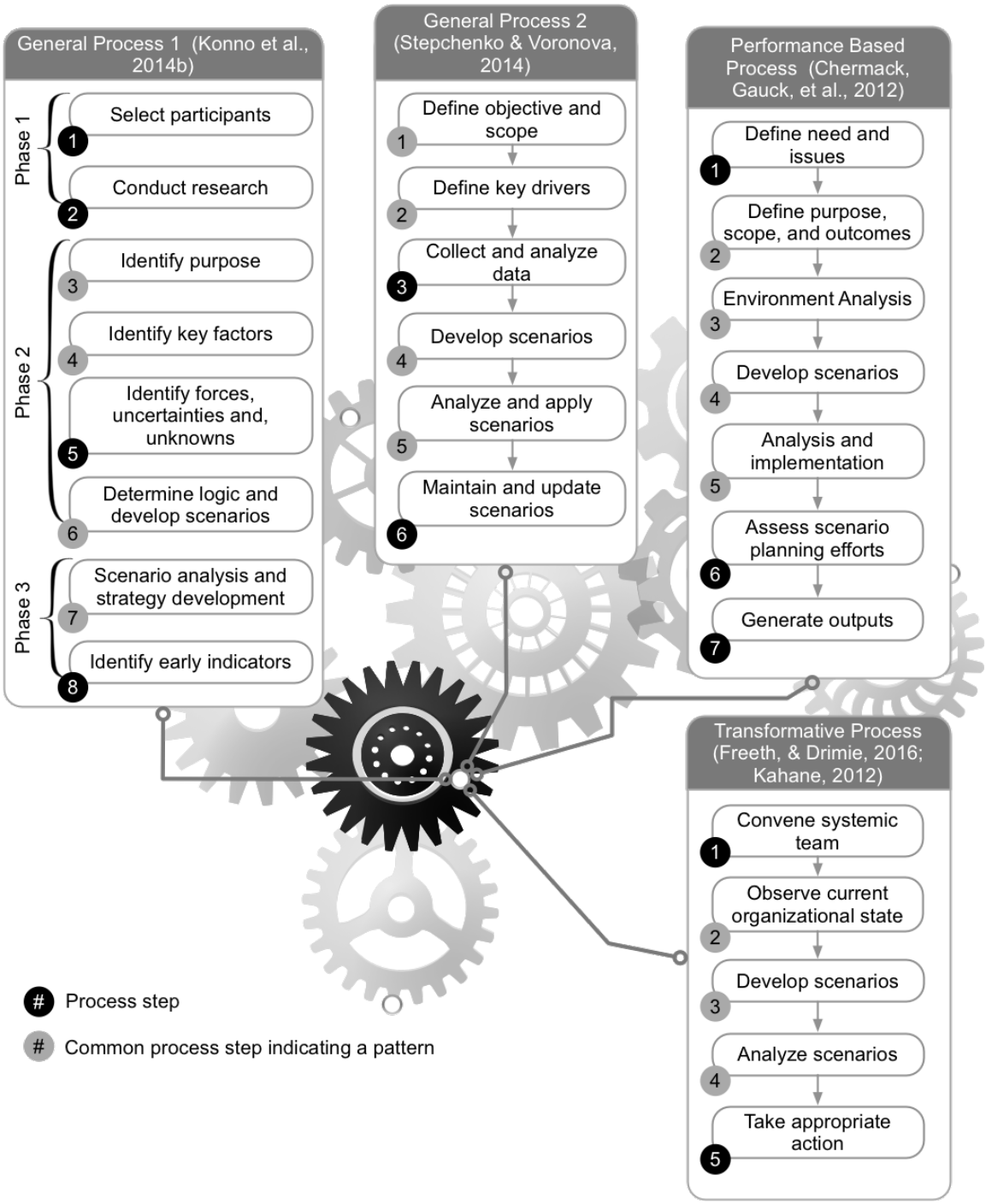


*Figure 8.* Scenario planning processes cross-comparison and pattern.

Regarding the setting for conducting scenario planning, there is an opinion among some authors that scenario planning should occur in an isolated environment such as an off-site environment (Konno et al., 2014b). Konno et al., 2014b recommended that an optimal environment is one where the planning team can avoid distractions. Avoiding distractions includes ensuring the scenario planning team has enough time without conflicting commitments. Furthermore, leaders should strive for total engagement and attention on the part of participants to facilitate imaginative and creative scenario development (Konno et al., 2014b). Conversely, virtual scenario planning among remote participants has been an effective approach to reduce the cost and support resources required to successfully execute scenario planning, while increasing the knowledge and range of participants available to support scenario planning (Lynham & McWhorter, 2014).

**Scenario Planning and Strategy Toolkit Integration**

There are numerous strategy development tools that leaders can integrate into scenario planning that are also common strategy development tools. Some of the common strategy development tools that leaders can integrate with scenario planning include the Boston Consulting Group (BCG) growth-share matrix; strengths, weaknesses, opportunities, and threats (SWOT) analysis; Porter's five competitive forces analysis; simulation and gaming; value chain analysis as well as brainstorming and visioning exercises (Konno et al., 2014b). Additional strategy development tools that organizations have incorporated into scenario planning include multidirectional temporal analysis, technology road mapping, systems dynamics simulation, and balanced scorecard (BSC)

(Deal et al., 2017; Geum et al., 2014; Jafari et al., 2015). The event, pattern, structure system also has integration with scenario planning potential and utility (Harris, 2013). The reason for the integration of scenario planning with other strategy development tools, as part of a comprehensive strategy development toolkit, is the potential for two-way scenario development and analysis enhancement resulting in better strategy development (Konno et al., 2014b).

Rynca (2016) defined the BCG matrix is a portfolio tool used to help leaders understand the ability to obtain and maintain a position in a market. The BCG matrix is a prescriptive approach to determining when and where to allocate funds, maintain investments, allocate venture capital, and divest to achieve and maintain a leadership position (Rynca, 2016). The implications of the integration of BCG matrix with scenario planning may be the development and analysis of scenarios based, in part, on the BCG matrix and/or the use of scenarios to run what-if type simulations during BCG matrix development and strategic decision-making (Konno et al., 2014b).

Strengths, weaknesses, opportunities, and threats (SWOT) analysis is a strategy development tool that leaders have used to support the development of business strategies based on the identification, analysis, and cross-comparison of organizational strengths, weaknesses, opportunities, and threats (Ramooshjan, 2014). SWOT analysis may include the use of analysis to pair strengths with opportunities, strengths with threats, weaknesses with opportunities, and weaknesses with threats in the form of a SWOT factor matrix. As part of each pairing, leaders may develop a set of actions that would leverage one against the other to capitalize on strengths and opportunities, mitigate threats, and overcome

weaknesses (Ramooshjan, 2014). Some reasons for the integration of SWOT analysis with scenario planning may be to further understand the questions driving the scenario planning effort and enhance the definition of critical uncertainties based on current or potential future state strengths, weaknesses, opportunities, and threats (Konno et al., 2014b).

Leaders have used Porter's five competitive forces analysis to explore the competitive landscape and develop business strategies using a five competitive forces matrix (Ortega, Ángel, Delgado, Luisa, & Menéndez, 2014 Luisa, & Menéndez, 2014). Porter asserted that the five competitive forces include the threat of new entrants, barriers to entry, the threat of substitutes, the bargaining power of suppliers, the bargaining power of buyers, and competitive rivalry. The primary use of Porter's five competitive forces analysis has been the development of strategies that target sustainable competitive advantages (Cheng, 2013; Dobbs, 2014).

There are several reasons for integrating five competitive forces analysis with scenario planning. As Ortega et al. (2014) concluded an understanding of competitive landscape within the industry aids in the identification of strengths, weaknesses, opportunities, and threats relative to the industry and the organizations that operate within the industry. These types of insights facilitated the development of strategies that enabled an organization to (a) defensively position itself within the industry by identifying a location where the forces were the weakest, (b) take advantage of current and impending changes within the industry, and (c) increase competitive advantage by shaping the nature of competition through an understanding of the current competitive

landscape (Dobbs, 2014). Porter's five competitive forces analysis has also enabled strategists to understand why the competitive landscape is shaped in a particular way thus, has provided a useful tool for guiding strategy development (Cheng, 2013).

Organizational leaders have used simulation and gaming to enhance organizational learning and improve decision-making through the exploration of open-ended situations based on existing or potential realities (Ceschi, Dorofeeva, & Sartori, 2014). The implication for strategy development is that scenario planning exposes participants to a feedback loop that enables participants to see and understand the effect of strategic decisions. Furthermore, through a heightened understanding, participants can apply what they learned to real world situations and strategy development (Ceschi et al., 2014). One of the implications for scenario planning integration is that leaders can share scenarios between scenario planning and simulation and gaming efforts; thus, compliment both strategy development and organizational learning activities (Konno et al., 2014b). One form of modeling and simulation is systems dynamics simulation wherein scenario planning teams model and understand dependencies, relationships, as well as organizational and environmental system behavior over time-based on potential future events, activities, and/or actions (Geum et al., 2014).

Leaders have used detailed value chain analysis to examine organizational value chain activities as compared to competitors to identify the organization's strengths and weaknesses relative competitors (Manzini, Mazza, & Savino, 2013). Value chain analysis is based on nine organizational system elements identified by Porter, which were (a) management including structure, control, and culture; (b) research and development

(R&D) incorporating the development of products, services, and technologies that add value; (c) labor encompassing recruitment, training, and development; (d) procurement pertaining to the acquisition of resources including purchasing; (e) inbound logistics encompassing the delivery and warehousing of incoming resources and materials including the delivery to endpoints within the organization; (f) business operations ; (g) outbound logistics incorporating the delivery of goods and services to customers; and (h) sales including marketing and service, which typically referred to the ongoing support of products and services (Gradin, 2016). One implication of using value chain analysis as part of scenario planning may be the use of value chain analysis to identify variables and unknowns during scenario development and analysis while assessing and/or comparing the impact of potential future states (Konno et al., 2014b).

Brainstorming and visioning exercises have been useful tools during the scenario development and analysis process (Konno et al., 2014b). Brainstorming has been a valuable technique for generating and fostering creativity around a central theme (Alexander, Higgins, Levine, & Wright, 2015). Leaders have used visioning exercises to enhance the understanding of objects, concepts, and relationships by attempting to see them using one or more means of visualization such as data visualization (Laari-Salmela et al., 2015).

The Event, Pattern, Structure System (EPS) is a database tool used to capture relevant information such as articles, reports, research, legislation, and current events that participants then link to scenarios and environmental drivers (Harris, 2013). Participants use the EPS tool to collaboratively share, identify, and track internal as well as external

environmental changes and relate them to situations, variables, driving forces, and uncertainties within scenarios. The purpose of using EPS was to detect events, patterns, and underlying causes as scenarios unfold and the environment changes (Harris, 2013).

Strategists have used multidirectional temporal analysis to develop scenario models that grow and morph over time (Deal et al., 2017). In so doing, participants can consider multiple points in time; thus, adding an evolutionary factor to scenario development and analysis. By taking into account changes in the environment, drivers, and casual relationships that could occur as the organization and environment evolve as well as the influence variables have over other variables over time, more dynamic scenario planning can occur that would not be achievable if only considering a beginning and end state (Deal et al., 2017).

Scenario planning practitioners have integrated technology roadmapping to develop scenario-based roadmaps (Geum et al., 2014). The purpose was to assess how various technologies would need to evolve to meet market needs based on one or more scenarios. The use of technology roadmapping has enabled strategists to identify, analyze, assess, and project potential technologies and applications that would be necessary to maintain a competitive advantage given multiple potential futures (Geum et al., 2014).

Leaders have used the Balanced Scorecard (BSC) approach to measure organizational performance along four dimensions including learning and growth, internal business processes, customer, and financial performance (Jafari et al., 2015). Organizations have leveraged scenario planning as part of their BSC approach to

understanding performance. The purpose has been to prevent overlooking internal and external variables when assessing performance and to assess potential performance based on potential future eventualities (Jafari et al., 2015). Using the scenario planning as a machine metaphor, I have represented some of the strategy development tools that leaders could integrate with scenario planning as gears in Figure 9.

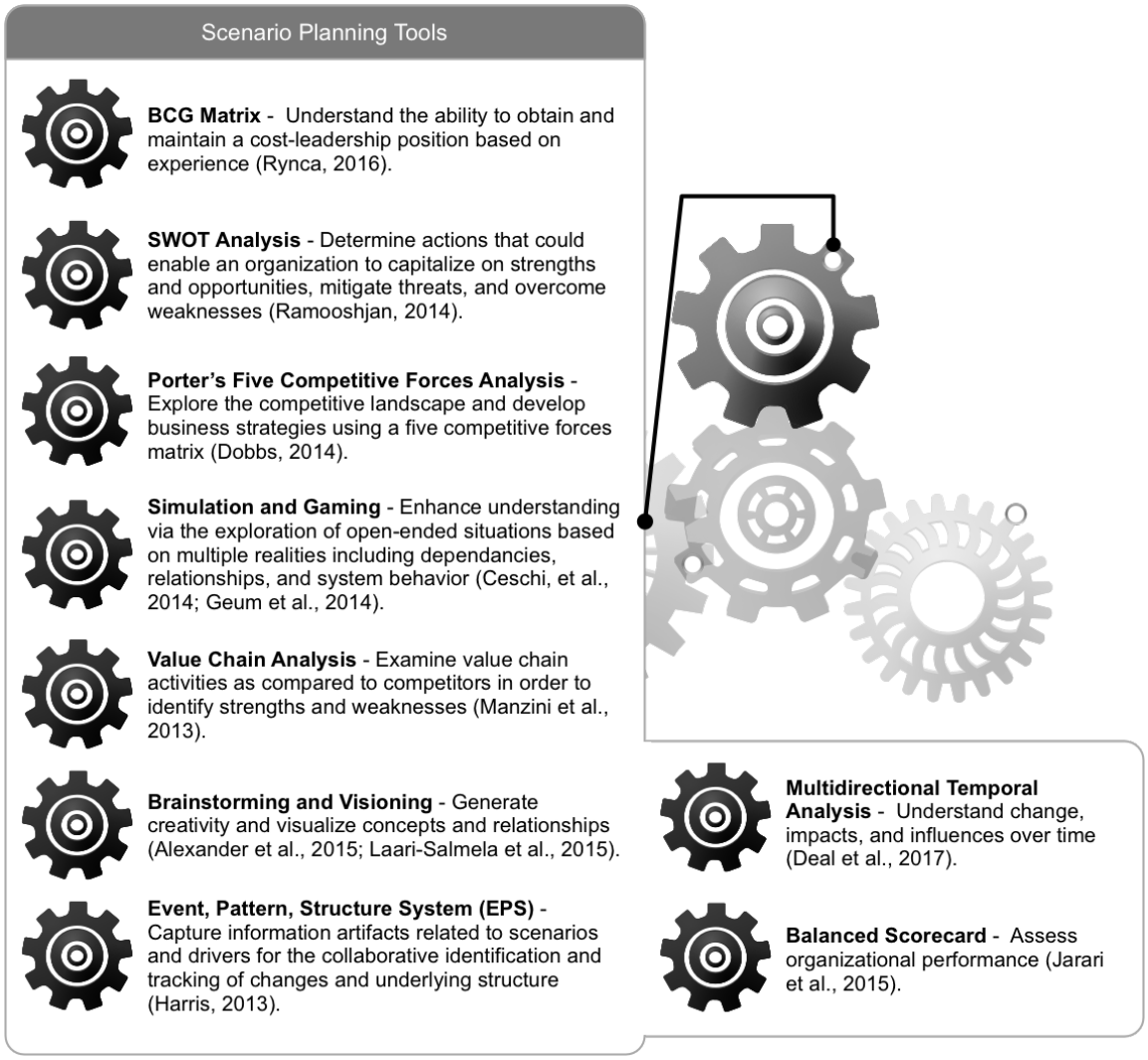


*Figure 9.* Strategy development tools integrated with scenario planning.

**Scenario Planning Criticisms**

Despite the potential benefits and applications, there are several scenario planning criticisms. A significant criticism noted by Bielińska-Dusza (2013), Chermack, Coons, et al. (2012), and Moriarty (2012) was that scenario planning lacked a defined theoretical or conceptual framework and standardized application processes. Bielińska-Dusza and Moriarty also pointed out that numerous and conflicting assertions within the literature regarding how leaders could and should apply scenario planning have exacerbated the lack of a defined framework. Moreover, there has been a growing disconnect between the academic analysis and discussion of the scenario planning concept and the application of scenario planning within organizations (Bielińska-Dusza, 2013). Chermack, Gauck, et al. (2012) and Ogilvy (2014) concluded that cognitive and motivational bias due to optimism, pessimism, judgment, hindsight, and foresight have impugned scenario planning efforts and thus provided a foundation for the inadequate cognitive ability to apply scenario planning within some organizations and among some participant's. Furthermore, scenario planning has been criticized on the basis of (a) naïve realism involving the acceptance of current realities as just being what they are and assumptions that the realities will persist into the future as is; (b) applications have been silo-based and did not look across the full organizational activity and unit spectrum; (c) applications were empirical with a tendency to be based only on quantifiable evidence that overlooked qualitative experience; (d) conflicting terms and concepts have been used in the literature such as interchanging scenario development, analysis, potential future, alternative future, and other terms associated with the scenario planning concept that has caused confusion;

(e) incorrect determinations of causality; and (f) misunderstandings regarding the relationship between variables which may have been the result of selecting incorrect or inadequate scenario development and analysis tactics (Moriarty, 2012).

**Integration of Scenario Planning, CAS Theory, and Chaos Theory**

Scenario planning is a future-oriented tool for addressing complexity, uncertainty, and the unknown. Scenario planning has the potential for application to a single business function such as risk management or a cross-functional areas such as risk, innovation, change, and program management. Scholars and leaders have used CAS and chaos theories as lenses to identify and understand complexity, uncertainty, and the unknown with an eye toward adaptability at the local (agent/s), entire system (organizational), and ecosystem (industrial) levels. Given that the business applications of scenario planning, CAS theory, and chaos theory are similar and include understanding and addressing complexity, uncertainty, and the unknown. CAS theory and chaos theory may represent unique perspectives if an organization wants to engage scenario planning with an eye toward organizational adaptability. Therefore, when combined, CAS theory and chaos theory may provide a suitable conceptual framework for the application of scenario planning as a tool to foster organizational adaptability. Thus, the combination of CAS theory and chaos theory is a suitable conceptual framework for this study.

I have also established the relevance of CAS and chaos theories as a conceptual framework by examining how scholars and leaders have applied scenario planning, CAS theory, and chaos theories. When looking across the various business applications, there is a strong degree of overlap between scenario planning, CAS theory, and Chaos theory

applications. For example, leaders have used all three in support of strategy development, business intelligence, operations management, organizational development, organizational decision-making, innovation management, change management, business process management, program management, risk management, crisis management, and contingency planning. Table 3 contains a cross-comparison of some scenario planning, CAS theory, and chaos theory business applications.

Table 3

*Comparison of CAS/Chaos Theory and Scenario Planning Applications*

| Business applications | CAS/Chaos theory | Scenario planning |
|---|---|---|
| Strategy development | Enhance future-oriented strategy based on complexity, uncertainty, and unknowns. | Enhance future-oriented strategy based on complexity, uncertainty, and unknowns. |
| Business intelligence | Identify dynamic internal and external patterns. | Scenario-driven identification of dynamic internal and external patterns. |
| Operations management | Incorporate adaptability into day-to-day operations. | Bolster creative climates and resilience. |
| Organizational development, leadership, and learning | Enhance nonlinear systems thinking and agent interactions emphasizing adaptability. | Foster dialog and inquiry, team learning, embedded systems thinking, leadership, system connection, empowerment, and double-loop learning. |
| Organizational decision-making | Enhance decisions with an eye toward consequence and adaptability. | Change, and enhance individual worldviews; including the reduction of political while enhancing efficiency, social, and systems-oriented thinking. |
| Innovation and technology management | Enhance innovation capacity and adapt to destabilizing innovation. | Identify, assess, select, develop, and implement opportunities with an eye toward enhancing innovation capacity. |
| Change management | Implement nonlinear 360-degree change approaches. | Identify signals of change, assess the impact, and develop implementation strategies. |
| Business process management | Develop dynamic adaptive polices and processes. | Conduct scenario-driven process and policy examinations / explorations and manage, adjust, and improve internal and cross-organizational business processes. |
| Program, portfolio, and project management | Identify, understand, anticipate, and adapt to structural, sociopolitical, and emergent complexity. | Identify, select, develop, and execute while understanding dependencies. |
| Risk management, crisis management, and contingency planning | Whole system and environmental risk assessment and mitigation before crises emerge with adaptive contingency planning. | Evaluate, manage, mitigate, and prevent risks and crises while developing strategies that apply to the widest array of possibilities. |

One major implication of conducting scenario planning in support of organizational adaptability using a CAS theory and chaos theory lens may be that scenario planning would then need to be an ongoing living effort. The need for continuous scenario planning within an organization could underscore the notion that organizations are CAS operating within complex ecosystems wrought with uncertainties and unknowns that change over time as agents interact, systems interact and evolve, and ecosystems evolve. As such, an organization's internal and external dynamics may include fluctuating periods of internal as well as external stability and instability. Using the scenario planning machine metaphor, this would mean that a scenario planning machine constructed by an organization would need to be a dynamic, adaptive, and living machine. As a living machine, organizations may need to interchange gears periodically based on the evolving needs of the organization as the organization continuously attempts to adapt. However, given that scenario planning is a tool for addressing uncertainties and unknowns, the use of a CAS theory and chaos theory lens with an organizational adaptability objective may provide additional cross-functional, whole system, and future-oriented insights into uncertainty and unknowns that could drive a need to adapt as well as opportunities for proactive adaptation.

## Transition and Summary

In summary, scenario planning is a tool for addressing complexity, uncertainty, and the unknown. Complexity, uncertainty, and the unknown may represent conditions that may require an organization to adapt to survive. However, some business leaders

may lack knowledge and insight regarding the use of scenario planning and what it means to engage scenario planning as an organizational adaptability tool.

This study was a qualitative interpretive phenomenological study. The purpose of this study was to explore the lived experiences of the selected executives regarding the use of scenario planning and what leaders need to know to use scenario planning as a means of adapting to extreme disruptive complex events. The reason for conducting a phenomenological study was to examine the experiences of selected executives in depth and beyond the confines of any one organization or industry.

Because scenario planning in unto itself lacks a clear conceptual framework, I selected CAS and chaos theories as a best-fit conceptual framework. The crux of CAS theory and chaos theory business applications has been to understand complexity, uncertainty, and unknowns with an eye toward adaptability. Given the overlap between the purpose of scenario planning and the business applications of CAS theory and chaos theory, CAS theory and chaos theory combined may provide a lens that leaders could apply to scenario planning with an eye toward adaptability.

Section 2 contains a detailed description of this study and protocols including participant recruitment, the qualitative method and interpretive phenomenological design, data collection, and data analysis methods. Section 2 also includes a rich explanation of ethical conduct and the establishment of reliability and validity.

Section 3 contains the presentation of findings. Section 3 also includes the application of the findings to professional practice, implications for social change, recommendations for action, and recommendations for future research. Lastly, Section 3

includes a personal reflection on my experiences with the research process while conducting this proposed study.

# Section 2: The Project

In Section 2, I provide a detailed description of this study and expand on the general description provided in Section 1. This section contains a restatement of the purpose, an explanation of my role as the sole researcher, a clear description of the participant population, and participant recruitment strategy. This section also contains (a) a detailed justification for the selection of a qualitative research method with an interpretative phenomenological design versus other research methods and designs, (b) a rich description of the data collection and analysis process, (c) an explanation of how this study adhered to stringent standards for ethical research, and (d) the measures for the establishment of reliability and validity.

## Purpose Statement

The purpose of this qualitative interpretive phenomenological study was to explore the information needed by executives regarding the application of scenario planning to adapt to extreme disruptive complex events. Twenty executives who had lived experience with extreme disruptive complex events and applied scenario planning to help adapt from a single large organization with executives distributed throughout the United States and executives from 10 state agencies participated in phenomenological interviews to share their experiences related to the application of scenario planning as a means adaptation regarding extreme disruptive complex events. The insights provided could help some business leaders develop scenario planning strategies and evaluate scenario planning efforts using an organizational adaptability lens. The achievement of organizational adaptability could have a positive effect on social change by mitigating the

societal impacts associated with business economic loss and failure such as the nonlinear effects on a community associated with job loss and diminished revenue.

## Role of the Researcher

I was the sole researcher. The role of a researcher for a qualitative interpretive phenomenological study includes identifying participants, recruiting participants, conducting phenomenological long interviews, conducting follow-up with participants (member checking), data analysis, and the presentation of findings (Alase, 2017; Wagstaff & Williams, 2014). Data collection and analysis included the ethical protection of the participants and research data (U.S Department of Health and Human Services, 1979, 2009).

I have engaged in scenario planning activities for over a decade in military, nonprofit, and for-profit environments. However, my engagement in scenario planning was for specific stovepipe purposes associated with extreme disruptive complex events and did not include overall organizational adaptability to extreme disruptive complex events. My involvement with scenario planning was response centric and did not include the use of a CAS and/or chaos theory lens, or the use of scenario planning as a tool for enhancing holistic organizational adaptability.

There was a preestablished professional relationship with two of the participants. However, the nature of the professional relationship did not include any senior, subordinate, or economic elements. The nature of the relationship was as a peer, and no personal relationship existed.

Researchers are responsible for conducting ethical research as outlined in the Belmont Report and 45 C.F.R § 46 regarding the ethical protection of human subjects. Therefore, as the sole researcher I was responsible for (a) maintaining boundaries between practice and research; (b) adherence to the ethical principles regarding respect for persons, benefice, and justice; (c) obtaining informed consent; (d) assessing risks and benefits; and (e) the ethical protection of participants (U.S Department of Health and Human Services, 1979, 2009). The Walden University Institutional Review Board (IRB) approved this study (IRB approval number 10-04-16-0456433) prior to participant recruitment and data collection; thus, the university and state IRBs provided approval before recruiting participants, conducting any interviews, and collecting any data. Participation was voluntary, and participants were free to withdrawal at any time without penalty or repercussion. Participants did not receive monetary or professional incentives for participation.

Due to my experience with scenario planning, the knowledge gained through the research process, and the nature of phenomenological studies, I paid special attention to epoché and bracketing. Epoché involves stripping away and setting aside any preconceived notions and the *natural attitude* regarding the meaning associated with a phenomenon (Butler, 2016; Moustakas, 1994). Bracketing is a process where the researcher identifies preconceived notions, biases, assumptions, theories, and previous experience with a phenomenon to set them aside and approach a phenomenon anew (Overgaard, 2015; Skea, 2016). Moreover, Broome (2013) concluded that maintaining

epoché throughout the research process and not just during data collection or analysis is crucial.

To achieve epoché and bracketing, I needed to set aside my preconceived notions of scenario planning based on my experience and the research process. Epoché and bracketing included setting aside any judgments regarding good, bad, successful, or unsuccessful, and what executives should or should not do, as well as any perceptions regarding scenario planning, organizational adaptability, and the meaning of both to a leader and/or an organization. Moreover, epoché and bracketing must include the experience throughout the research process and perceptions of the experiences of the participants. In other words, the researcher must consider the experience of each participant independently without bias based on either the personal experience of the researcher, or perceptions of the experiences relayed by other participants (Flowers, Larkin, & Smith, 2009; Moustakas, 1994; Wagstaff & Williams, 2014).

I employed several tactics to maintain epoché and bracketing. The first tactic was the delimitation of the scope to omit judgments and any value dimension unassociated with the meaning executives attributed to scenario planning as a tool for enhancing organizational adaptability. The second tactic was the selection of a data analysis method that required me to deliberately document and analyze my own experience as a precursor to examining the experiences of the participants. Thus, I was compelled to document and analyze my own perceptions and preconceived notions. The documentation and analysis of the researcher's experience illuminates perceptions and preconceived notions, bringing them to the forefront of the researcher's consciousness so that the researcher can bracket

them in support of epoché (Moustakas, 1994; Overgaard, 2015). Keeping a research journal aids researchers by documenting the experience with the research process and participants, thus assisting the researcher with the continuous identification of potential bias and notions that the researcher needs to bracket (Lamb, 2013; Nazir, 2016). A third tactic was to keep a reflective research journal and record thoughts and perceptions throughout the research process, including perceptions of the interviews and participants.

I used an interview protocol included in Appendix A to help capture participant experiences in a manner conducive to answering the research question. Phenomenological researchers use interview protocols to guide and structure phenomenological long interviews (Zohrabi, 2013). The use of an interview protocol aids in focusing conversations while still providing enough flexibility to capture the participant's experience with a phenomenon (Englander, 2012).

## Participants

Participants were executives from a single large national organization with executives distributed throughout the United States and executives from state agencies located within a single state. Because of the geographical distribution of executives within the selected organizations, the selection of a smaller geographical area was impractical. The selected organizations provided authorization to recruit participants. Appendix B contains a redacted copy of the authorizations.

The recruitment process associated with phenomenological research includes the identification, selection, and recruitment of potential participants by (a) identifying a pool of potential participants, (b) making initial contact, (c) verifying eligibility, and (d)

establishing trust (Alase, 2017; Wagstaff & Williams, 2014). To recruit participants, I implemented a recruitment process consistent with phenomenological research using a purpositive convenience recruitment method. Phenomenological researchers have well established the use of a purpositive convenience recruitment method (A. Wilson, 2015). Wagstaff and Williams (2014) concluded that a purpositive convenience recruitment method is an appropriate method because interpretive phenomenological study participants must have experience with the phenomenon, while convenience sampling enables the researcher to recruit participants from a known pool of potential participants who meet the participant selection criteria. Furthermore, Wagstaff and Williams used a purpositive convenience recruitment method to demonstrate specific design features of interpretive phenomenological studies. Lastly, the purpositive convenience recruitment method is an accepted and beneficial design feature of a well-crafted phenomenological study wherein the researcher can identify and has access to a pool of participants who meet the participant selection criteria (Emerson, 2015).

A purpositive recruitment method was appropriate because it is crucial to phenomenological studies that all participants have experienced the phenomenon under study (Bevan, 2014; Cooney, Dowling, Murphy, Sixsmith, & Tuohy, 2013 Sixsmith & Tuohy, 2013; Wagstaff & Williams, 2014). Therefore, to qualify, participants were executives who had experienced extreme disruptive complex events and who had applied scenario planning as a means of organizational adaptation. To be eligible to participate, participants needed to have at least 5 years of senior-level experience. Additionally, participants needed to have engaged in scenario planning in relation to extreme disruptive

complex events and/or during extreme disruptive complex events in any of the following ways: (a) scenario development, (b) scenario analysis, (c) strategy development, or (d) operational decision-making.

A convenience participant recruitment method is a method where researchers leverage their access to a pool of identified participants who may meet the participant selection criteria and directly recruit individuals based on their willingness to participate (Ardern, Nie, Perez, Radhu, & Ritvo, 2013 Radhu, & Ritvo, 2013; Emerson, 2015). A convenience recruitment method was appropriate because of the ability to identify a pool of participants who met the participant selection criteria *a priori* and there was direct access to the pool of participants. Therefore, having established a pool of participants, I recruited participants who met the participant selection criteria based on their willingness to participate.

To make initial contact with potential participants, verify eligibility, and establish trust, I sent potential participants an introductory email including (a) an overview of the study, (b) eligibility criteria, (c) the informed consent form, (d) explanation that participation was voluntary, (e) information on how the potential participant could withdrawal at any time, and (f) an explanation of how the participant's confidentiality was protected. The introductory e-mail doubled as the informed consent form, and the participant's response to the introductory email indicating a willingness to participate equated to informed consent. The verification of eligibility and establishing trust via direct communication between the researcher and potential participants is consistent with

phenomenological research practices (Alase, 2017; Wagstaff & Williams, 2014). Figure 10 is an illustration of the participant recruitment process.

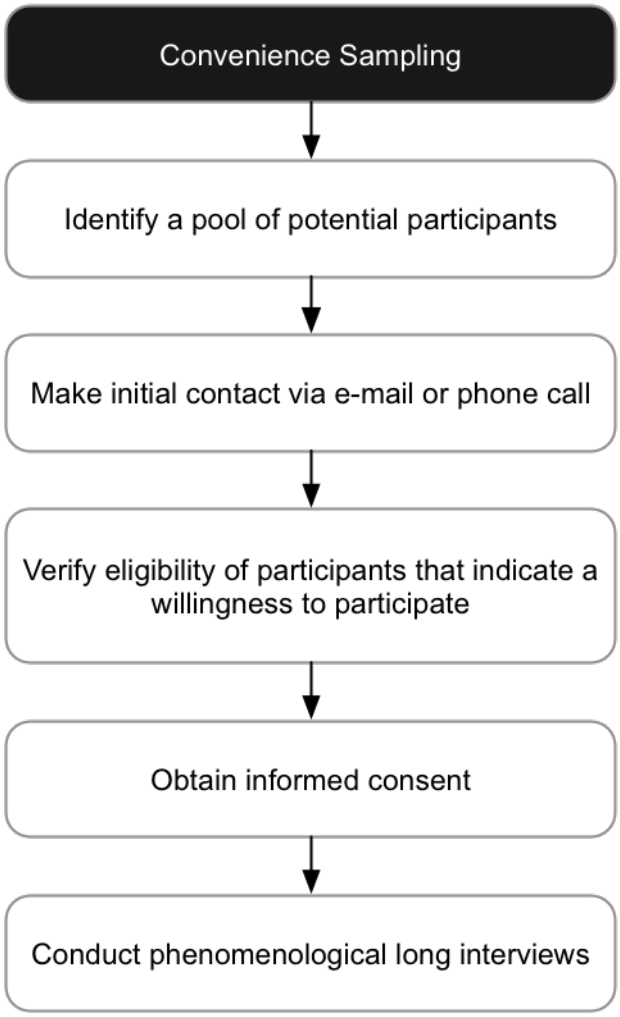


*Figure 10.* Participant recruitment strategy.

## Research Method and Design

The purpose of this study was to explore the lived experiences of selected executives regarding the application of scenario planning to help organizations adapt to extreme disruptive complex events, which included what the application of scenario planning meant to the ability for an organization to adapt to extreme disruptive complex

events. Given the purpose, I selected a qualitative research method with an interpretive phenomenological design. Other research methods and research designs were either inappropriate or less appropriate.

**Research Method**

I selected a qualitative method because the intent was to provide a deeper understanding of the experiences of selected executives regarding scenario planning as a tool to enhance organizational adaptability related to extreme disruptive complex events. Additionally, the intent was to explore the meaning the selected executives attributed to scenario planning as an organizational adaptability tool based on their lived experiences with both scenario planning and organizational adaptability regarding extreme disruptive complex events. Qualitative research is appropriate when the researcher seeks to explore *how* and *why* questions related to events and/or activities over which the researcher has no control (Yin, 2014). Quantitative research is appropriate when the researcher seeks to test hypotheses and measure the relationship between variables, which may include determinations of causation (Petty, Stew, & Thomson, 2012a). A quantitative method was not appropriate because adequate literature did not exist to construct viable hypotheses and reliably measure variables. Mixed method research is suitable when the researcher seeks to integrate qualitative and quantitative methods into a single study (Barrett, Scott, & Zachariadis, 2013; Zohrabi, 2013). A mixed method was not appropriate because the experiential and meaning focus did not include a quantitative component.

**Research Design**

I selected an interpretative phenomenological design. A phenomenological design is appropriate when the researcher seeks to explore, describe, and understand how individuals make sense of a phenomenon and construct meaning based on each selected individual's experiences and interactions with the phenomenon under study (C. Adams & VanManen, 2017; Crowther, Ironside, Spence, & Smythe, 2017; Matua & Van Der Wal, 2015). An interpretive phenomenological design is appropriate when the researcher seeks to not only describe and understand but also interpret the lived experiences of the selected executives (Cooney et al., 2013; Flowers et al., 2009; Wagstaff & Williams, 2014). Furthermore, an interpretive phenomenological design is appropriate when the aim of the research is to explore perceptions of an activity based on the lived experiences of individuals who engage in the activity; thus, also understand how the individuals attached meaning to the activity (Alase, 2017; Eatough & Tomkins, 2013; Matua & Van Der Wal, 2015). An interpretive phenomenological design was suitable because this study was an in-depth exploration of the lived experiences of the selected executives regarding scenario planning as a tool to achieve organizational adaptability regarding extreme disruptive complex events. Secondly, the focus was participant experiences including meaning attributions made by the participants regarding scenario planning, extreme disruptive complex events, adaptive organizations, and scenario planning as a tool for enhancing organizational adaptability. Moreover, familiarity with the conceptual framework varied from participant to participant giving rise to the need to interpret participant responses within the context of the conceptual framework.

Before selecting an interpretive phenomenological design, I considered other qualitative research designs including grounded theory, case study, ethnographic, and narrative designs. A grounded theory design is appropriate when the researcher seeks to generate new or expand existing theory regarding a phenomenon based on information from participants who have experienced the phenomenon as well as other data sources (Lawrence & Tar, 2013; Petty et al., 2012b). A grounded theory design was not appropriate because this study was an applied study and the intent was not to develop new or extend existing theory. A case study design is suitable when the researcher seeks to examine the application or instances of a phenomenon or activity, which may include cross-comparisons between applications or instances (Petty et al., 2012a; Yin, 2014). A case study design was not suitable because the identification of how leaders have engaged scenario planning within one or a few organizations may not have been sufficient to explore the meaning and perceptions underlying why the selected executives did or did not engage scenario planning from multiple perspectives and in multiple contexts throughout their professional careers. Additionally, a case study may not have aided in understanding the meaning attributed to the use of scenario planning as a tool to foster organizational adaptability regarding extreme disruptive complex events. Moreover, a case study may have limited transferability due to an exploration of one or a few uses of scenario planning versus an exploration of the cumulative breadth and depth of the lived experiences of executives throughout their careers. Thus, a case study design was not appropriate because the scope included the full breadth and depth of the participants' lived experiences outside the confines of any one organization. An

ethnographic design is appropriate when the researcher seeks to examine shared experiences and behaviors within a cultural group (Ares, 2016). An ethnographic design was not appropriate because, organizational leaders were not a cultural group, and the selected executives did not have shared experiences. A narrative design is suitable when the researcher seeks to use rich narratives and individual accounts of a phenomenon, which may be longitudinal to examine a phenomenon or build theory (Whiffin, Bailey, Ellis-Hill, & Jarrett, 2014). A narrative design was not suitable because this study was not longitudinal and, answering the research question required an examination of the experiences and perceptions of a pool of participants that was large enough to achieve data saturation.

Data saturation occurs when the researcher has collected enough data that additional data becomes repetitive (O'Reilly & Parker, 2013). One method of demonstrating saturation is the use of Cronbach's alpha to measure the reliability of code distribution using the number of times codes appear across samples (Arensman, Corcoran, Larkin, Matvienko-Sikar, & Spillane, 2017; Cardon, Fontenot, Marshall, & Poddar, 2013). Cardon et al. (2013) found that phenomenological researchers consider a minimum Cronbach's alpha value of .70 acceptable as a measure of saturation. Thus, I used a Cronbach's alpha of at least .70, calculated via IBM SPSS software using the frequency of coded themes across cases to demonstrate data saturation. The reason for using Cronbach's alpha to demonstrate data saturation was to enhance perceptions of reliability among quantitative researchers via the statistical demonstration of data saturation because traditional approaches to asserting data saturation may not hold up to

the perceptions of rigor and credibility among quantitative researchers due to a perceived lack of definitive criteria (Cardon et al., 2013). The use of Cronbach's alpha was also important to this study because as a novice and sole researcher the Cronbach's alpha value (.90 or higher) provided a barometer for determining if data analysis was too narrow.

## Population and Sampling

I used purpositive convenience sampling to select executives within the pool of executives who met the criteria for participation. Purpositive sampling is appropriate when a researcher seeks to engage participants who meet pre-established criteria necessary to answer the research question (Emerson, 2015; Evenstad & VanScoy, 2015; Wagstaff & Williams, 2014). Purposive sampling was appropriate because it is critical to phenomenological studies that participants have experience with the phenomenon under study based on pre-established criteria (Bevan, 2014; Evenstad & VanScoy, 2015; Wagstaff & Williams, 2014). Convenience sampling is a method where researchers leverage their access to a pool of identified participants who meet the participant selection criteria and directly recruit individuals based on their willingness to participate in the study (Ardern et al., 2013 Radhu, & Ritvo, 2013; Emerson, 2015). A convenience recruitment method was appropriate because of the ability to identify a pool of participants who met the participant selection criteria *a priori* and there was direct access to the pool of participants. Therefore, having established a pool of potential participants, I recruited participants who met the participant selection criteria based on their willingness to participate.

There is no clear prescriptive guidance as to determining an adequate sample size for an interpretive phenomenological study (Cardon et al., 2013; Flowers et al., 2009; O'Reilly & Parker, 2013). Furthermore, phenomenological research involves small groups of homogeneous participants who have experienced the phenomenon under study (Wagstaff & Williams, 2014). There are three predominant methods qualitative researchers use to justify sample sizes. One method for justifying sample size is for a researcher to use a size recommended by other qualitative researchers (Cardon et al., 2013). For example, Alase (2017), Arensman et al. (2017), and O'Reilly & Parker (2013) found that phenomenological researchers have recommended sample sizes anywhere between six to 30 participants. A second method of justifying sample size within a qualitative study is through precedent wherein the researcher uses a sample size like the sample sizes used by other researchers (Arensman et al., 2017, Cardon et al.,2013). A third means by which qualitative researchers justify sample size is the number of participants required to achieve data saturation (Cardon et al., 2013; Guassora, Malterud, & Siersma, 2015; O'Reilly & Parker, 2013).

However, Cardon et al. (2013) found that traditional approaches to determining and asserting data saturation may not hold up to the perceptions of rigor and credibility among quantitative researchers because of a lack of definitive criteria for determining data saturation. While Arensman et al. (2017) and Cardon et al. concluded that in general, researchers have determined data saturation with 12 to 18 participants the statistical demonstration of data saturation via the use of Cronbach's alpha may enhance perceptions of rigor and credibility among quantitative researchers. Thus, in keeping

with the sample sizes recommended by Arensman et al., Cardon et al., Gaussora et al. (2015), and O'Reilly and Parker (2013), and in support of the statistical demonstration of data saturation, I included 20 participants and demonstrated data saturation using Cronbach's alpha.

It is crucial to phenomenological studies that all participants have experienced the phenomenon under study (Arensman et al., 2017; Bevan, 2014; Wagstaff & Williams, 2014). Therefore, to qualify, participants were executives who had applied scenario planning as a means of adapting to extreme disruptive complex events. To be eligible to participate in this study, participants needed to have at least 5 years of senior-level experience with any organization, not just their current organization. Additionally, participants needed to have engaged in scenario planning regarding extreme disruptive complex events and/or during extreme disruptive complex events in any of the following ways: (a) scenario development, (b) scenario analysis, (c) strategy development, or (d) operational decision-making.

I conducted 20 in-person phenomenological long interviews as the form of data collection. Phenomenological long interviews lasted one hour on average. Capturing the breadth and depth of the participant experiences is the determining factor in the length of phenomenological long interviews, and the general length of a phenomenological long interview is one to two hours (Alase, 2017; Bevan, 2014). Interviews are the most common form of data collection associated with phenomenological studies (C. Adams & VanManen, 2017; Alase, 2017; Walker, 2011). Interviews serve three primary purposes which include (a) providing a tool for collecting experiential data from participants; (b)

providing a venue for personalized interactions between the researcher and participant that fosters understanding on the part of the researcher and the participant; and (c) allowing the researcher to capture what the participant says as well as the participant's reaction to the phenomenon, questions, and interview (Bevan, 2014; Englander, 2012).

Alase (2017), Bevan (2014), and Englander (2012), found that a face-to-face interview setting was the most effective setting for researchers to interactively engage participants and not only capture what the participant said, but the participant's reaction to the phenomenon, questions, and interview itself. Thus, I conducted interviews in-person and documented what the participants stated as well as their reaction to the topic and interview itself. Each participant determined the setting, time, location, and duration of the phenomenological long interview based on the participant's convenience.

I used a minimum Cronbach's alpha of .70 to demonstrate data saturation. Cronbach's alpha is a means of measuring the reliability of frequency distributions within a data set, thus indicating internal consistency (Abadi et al., 2016; Arensman et al., 2017; Ark, Croon, & Kuijpers, 2013; Fan & Teo, 2013). Regarding qualitative studies, Cronbach's alpha is a statistical means of measuring the reliability of code frequency distribution during data analysis thus, enabling the researcher to demonstrate data saturation (Cardon et al., 2013). Abadi et al. (2016), and Arensman et al. (2017) concluded that qualitative and quantitative researchers consider a minimum Cronbach's alpha value of .70 to be adequate for establishing internal consistency and data saturation. As per the delimitations, saturation was not based on how the selected executives used scenario planning outside the scope of the research question, the specific types of extreme

disruptive complex events experienced, or how the selected executives experienced organizational adaptability regarding extreme disruptive complex events in general. Saturation was based on what leaders needed to know about the application of scenario planning as an organizational adaptability tool regarding extreme disruptive complex events as aligned to the research question and conceptual framework.

## Ethical Research

This study included human participants. Researchers are responsible for conducting ethical research as outlined in the Belmont Report and 45 C.F.R § 46 when the research involves human participants. As the sole researcher I was responsible for (a) maintaining boundaries between practice and research; (b) adherence to the ethical principles regarding respect for persons, benefice, and justice; (c) obtaining informed consent; (d) assessing risks and benefits; (e) the ethical selection of participants, and (f) the protection of participants (Cugini, 2015; U.S Department of Health and Human Services, 2009; U.S. Department of Health and Human Services, 1979; World Medical Association, 2014). Therefore, in adherence to the Belmont Report and 45 C.F.R § 46 the steps taken to ensure ethical research involved respect for persons, justice, informed consent, and benefice.

Under the respect for persons and justice ethical research principles set forth in the Belmont Report, participants must be informed of the nature of the study, any associated risk and once informed participants must provide their consent and participant treatment must be fair and just (Cugini, 2015; U.S. Department of Health and Human Services, 1979; World Medical Association, 2014). As mandated by 45 C.F.R § 46 and

the World Medical Association, the minimum general requirements for informed consent include (a) a statement that the study is a research study along with the intended purpose of the study, (b) a description of the possible risks to the participant, (c) a description of the benefits to the participant, (d) a statement regarding how the confidentiality of the participant will be protected, (e) the nature of any compensation that will be provided to the participant, (f) the process and points of contact for submitting questions or reporting grievances against the researcher, and (g) a statement reinforcing that participation is voluntary including the process of withdrawing from the study (Cugini, 2015; U.S Department of Health and Human Services, 2009; World Medical Association, 2014). Furthermore, a researcher must obtain and document informed consent prior to collecting data from participants (Cugini, 2015; U.S Department of Health and Human Services, 2009; World Medical Association, 2014). Participants must provide informed consent prior to participating in any interviews.

Prior to engaging in the participant recruitment process, I obtained the consent of the organizations the selected executives were from via a letter of cooperation and state IRB approval. Appendix B contains a redacted copy of the letter of cooperation and state IRB approval. In accordance with the respect for persons and informed consent ethical policy and guidelines, I obtained the informed consent of each participant. Each participant reviewed the informed consent form, and each participant provided informed consent prior to any interviews. Prior to approval, the Walden University IRB and a state IRB reviewed the letter of cooperation along with the informed consent process and forms to ensure the informed consent process and form were thorough and appropriate.

Participation was voluntary, and participants had the opportunity to withdraw from the study at any time without penalty or repercussion. The process for participant withdrawal was for the participant to notify the researcher via phone, e-mail, or letter that the participant wished to withdrawal. No participants opted to withdrawal from the study.

I did not provide participants with any professional or monetary incentives; furthermore, because participation was confidential, I did not disclose (a) who participated, (b) the name of the selected organizations, or (c) any information that would be adequate to identify the organizations or participants. I assigned a number to each participant and only referred to participants by number. As per Walden University policy and IRB regulations, this study included the protection of the rights and confidentiality of the participants via the destruction of all participant information and data after the mandatory data retention period of 5 years. For a complete description of data protection, data retention, and data destruction safeguards refer to the data collection strategy under the data collection heading.

Benefice refers to the researcher's obligation to minimize and mitigate the harm to participants while providing every opportunity for participants to directly benefit from participation (Cugini, 2015; U.S Department of Health and Human Services, 2009; U.S. Department of Health and Human Services, 1979; World Medical Association, 2014). The benefice of this study is an underlying assumption that exploring the lived experiences and perceptions of some executives was useful to other business leaders. Thus, the direct benefit was *vicarious learning*. While I cannot prove that participants

directly benefited through vicarious learning, the assumption that participants may directly benefit via vicarious learning had theoretical foundations.

Bobelyn et al. (2013), Hernandez, Sanders, and Tuschke (2014), and Perkins (2014) found that vicarious learning contributed to business success and that vicarious learning was a significant and positive source of knowledge among business leaders. Furthermore, Perkins found that experiential breadth and depth had strategic benefits, but experiential *breadth variation* gained, in part, through vicarious learning was more significant in complex environments. The implication is that an exploration of scenario planning and adaptability based on the experience of some executives may aid other business leaders. In support of vicarious learning, I offered all participants a summary of the findings and a full version of the study upon request.

## Data Collection

As the data collection instrument, I was responsible for data collection and data organization. This study contained a multi-stage data collection technique. The data organization and protection technique involved several processes including the use of computer-aided qualitative data analysis software (CAQDAS).

### Instruments

I was the sole data collection instrument and collected all data using phenomenological long interviews with an interview protocol. Phenomenological long interviews consist of one or two broad questions to elicit the lived experiences of the participants with the addition of clarifying questions when appropriate based on the participant's response to the broad question/s (Dumay & Qu, 2011; Fleming &

Vandermause, 2011; Walker, 2011). Interview protocols are a common method used by qualitative researchers to help ensure interviews are thematically and structurally uniform (Bevan, 2014; Dumay & Qu, 2011; Flowers et al., 2009). Appendix A contains a copy of the interview protocol.

I used phenomenological long interviews with open-ended questions that were long-term experience focused with short-term experience focused follow-up questions to obtain deep and rich experiential descriptions of general and specific experiences with scenario planning and organizational adaptability regarding extreme disruptive complex events. Phenomenological long interviews consist of an initial open-ended question that may include a long and/or short-term experiential focus. Open-ended interview questions are how and why based questions intended to prompt the participant to share their experience with a phenomenon (Alase, 2017; Bevan, 2014; Eatough & Tomkins, 2013). Phenomenological researchers use long-term lived experience focused questions to elicit participant lived experiences based on generalized exposure to the phenomenon outside of any one experience, while phenomenological researchers use short-term experience focused questions to elicit participant lived experiences based on a specific instance of the phenomenon (Francesconi & Gallagher, 2012).

Because interviews were phenomenological long interviews with open-ended interview questions; however, interviews were time constrained there was a risk that I did not capture the breadth and depth of a participant's experiences or that I may have misinterpreted the participants lived experiences. Therefore, this study included member checking to enhance the reliability and validity of the data collected during the collection

process. Inadequate data capture and misinterpretation are common threats to the reliability and validity of phenomenological studies (Bevan, 2014; Cooney et al., 2013; Wagstaff & Williams, 2014). Crowther et al. (2017), Bevan (2014), and Wagstaff & Williams (2014) found that researchers could overcome the risks of inadequate capture and misinterpretation, in part, via the use of member checking. Member checking includes a process in which the researcher reviews a narrative transcript of the interview as well as the researcher's analysis of the interview with the participant to validate and verify the narrative as well as provide the participant with an opportunity to expound on their experience (Bevan, 2014; Cooney et al., 2013; Wagstaff & Williams, 2014).

**Data Collection Technique**

Once selected and recruited, qualified participants participated in phenomenological long interviews using the interview protocol provided in Appendix A. I used several techniques to collect data during the interviews depending on the venue selected by the participant. Data collection techniques included interview recordings, interview notes, and documenting perceptions regarding the interviews in a research journal, which qualitative researchers have established as mechanisms for interview-based data collection during qualitative research (C. Adams & VanManen, 2017; Bevan, 2014; Englander, 2012).

I conducted phenomenological long interviews in-person while taking notes and keeping a reflective research journal. The primary technique for collecting data during an interview was audio recording with the permission of the participant. Recordings allow the researcher to capture participant answers verbatim that enhances reliability and

validity during data analysis (Crowther et al., 2017; Wagstaff & Williams, 2014; Walker, 2011).

I took interview notes and kept a research journal. Interview notes are a means by which researchers can document the key points made by a participant and the participant's reaction to the topic and questions (Dumay & Qu, 2011; Englander, 2012; Fleming & Vandermause, 2011). Therefore, the interview notes contained key points made by the participant and the participant's reaction to the topic and questions, thus providing additional context during data analysis.

The interview forum was in-person. Participants determined the interview forum based on what was convenient for the participant. I coordinated the date, time, and location for the interview with the participant. Participants provided permission before recording an interview. I coordinated and set up all in-person, and audio conference interviews; furthermore, I took interview notes and documented my perceptions of the interview in the research journal. Each interview took one hour on average during a single time block due to the time constraints of the participants.

All audio recording transcripts were verbatim, and I used the verbatim transcripts for member checking. A third-party transcription service assisted with the verbatim transcription of audio recordings. The audio files transcribed by a third party did not include any references to a participant, other individuals, or an organization by name.

The selected data collection technique had a few disadvantages. I discussed the topic of the study and provided participants with some insight into the nature of the study during the recruitment process. Thus, there were some risks associated with the

adequacy and reliability of participant responses. Discussing the nature of the study during the recruitment process may cause a participant to *self-interpret* their experience and in so doing influence the answers provided. However, self-interpretation may also result in richer experiential descriptions, and a researcher can mitigate the risk of self-interpretation by scheduling interviews within a week of recruitment (Dumay & Qu, 2011). Therefore, I scheduled interviews within one week of participant recruitment whenever possible.

I used member checking to enhance study reliability and validity. Participants received a copy of the interview transcript with a request for follow-up to discuss whether I accurately captured his or her experience. Follow-up member checking provided an opportunity for participants to verify and validate the transcript in addition to providing an opportunity to expound on their initial responses and/or experiences.

**Data Organization Techniques**

I used NVivo 11 as the primary tool for cataloging, organizing, and tracking raw data. The use of computer-aided qualitative data analysis software (CAQDAS) such as NVivo 11 is common and accepted among qualitative researchers as a means of cataloging, organizing, analyzing, and tracking data (Cope, 2014; Doyle, Franzosi, McClelland, Putnam Rankin, & Vicari, 2013 Putnam Rankin, & Vicari, 2013; Humble, 2015). Once collected, I imported raw data including recordings, notes, and transcripts, into NVivo 11 and organized the data by participant number.

To protect participants and data I stored all data collected, as well as all NVivo 11 data analysis files on two (a primary and a backup) encrypted external hard drives. Once

complete and approved by the Walden University Chief Academic Officer all raw data and data analysis working files were copied to two (a primary and a backup) encrypted micro SD memory cards. The encrypted micro SD memory cards were stored in two physically separate secure locations for 5 years as per Walden University IRB policy.

The regulations in the Belmont Report regarding the protection of human research subjects require that researchers protect the confidentiality of research participants (U.S. Department of Health and Human Services, 1979). I protected participant confidentiality via the use of participant numbers. There was an Excel spreadsheet stored separately from the raw data and NVivo 11 that contained participant names and contact information as well as the number assigned to each participant. The spreadsheet was encrypted and stored on two (a primary and a backup) encrypted micro SD memory cards along with the informed consent e-mails. Once completed, the micro SD memory cards that contain the spreadsheet and signed informed consent forms were stored in two physically separate secure locations for 5 years. During the 5 year retention period, the participant names and contact information spreadsheet and informed consent forms were not stored on the same micro SD memory cards as the participant raw data and data analysis working files. To adhere to Walden University policy and IRB regulations, after 5 years I destroyed all raw data, all participant information, and all micro SD memory cards.

## Data Analysis Technique

I used the modified Stevick-Colaizzi-Keen method of phenomenological data analysis as the analytical framework while implementing a six-step interpretive

phenomenological analysis (IPA) process with structural and eclectic first cycle coding and second cycle pattern coding. I considered both the modified Van Kaam and the modified Stevick-Colaizzi-Keen methods for phenomenological data analysis. However, the modified Stevick-Colaizzi-Keen method was more appropriate because I had experience with scenario planning. Unlike the Van Kaam method, the modified Stevick-Colaizzi-Keen method includes the researchers' analysis of their own experience with a phenomenon as a precursor to participant data analysis (Bernauer, Holdan, Klentzin, & Semich, 2013 & Semich, 2013; Moustakas, 1994). Furthermore, the documentation and analysis of the researcher's experience as a precursor to the analysis of participant data aids in epoché and transcendental reduction (Moustakas, 1994). The modified Stevick-Colaizzi-Keen method of data analysis consists of four phases. The four phases of the modified Stevick-Colaizzi-Keen method include (a) striving for epoché and documenting the researcher's experience with the phenomenon, (b) analyzing the researchers experience including transcendental phenomenological reduction as well as imaginative variation, (c) repeating the analysis for each individual case then looking across cases, and (d) overall synthesis (Bernauer et al., 2013; Moustakas, 1994).

I implemented the modified Stevick-Colaizzi-Keen method as the analytical framework using the six-step IPA data analysis process identified by Flowers et al. (2009) to help ensure the analysis remained in line with IPA guidelines and theory. The six-step process identified by Flowers et al. includes (a) reading and re-reading transcripts, (b) initial noting, (c) developing emergent themes, (d) searching for connections between emergent themes, (e) analyzing each case independently, and (f)

looking for patterns across cases. I used a combination of structural, eclectic, and pattern coding during the various steps within the IPA process. While there is no universally accepted prescriptive method for IPA among phenomenological researchers, Wagstaff and Williams (2014) and Cooney et al. (2013) asserted general IPA guidelines that were consistent with the six-step process identified by Flowers et al..

**Data Analysis Process**

The first phase of the modified Stevick-Colaizzi-Keen method is for the researcher to develop descriptions of the phenomenon based on the researcher's experience with the phenomenon (Bernauer et al., 2013; Moustakas, 1994). The researcher then uses the description of the researcher's experience to foster epoché and the researcher uses the transcript as the first case transitioning into Phase 2 (Flowers et al., 2009; Moustakas, 1994). As part of data analysis Phase 1, I documented a full description of my experience with scenario planning and my perceptions of scenario planning as a tool for organizational adaptability then used the description to both foster epoché and as the first case transitioning into Phase 2 of the Stevick-Colaizzi-Keen method.

The second phase of the modified Stevick-Colaizzi-Keen method is for the researcher to analyze their description of the phenomenon (Moustakas, 1994; Wagstaff & Williams, 2014). Within the second phase of the modified Stevick-Colaizzi-Keen method, I used IPA Steps 1 through 4 coupled with structural and eclectic coding. The second phase of the modified Stevick-Colaizzi-Keen method includes transcendental phenomenological reduction, imaginative variation, and synthesis within the researcher's

description of the phenomenon (Cooney et al., 2013; Flowers et al., 2009; Moustakas, 1994). Transcendental phenomenological reduction is a pre-reflective description of things based on the researcher's knowledge and experience with a focus on the meaning of things as they appear and exist (Bernauer et al., 2013; Broome, 2012; Cooney et al., 2013; Moustakas, 1994). Transcendental phenomenological reduction includes bracketing and horizontalizing wherein the researcher treats every statement as having equal value at the outset with the eventual deletion of repetitive, duplicative, and irrelevant statements until only *horizons* which are textual meanings and unaltered elements of the phenomenon deemed *invariant constituents* remain (Cooney et al., 2013; Moustakas, 1994; Spence, 2017). Leveraging transcendental phenomenological reduction further enables the identification of bias and preconceived notions based on experience and familiarity with the concepts related to a phenomenon (Broome, 2012; Cooney et al., 2013). Engaging transcendental phenomenological reduction also aids in the refinement of an initial list of candidate codes (Flowers et al., 2009).

Step 1 of IPA is for the researcher to read and reread a single interview transcript to identify the interview and narrative structures and perform member checking (Flowers et al., 2009) Evaluating and reevaluating participant data is critical to the identification of emergent themes and issues that require clarification (Wagstaff & Williams, 2014). Thus, qualitative phenomenological researchers have summarized participant transcripts and used member checking to (a) verify they captured the participant's experience correctly, (b) provide the researcher with an opportunity to ask clarifying questions, and (c) provide participants with an opportunity to expound on their experience (Åkerlind,

2012; Wagstaff & Williams, 2014). In conjunction with IPA Step 1, I also examined the interview transcript to refine initial codes developed *a priori* and categories developed *ex-anti* using scenario planning concepts as well as concepts derived from the conceptual framework while also structurally coding the transcript. Researchers use *structural* coding to identify a segment of the interview transcript that pertains to one of the interview questions related to the overarching research question (Gläser & Laudel, 2013; Saldana, 2013).

IPA Step 2 includes an exploration of semantic content and language within the transcript while looking for (a) descriptive comments that describe the content of what the participant said, (b) linguistic comments that aid exploration using the participants language, and (c) conceptual comments related to concepts under examination (Flowers et al., 2009; Wagstaff & Williams, 2014). To complete Step 2, I used *eclectic* coding to facilitate a rich exploration based on descriptions, linguistics, and concepts. Eclectic coding is a form of exploratory coding where the researcher purposefully uses several forms of first cycle coding in support of rich explorations (Greenwood, Rose, Sweeney, Williams, & Wykes, 2013 Williams, & Wykes, 2013; Saldana, 2013).

Eclectic coding included two forms of first cycle coding. The two forms of first cycle coding were *In Vivo* and *simultaneous* coding. The application of two forms of coding fosters the researcher's ability to recursively extract meaning from the data while also improving quality (Flowers et al., 2009; Greenwood et al., 2013; Watts, 2014). Qualitative researchers use In Vivo coding to explore what participants said and ensure they maintain the participant's voice; whereas qualitative researchers use simultaneous

coding to code segments of data that may be both descriptively and inferentially meaningful (Saldana, 2013). Due to the nature of this study and overarching research question, it was conceivable that the same data segment may contain meaningful descriptive information regarding scenario planning and adaptability as well as inferential information regarding the meaning attributed to the use of scenario planning as an organizational adaptability tool.

IPA Step 3 involves the development of emergent themes by categorizing codes. Categorizing codes includes grouping codes into categories based on shared characteristics (Greenwood et al., 2013; Wagstaff & Williams, 2014). Phenomenological researchers develop emergent themes by mapping the interrelationships, connections, and patterns within the codes (Greenwood et al., 2013; Saldana, 2013; Watts, 2014). IPA Step 4 includes searching for connections across emergent themes within a case (Flowers et al., 2009).

To complete IPA Steps 3 and 4, I used imaginative variation. Phenomenological researchers use imaginative variation to determine structural descriptions of the lived experience via the imaginative variation of frames of reference regarding the experience (Moustakas, 1994; Wagstaff & Williams, 2014; Watts, 2014). Furthermore, Moustakas found that imaginative variation included (a) the systematic variation of potential structural meanings, (b) recognizing underlying themes, (c) considering universal structures, and (d) searching for invariant structural themes that yield a valid description of a phenomenon. Imaginative variation is the result of examining the relationships between emergent themes via (a) abstraction, which is the clustering themes based on

similarity; (b) subsumption, which involves looking for emergent themes by relating a group of themes to other groups of themes; (c) polarization, which is looking for opposing themes; (d) contextualization, which includes looking at the context in which themes occur and apply; (e) numeration, which involves examining the frequency of emergent theme occurrence; and (f) function, which involves looking at how themes relate to meaning in an attempt to look beyond any meaning actually stated by the participant (Flowers et al., 2009; Moustakas, 1994; Watts, 2014).

As per the guidelines identified by Flowers et al. (2009), I used code mapping, code landscaping, operational model diagramming, and second cycle pattern coding as part of IPA Step 4. Code mapping involves taking the full set of codes and iteratively organizing and reorganizing them into a list of categories, which researchers then condense into emerging themes (Flowers et al., 2009; Saldana, 2013; Watts, 2014). Code landscaping includes merging visual and textual analyses to enable the researcher to visually analyze relationships at the code, category, and theme level (Flowers et al., 2009; Saldana, 2013; Watts, 2014). Researchers have conducted code mapping and landscaping, in part, by the development of textual and graphical hybrid representations of codes, categories, and themes with a graphical analysis of each type of relationship (Flowers et al., 2009; Greenwood et al., 2013; Saldana, 2013; Watts, 2014). Operational model diagramming involves the creation of a graphical depiction of the relationships between codes and/or categories (Flowers et al., 2009; Saldana, 2013; Watts, 2014). Operational model diagramming includes the development of network diagrams, cluster diagrams, and mind maps. Pattern coding consist of the development of inferential

inductive codes that illustrate an emergent theme in a manner that aids the researcher in the inferential reduction of categories and sets of themes into a smaller number of operational themes (Flowers et al., 2009; Greenwood et al., 2013; Saldana, 2013; Watts, 2014).

The third phase of the modified Stevick-Colaizzi-Keen method is for the researcher to repeat Phase 2 for each case while maintaining epoché (Bernauer et al., 2013; Moustakas, 1994). I completed Phase 3 by applying IPA Step 5, which involves the repetition of IPA Steps 1 through 4 for each case (Flowers et al., 2009). Moustakas, Flowers et al., and Watts (2014) concluded that maintaining epoché while analyzing each case is critical to ensure that the researcher analyzes each case independently and that the researcher continues to set aside any preconceived notions based on the researcher's experience with or the analysis of previous cases.

The fourth phase of the modified Stevick-Colaizzi-Keen method is to construct composite, unified, and integrated structures as well as themes to uncover the essence of experience and meaning (Bernauer et al., 2013; Moustakas, 1994). I completed Phase 4 by implementing IPA Step 6. IPA Step 6, involves looking for patterns across cases to interpret the meaning of the phenomenon; thus, answer the research question and is the last step in the IPA data analysis process (Flowers et al., 2009; Gläser & Laudel, 2013; Watts, 2014). I have illustrated the data analysis process in Figure 11.

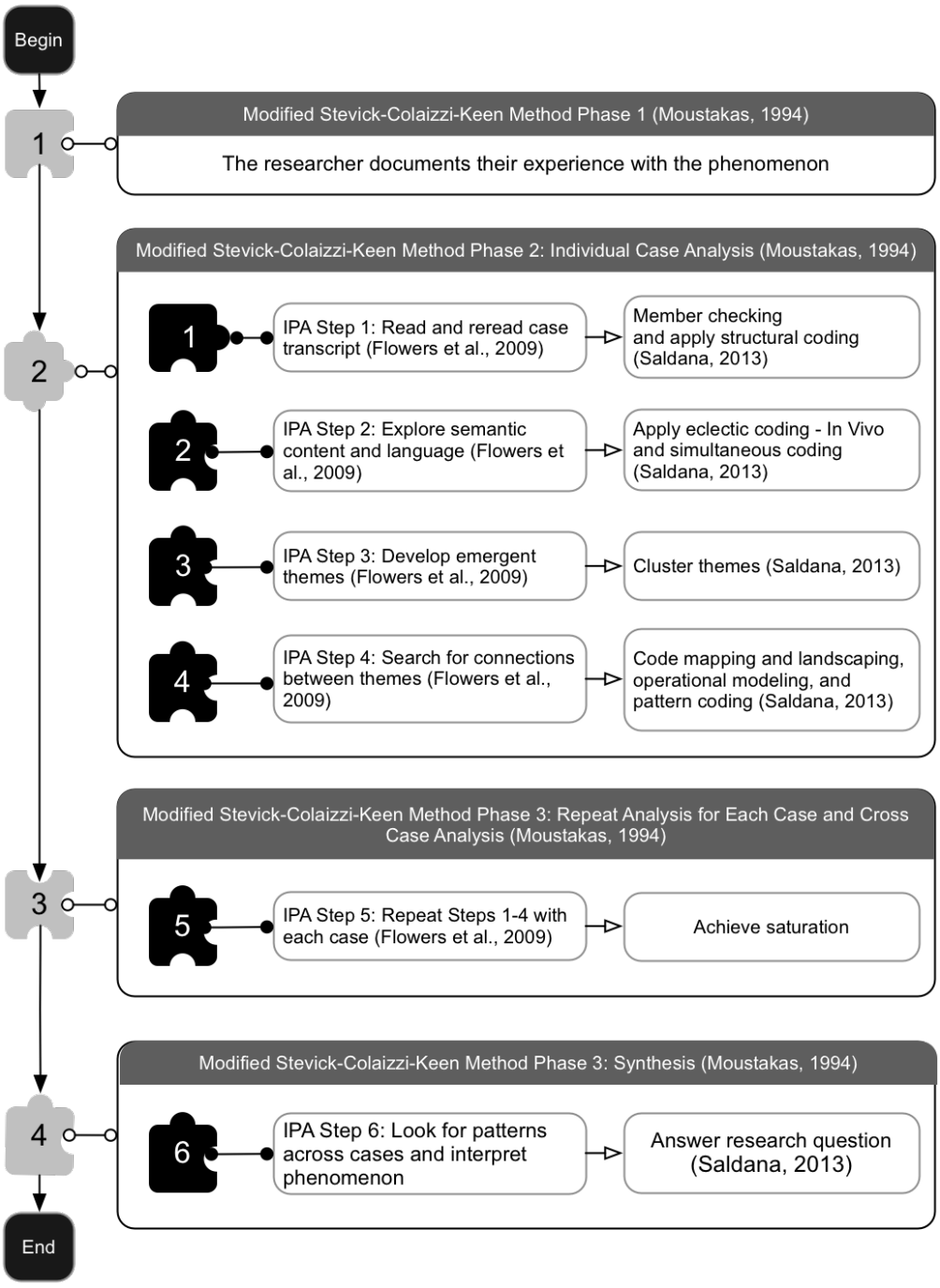


*Figure 11.* The data analysis process.

CAQDAS has precedence in qualitative research as a tool for assisting researchers with complex data analysis, improving accuracy, and enhancing data management (Flowers et al., 2009; Gläser & Laudel, 2013; Saldana, 2013). During the data analysis process, I used NVivo 11 as the CAQDAS. I used NVivo 11 to (a) store, organize, and categorize participant data, research notes, and reflective journal entries; (b) assist with coding; and (c) assist with the development of code maps, code landscapes, and operational models.

## Reliability and Validity

Valid qualitative studies need to be dependable, credible, transferable, and confirmable (Zohrabi, 2013). Therefore, establishing the dependability, credibility, transferability, and confirmability within a qualitative study is crucial. During the completion of this study, I took care to ensure the highest degree of dependability, credibility, transferability, and confirmability via multiple means.

### Dependability

Dependability in qualitative studies refers to the reliability and consistency of the study results (Alase, 2017; Zohrabi, 2013). Furthermore, as Poortman and Schildkamp (2012) pointed out, dependability refers to the ability for other researchers to repeat the study while following the same procedures to obtain comparable results. Some of the means of establishing dependability in qualitative studies include member checking, transcript reviews with participants, a systematic data collection approach, the use of software to support data analysis, and providing thick descriptions of the research process (Yin, 2014; Zohrabi, 2013). I established dependability by (a) the use of transcript

reviews and member checking as defined under the data collection and data analysis headings; (b) the systematic collection of data using an interview protocol and strict adherence to the data collection techniques specified under the data collection heading; (c) the use of NVivo 11 software to aid in consistent and methodical data analysis; and (d) the thick descriptions of the participant recruitment, data collection, and data analysis processes.

**Credibility**

Credibility within qualitative studies centers on the degree to which the researcher accurately portrays the perceptions of the study participants and the degree of convergence between the study findings and reality (Zohrabi, 2013). Some of the mechanisms for establishing credibility include (a) providing a clear explanation of the conceptual framework, (b) member checking to ensure the researcher accurately captured the perceptions and experience of the participants, (c) maintaining a chain of evidence, (d) systematic data analysis that includes the enumeration of patterns across the experiences of the participants, and (e) the use of multiple types of coding during data analysis (Watts, 2014; Yin, 2014; Zohrabi, 2013). I established credibility by (a) providing a clear examination and review of scenario planning, CAS theory and chaos theory within the literature review, (b) member checking, (c) maintaining a chain of evidence as described in the data collection technique, (d) systematically applying the data analysis technique, (e) using multiple forms of coding including structural and eclectic coding, and (f) the achievement and statistical demonstration of data saturation.

Cardon et al. (2013) found that traditional approaches to determining and asserting data saturation may not hold up to the perceptions of rigor and credibility among quantitative researchers because of a lack of definitive criteria for determining data saturation. To overcome this challenge researchers have used Cronbach's alpha to demonstrate saturation in qualitative studies (Cardon et al., 2013). Furthermore, researchers have used Cronbach's alpha to demonstrate the internal consistency of quantitative measures derived from the qualitative component in mixed method studies (Abadi et al., 2016; M. Adams et al., 2016; Arensman et al., 2017).

I considered the data saturated with a minimum Cronbach's alpha value of .70. Abadi et al. (2016), Arensman et al. (2017) and Cardon et al. (2013) concluded that a minimum Cronbach's alpha value of .70 was adequate for demonstrating data saturation within a qualitative study or the qualitative component of a mixed method study. I did not base saturation on all the ways the selected executives used scenario planning or all the ways the selected executives experienced organizational adaptability, and/or extreme disruptive complex events. Saturation related to what leaders need to know about the use of scenario planning as an organizational adaptability tool regarding extreme disruptive complex events, aligned to the research question, to ensure alignment between the purpose of the study, research question, and study findings. The reason for using Cronbach's alpha to demonstrate data saturation was to enhance perceptions of reliability among quantitative researchers and mitigate the risk that data analysis was too narrow.

**Transferability**

Transferability in qualitative studies refers to the degree to which readers and other researchers can apply the study findings in other contexts and to other settings (Alase, 2017; Zohrabi, 2013). While a researcher cannot directly establish transferability, a researcher can foster transferability by providing descriptions of the study and study findings that are thick and rich enough to enable readers to determine whether the findings are transferable (Alase, 2017; Zohrabi, 2013). Some ways qualitative researchers foster transferability is to provide a clear comparison between the conceptual framework and the study findings as well as providing a thick description of the participants, environment, study design, and sampling strategy that includes discussion of any shortfalls or limitations (Yin, 2014; Zohrabi, 2013). To foster transferability, I have provided thick descriptions of the participants, environment, design, sampling strategy, and clear comparisons between the conceptual framework and findings.

**Confirmability**

Confirmability in qualitative studies involves the degree to which other researchers could confirm or corroborate the study findings (Alase, 2017; Zohrabi, 2013). Some of the mechanisms used to support confirmability include (a) the interpretation of the data in a logical way using methodical analysis tactics, (b) providing a complete description of the research steps and data analysis process, (c) retaining the data so others could use the data for reanalysis, and (d) providing a chain of evidence (Yin, 2014; Zohrabi, 2013). I supported confirmability by (a) conducting data analysis in the logical and methodical way described under the data analysis section, (b) providing a complete

step by step description of the research process and data analysis process, (c) retaining all data collected for 5 years, and (d) maintaining a chain of evidence throughout the data collection and analysis process.

## Transition and Summary

In summary, this study was a qualitative interpretive phenomenological study. The purpose of this study was to explore the lived experiences of selected executives regarding the use of scenario planning to adapt to extreme disruptive complex events, and what executives need to know to engage scenario planning as an organizational adaptability tool. The reason for conducting a phenomenological study was to examine the experiences of selected executives in depth beyond the confines of any one organization. I recruited 20 participants from a single national organization and 10 state agencies using a purpositive convenience recruitment strategy. Data was collected using phenomenological long interviews and validated via member checking. Data was analyzed using the modified Stevick-Colaizzi-Keen method coupled with a six-step IPA process incorporating structural, eclectic, and pattern coding.

Section 3, contains the presentation of findings. Other elements of Section 3 include the application of the findings to professional practice, implications for social change, recommendations for action, and recommendations for future research. Additionally, Section 3 contains a personal reflection on my experiences with the research process while conducting this study.

Section 3: Application to Professional Practice and Implications for Change

In this section, I provide the presentation of findings. Other elements of this section include the application of the findings to professional practice, implications for social change, recommendations for action, and recommendations for future research. Additionally, this section includes a personal reflection on my experiences with the research process.

## Overview of Study

The purpose of this qualitative interpretive phenomenological study was to explore the information needed by executives regarding the application of scenario planning to adapt to extreme disruptive complex events. Based on the interpretation of the lived experiences of the selected executives, there are several things that executives need to know. First, there is a difference between organizational adaptability and organizational response. Second, CAS and chaos theory can provide a lens for scenario planning with an eye toward adaptability. Third, executives can apply scenario planning in any business area. Fourth, leaders should not be afraid to tackle the tough questions. Fifth, when adaptability is the target, scenario planning is never over. Sixth, it is necessary to understand the benefits to take full advantage of the benefits, and the true measures of value are the benefits achieved. Seventh, scenario planning is all about the question. Eighth, executives should focus participation on individuals who can or could impact organizational adaptation. Ninth, executives should focus scenarios on transformation and/or collapse and adhere to principles established ahead of time during the entire scenario planning process. Tenth, executives should not get bogged down in

rigid processes, methods, and/or tools because while sometimes useful, they are not required to be successful.

## Presentation of the Findings

I have broken down the presentation of the findings into two elements. The first element is the profile of the selected executives including years of experience, industries in which the participants had experience, and the types of extreme disruptive complex events the participants experienced. The second element is answering the research question structured by the emergent themes around what information executives need. I based emergent theme analysis on what executives need to know regarding the use of scenario planning to adapt to extreme disruptive complex events in accordance with the delimitations of this study and within the confines of the conceptual framework.

The data collected from each of the selected executives represented a case. I considered an emergent theme to be any theme present in at least 50% of the cases and demonstrated saturation using the frequency distribution of coded themes across all the cases. I used a minimum Cronbach's alpha of .70 to demonstrate saturation as an extra step to help confirm the achievement of saturation. Eclectic coding yielded a Cronbach's alpha value was 0.78, and Nvivo coding yielded a Cronbach's alpha value of .85. To help reduce the chance of bias derived from eclectic coding affecting Nvivo coding, I waited 30 days from completion of Eclectic coding before starting Nvivo coding; thus, I started fresh when Nvivo coding.

The participants engaged in scenario planning in a myriad of ways. I did not base saturation on the ways participants engaged in scenario planning activities. However, the

presentation of how participants engaged in scenario planning was germane to answering the research question because how they engaged provided the context for the themes regarding what information leaders need to use in scenario planning as a means of adaptation to extreme disruptive complex events. It is also important to note that the term *scenario planning* did not resonate with some of the participants; however, for those participants, the term *what-if planning* unlocked their lived experiences with scenario planning.

**Participant Profile**

Participants having lived experience with the phenomenon under study is vital to phenomenological studies. Therefore, to qualify for this study, participants needed to be executives who had applied scenario planning as a means of adapting to extreme disruptive complex events. To be eligible to participate in this study, participants needed to have at least 5 years of senior leadership experience with any organization, not just their current organization. Additionally, participants needed to have engaged in scenario planning related to extreme disruptive complex events and/or during extreme disruptive complex events in any of the following ways: (a) scenario development, (b) scenario analysis, (c) strategy development, or (d) operational decision-making.

The 20 selected executives had at least 5 years of senior leadership experience. Combined, the participants had 305 years of senior leadership experience. The least amount of experience a participant had was 5 years while the most amount of experience a participant had was 25 years. I have provided a breakdown of the years of experience each participant had in Table 4.

Table 4

*Years of Experience*

| Participant | Years of senior leadership experience |
|---|---|
| Participant 1 | 13 |
| Participant 2 | 25 |
| Participant 3 | 20 |
| Participant 4 | 30 |
| Participant 5 | 5 |
| Participant 6 | 11 |
| Participant 7 | 12 |
| Participant 8 | 20 |
| Participant 9 | 13 |
| Participant 10 | 10 |
| Participant 11 | 17 |
| Participant 12 | 12 |
| Participant 13 | 5 |
| Participant 14 | 25 |
| Participant 15 | 20 |
| Participant 16 | 15 |
| Participant 17 | 19 |
| Participant 18 | 14 |
| Participant 19 | 5 |
| Participant 20 | 14 |
| Combined years of senior leadership experience | 305 |

Because the scope of this study included participant experience with scenario planning with any organization, not just their current organization, I was able to capture participant experiences in relation to numerous industries and types of organizations. Every participant had experience with multiple industries. Participants were from a large national organization with executives distributed across the United States or from 1 of 10 state agencies located within a single state. In total, the participants had experience spanning 25 industries. The breadth of participant experience included for-profit,

nonprofit, and public sector organizations. Experience with for-profit organizations spanned from large international businesses to small start-ups. Participant experience with nonprofit organizations included only large national organizations. The breadth of public sector experience spanned from local and municipal government through state and federal government. Specific industry experience fell into several categories, including (a) government, (b) communications and technology, (b) finance, (c) health and human services, (d) logistics, (e) education, (f) military, (g) transportation, (h) law, (i) environmental, and (j) public services. I have provided a breakdown of the specific industries with which participants had experience and the number of participants with experience in each industry in Table 5.

Table 5

*Industry Experience*

| Industry | Number of participants with experience |
|---|---|
| Biomedical | 2 |
| Consulting and professional services | 1 |
| Corporate law | 2 |
| Criminal law and justice | 2 |
| Education K-12 | 3 |
| Emergency services | 3 |
| Entertainment | 2 |
| Entrepreneurial start-up | 2 |
| Environmental | 1 |
| Federal government | 5 |
| Financial | 6 |
| Healthcare | 3 |
| Higher education | 1 |
| Logistics | 1 |
| Maritime | 1 |
| Military | 2 |
| Municipal / County government | 2 |
| Nonprofit and philanthropy | 3 |
| Public health | 7 |
| Public utilities | 1 |
| Regulatory | 11 |
| State government | 17 |
| Technology | 8 |
| Transportation | 2 |
| Telecommunications | 5 |

The participants experienced a myriad of types of extreme disruptive complex events. The types of events the selected executives had experienced fell into six major categories. The first category was changes in business structure which included events like acquisitions, mergers, reorganizations, and large-scale organization-wide change including going out of business. The second category was the passing of new federal or state legislation and/or new regulations that affected the terms of conducting business and the business environment. The third category was human resources where key leadership or personnel left the organization and/or there were major fluctuations in an organization's workforce over a brief period. The fourth category was financial wherein major unforeseen expenditures, significant loss of revenue, and/or major budget reductions that also included the suspension of business activities due to the lack of an operations budget had a negative impact on fiscal resources. The fifth category was disruptive technology wherein a recent technology or the new application of an existing technology disrupted business operations, and/or the business environment. The sixth category was disasters that included natural disasters (such as floods, hurricanes, etc.) or human-made disasters such as terrorist attacks. Disasters were events that resulted in major damage to and/or the destruction of businesses, homes, and critical infrastructure that included the denial of access to businesses, homes, crucial services, or critical infrastructure. I have provided a comprehensive list of specific types of extreme disruptive complex events the participants experienced and a synthesized description of the events, as well as the number of participants that experienced each type of event in Table 6.

Table 6

*Types of Extreme Disruptive Complex Events Experienced*

| Event category | Type of event | Description | Number of participants |
|---|---|---|---|
| Change in business structure | Acquisition | The purchase or takeover of one business by another. | 2 |
| | Foreclosure / Going out of business | The shutdown of a business due to lack of customers or the loss of required resources. | 1 |
| | Merger | The merger of one organization with another. | 7 |
| | Organizational change | A major organization-wide change in business operations. | 5 |
| | Reorganization | The combination or separation of organizational units. | 6 |
| Disruptive technology | Disruptive Technology | A new technology or the new use of an existing technology that had an impact on competition and/or the way business was conducted. | 14 |
| Financial | Budget reduction | A reduction in budget that resulted in the major loss of resources. | 5 |
| | Government shutdown | The suspension of government and affected business activities due to the lack of a budget. | 5 |
| | Loss of revenue | Loss of profit or income over a brief period. | 2 |
| | Major expenditures | Unplanned major expenditure that caused resources to drop below required levels. | 3 |
| Natural disaster | Blizzard | A major snow event that prevented day-to-day business operations for a prolonged period. | 1 |
| | Earthquake | An earthquake equal to or greater than a magnitude of 6.0 | 4 |
| | Flood | Flooding that caused damage or denial of access due to standing water over a prolonged period. | 2 |
| | Prolonged utility outage | Loss of power, water, etc. for over one week due to contamination or the loss of infrastructure. | 1 |
| | Terrorist act | The September 11 attack on the world trade center in New York City or terrorist bombings using improvised explosive devices (IEDs). | 2 |
| | Tornado | Tornado equal to or greater than an F4 or an outbreak of numerous smaller tornadoes over a brief period of time. | 2 |
| New laws / Regulations | New legislation or regulations | New legislation or regulations that required a major shift in how business was conducted. | 5 |
| Human resources | Loss of critical personnel | Loss of key personnel with little or no warning. | 2 |
| | Loss of key leadership | Loss of key leadership with little or no warning. | 3 |
| | Massive personnel turnover or layoffs | Mass turnover in personnel over a short period of time or the layoff of numerous personnel. | 2 |

## Emergent Themes

Based on the lived experiences and perceptions of the selected executives, there were 14 themes that emerged within at least 50% of the cases (10 of the 20). The emergent themes related to the information leaders need to vector scenario planning efforts toward adaptation in a meaningful way. Specifically, the 14 emergent themes related to knowing the difference between response and adaptation, recognizing the organization as a CAS that operates in a complex environment, application of scenario planning to business, scenario planning benefits, where the real benefit of scenario planning resides, the importance of asking the tough questions, and the need to right-size scenario planning efforts so that efforts add value within the confines of the available resources. I have provided the 14 emergent themes and the percentage of cases in which the theme emerged in Table 7.

Table 7

*Emergent Themes Across Cases*

| Emergent theme number | Emergent theme title | Percentage of cases |
|---|---|---|
| 1 | There is a difference between adaptability and response | 100 |
| 2 | CAS and chaos theory can provide a lens for adaptability | 90 |
| 3 | Scenario planning has the potential to be applied to any business area | 75 |
| 4 | Do not be afraid to ask the difficult questions | 70 |
| 5 | Scenario planning for adaptability is never over | 100 |
| 6 | Understand the benefits to capitalize on them | 70 |
| 7 | The true measure of value is the benefits | 100 |
| 8 | It is all about the question | 100 |
| 9 | Focus participation on those that can affect change | 80 |
| 10 | Focus scenarios on transformation and collapse | 100 |
| 11 | Establish and adhere to principles | 100 |
| 12 | Do not get bogged down in approaches and methods | 100 |
| 13 | Rigorous and rigid processes are not required | 100 |
| 14 | Structured tools can be useful but are not required | 100 |

**Emergent Theme 1: There is a Difference Between Adaptability and Response**

As part of the exploration of the use of scenario planning to adapt to extreme disruptive complex events, 19 of the 20 selected executives felt it was important to understand what it means to adapt. Moreover, all 20 of the participants (100%) believed there was a distinction between organizational adaptability and organizational response. There were two common differences expressed by the participants regarding organizational adaptability versus organizational response. The first difference was that response included reactions to a specific event while adaptation was the ability to

proactively change and morph due to an event which may or may not include one or more responses. For example, Participant 10 stated,

> Organizational response, I would say, is more responding to that particular incident whereas adaptation would be growth from that event and learning how we can adapt to the new environment, get things back on the right course, or be able to make things successful again.

Similarly, Participant 16 stated,

> I would describe organizational response as how an organization responds to an event and how quickly can they get organized around a particular event to resolve a particular thing. Organizational adaptation, I would assert, is more around how well an organization can change itself in response to experiences.

The second difference that emerged was that organizational response was more controlled whereas organizational adaptation while potentially deliberate and controlled also had the potential to be more organic. This second difference was summarized by Participant 17's statement that,

> Response is something that you control and is driven by leadership, it is immediate and is driven by the cultural norms of an organization. So for example, when an election happens, how people act in the moment is their response. What they do over time and how they integrate a new leadership style and a different approach is their adaptability.

Furthermore, participants stressed that organizational response is not the same as organizational adaptation as illustrated by Participant 7's statement that "response is not

adaptive because you are just going to answer this one thing or do this one thing, and then move on".

The strong insinuation that the two differences represent is that organizational response is reactionary based on a specific event wherein the reaction is meant to return the organization to stability and then move on without a focus on permanent change. Conversely, organizational adaptation, while also potentially reactive, has a proactive, long-term, permanent change, resilience, and survival in a new environment focus. Therefore, the implication is that the exploration of the information needed to use scenario planning as a mechanism to adapt to extreme disruptive complex events must target leadership's ability to proactively navigate the organization through permanent change and ensure the organization is resilient enough to survive a permanent environmental shift.

The distinction between organizational response and organizational adaptation is neither supported or unsupported by the literature nor consistent or inconsistent with the literature because the concept of a distinction does not appear in the literature I reviewed. Within the CAS and chaos theory literature, researchers linked adaptation and response together as an activity within a system wherein the cumulative effects of response equate to adaptation. For example, the foundation of CAS theory is that a CAS is an open system comprised of *agents* that are (a) autonomous, (b) continuously interact with each other, (c) are environmentally aware, and (d) adapt to environmental stimuli (Held et al., 2014; Poutanen et al., 2016). Interactions and behaviors within the CAS are governed by reactions to the behavior of other agents and environmental stimuli (Altindag et al.,

2014). Within the CAS and chaos theory business literature, researchers discussed applications without any concept of response versus adaptation. For example, Peter and Sharicz (2013) asserted that the focus of a bi-modal organization concept was to provide adequate structure to guide the organization and apply some rules, but simultaneously encourage and enable fluid agent networks that also drive innovation, forward momentum, and change but there was no concept of a distinction between response and adaptation. However, the lack of distinction in the literature does not represent an inconsistency because the context of the business application of scenario planning to adapt to extreme disruptive complex events was not addressed by the researchers. Regardless, all 20 of the selected executives felt that there was a distinction that leaders should be aware of to help ensure that as a business practice, scenario planning efforts target long-term adaptation and do not become arbitrarily short-sighted by only considering near to mid-term responses and not overall long-term adaptation.

**Emergent Theme 2: CAS and Chaos Theory Can Provide a Lens for Adaptability**

Interpretation of the information provided by the participants illuminated that the use of scenario planning to adapt to extreme disruptive complex events requires a lens through which leaders could view the event, organization, and scenario. The ability to adapt to extreme disruptive complex events is what led to the selection of CAS and chaos theories as the conceptual framework for this study. Within 18 of the 20 participant descriptions of an organization as a system (90%), Theme 2 emerged which supported the notion within the literature that an organization is and behaves like a CAS. All 20 of the selected executives expressed CAS and/or chaos theory components when discussing the

impact of, and adaptation to, extreme disruptive complex events. Therefore, I considered the CAS and chaos theory components described to be sub-themes under Emergent Theme 2. Emergent Theme 2 supports the concepts within CAS and chaos theory; thus, the conclusion that CAS and chaos theory could provide a lens for scenario planning geared toward organizational adaptability; however, I can make no assertion that CAS and chaos theories are the only lens that leaders could apply.

Only one participant used specific terms related to CAS theory, and none of the participants used specific terms associated with chaos theory when describing organizational adaptation or an organization as a system. However, each participant described some of the major components associated with CAS and chaos theory which I considered sub-themes. The sub-themes described by the participants included the CAS or chaos theory concepts of bifurcation, emergence, nonlinearity, self-organization, sensitive dependence, creative destruction, attractors, and the edge of chaos as they applied to an organization and business. CAS and chaos theory sub-themes emerged from the participant's descriptions of the concept of adaptation which they perceived as mid to long-term where the impact of the event was permanent. These sub-themes did not appear when the participants described organizational response. Participants described these sub-themes when discussing organizational adaptation, the difference between organizational adaptation and organizational response, an organization as a system, and when relaying specifics associated with what leaders need to know to use scenario planning as a means of adaptation to extreme disruptive complex events. I have listed the CAS and chaos sub-themes with an interpreted description synthesized across

all cases as well as the number of cases in which each sub-theme emerged in Table 8.

Table 8

*CAS and Chaos Theory Subthemes*

| Subtheme | Synthesized description | Number of cases |
|---|---|---|
| Bifurcation | Reaching points of no return where permanent change in the form of adaptation had to occur which participants associated with the impact of extreme disruptive complex events because the events were extremely disruptive and complex. | 20 |
| Emergence | Organizational patterns and behaviors emerged organically from the cumulative behavior of individuals and business units as they interacted with each other to adapt and/or during the process of adaptation. | 8 |
| Nonlinearity | Large or small interactions between individuals or business units had far-reaching effects that were disproportionate and unanticipated due to decisions made within one part/s of the organization and/or the performance of parts of the organization where dependencies existed. | 20 |
| Self-organization | The bottom-up and/or lateral creation of stability that grew organically without leadership's top-down direction or control which was typically seen as more effective than top-down direction would/could have been. | 10 |
| Sensitive/Historical dependence | The requisite changes and the impact thereof associated with the effect the event had on the organization which led to the significant and irreversible long-term changes required to adapt. | 18 |
| Creative destruction | The destruction or cannibalization of organizational structures to create a new structure in response to change which the participants associated with organization mergers and acquisitions, internal restructuring, loss of personnel, failure, and/or finance related events. | 5 |
| Attractors | The event that was extreme, disruptive, and complex that forced leadership and the organization to respond and/or adapt. | 20 |
| Edge of chaos | The point at which leadership and the organization was subject to disruption; however, scrambled to return to stability wherein survival and/or the return to stability required permanent change/adaptation. | 15 |

Emergent Theme 2 and the CAS and chaos theory sub-themes support and are supported by the findings of Adcroft, Lee, Skipp, and Winnard (2014), Cristancho (2016), and Hung and Tu (2014) that businesses are, and behave like, CAS and that concepts within CAS theory and chaos theory inform business leadership and management efforts. Emergent Theme 2 supports the finding in Cristancho that organizational structure, dynamics, and evolution is revealed by leaders considering the organization from multiple perspectives. Emergent Theme 2 also supports the conclusion that organizations are CAS but exist within complex chaotic environments and ecosystems (Adcroft et al., 2014; Chung-An, 2014).

**Emergent Theme 3: Scenario Planning Has the Potential to be Applied to Any Business Area**

In hindsight, 15 of the 20 selected executives (75%) believed scenario planning could be applied to more business areas than they had previously thought and that the applied possibilities were vast. Furthermore, given the diversity of the lived experiences of the participants, and the plethora of applications within the literature, a theme emerged that leaders could use scenario planning to help an organization adapt to extreme disruptive complex events in any business area. Moreover, the consideration of several business areas during a single scenario planning exercise increased the value associated with the effort. However, there was a point of diminishing returns wherein the consideration of too many business areas convoluted the effort overcome the cognitive capacity to the scenario planning team, and/or the effort would become unmanageable. Thus, while leaders could, in theory, apply scenario planning to any business area

executives should limit the number of areas to those that are most relevant to the scenario planning exercise.

The selected executives applied scenario planning to a litany of business areas/functions. The business functions included business process management, business transformation, organizational change management, contingency planning, emergency management, operations management, program and project management, risk management, strategy development, supply chain management, and technology management. The business applications were aligned with the applications addressed in the literature some of which included (a) operational risk management described in Ergashev (2012), Hanselman (2012), and Vacík and Zahradníčková (2014); (b) emergency management presented in Alexande et al. (2012) and Federal Emergency Management Agency (2014); (c) contingency planning discussed in Churchhouse et al. (2017) and Oliver & Parrett (2017); and (d) business transformation described in Freeth & Drimie (2016).

The participants did not identify any business applications that researchers did not discuss within the literature. However, the selected executives did identify the establishment of decision-making frameworks including decision-making principles and criteria as a key objective which was not called out by the authors of the scenario planning literature I reviewed. Table 9 contains a list of the specific business applications identified by the selected executives along with an interpreted description of the business applications synthesized across all cases and the number of participants that identified each business application.

Table 9

*Scenario Planning Business Applications Identified*

| Application | Synthesized description | Number of participants |
|---|---|---|
| Business process management | The application of scenario planning to identify the impact of change to business processes and/or inform decisions regarding changes to business processes to streamline processes or drive a specific outcome/s. | 4 |
| Business transformation | The use of scenario planning to anticipate the effects of decisions and/or activities while also seeking to discover the relationships and/or assess the decisions/activities required to successfully transform the business based on a desired future state. | 3 |
| Organizational change management (OCM) | The application of scenario planning to identify the type of OCM activities and where to target the activities to successfully implement large-scale adaptation. | 4 |
| Contingency planning | The use of scenario planning to discover and/or evaluate the impact of various types of events to plan for continuity of business operations should that type of event occur. | 3 |
| Emergency management | The application of scenario planning to guide and inform the response to emergencies typically associated with natural or human-made disasters. | 3 |
| Operations management | The use of scenario planning to inform operational decision-making and/or decision-making criteria/principles to be applied during or given a set of potential future circumstances. | 17 |
| Program and Project Management | The application of scenario planning to inform and guide project planning and/or management efforts based the cause and effect relationship between the program/project and potential future events/circumstances. | |
| Risk management | The use of scenario planning to identify and understand current and/or future risks and develop avoidance or mitigation countermeasures. | 7 |
| Strategy development | The application of scenario planning to inform future-oriented strategies taking into account uncertainty, unpredictability, and unknowns. | 19 |
| Supply chain management | The use of scenario planning to discover and/or evaluate the effect of events on supply chains to enhance resilience within the supply chain. | 1 |
| Technology management | The application of scenario planning to make technology decisions related to the use of new or changes in the use of existing technologies as well as strategize around or plan for the introduction of technology. | 10 |

**Emergent Theme 4: Do Not be Afraid to Tackle the Difficult Questions**

Fourteen of the 20 selected executives (70%) felt that leaders cannot be afraid to ask tough questions for two main reasons. The first reason is that leaders often find themselves facilitating scenario planning efforts. The underpinning of extreme disruptive complex events is that they have the potential to shake an organization to its foundations. Thus, scenario planning with an eye toward organizational adaptability requires addressing some tough questions that may be otherwise considered taboo or sensitive. Therefore, given the role of a scenario planning facilitator, leaders cannot shy away from asking sensitive and tough questions especially if others are unwilling or afraid to ask. Additionally, leaders need to be able to ask tough questions to keep the scenario planning effort on track and focused. Participant 4 illustrated this need when stating

> I typically don't do it in a vacuum. Typically, it's not just me. Either working with one person, sometimes with a team of people, often I'm the facilitator asking the tough questions, or perception-type questions, or even the what-if type of questions and keeping this focused because there's some tendencies to go off the rails.

The second reason is that some questions, uncertainties, and unknowns are (a) inherently difficult to answer, (b) unpopular, (c) sensitive, (d) emotionally charged, and/or (e) downright scary. Regardless, posing these questions may be the only way to ensure that the scenario planning effort is sufficiently challenging, and leaders may need to explore these questions to uncover the complexities, uncertainties, and unknowns that would need to be addressed if an organization was going to adapt to an extreme complex

disruptive event. Moreover, failure to ask these questions may impugn adaptability if not prevent organizational adaptability; however, leaders need to be smart about how they ask the tough questions. Participant 6 articulated the notion best when stating

> If nobody ever wants to talk about the changes coming, and they want to put their heads down and do the way that they've always done, I think that that makes a far less adaptable organization. I think the more we're willing to stick our heads up and say we think there may be change coming and how can we not only adapt to it, but use it to our advantage while really thinking through all of the different things that may come our way, we come out the other end of it being a better organization.
>
> People would much rather talk about the scenarios then hide them. Often, we say well, we know that this might happen but let's not talk about it. Let's not worry the people who are actually doing the work. One of the primary things that I would tell other executives is to not be afraid to talk about it. It's the communication of those things that impact the culture of an organization. It makes line level staff feel like there's some transparency with executives. So, don't be afraid to talk about the scenario even though you may see it as hugely disruptive. The planning part is what makes it less scary to people, but I think we need to be really careful how that's communicated. I think an executive who comes in with a very negative scenario that could happen and they present it in a very negative way could definitely instill panic.

Emergent Theme 4 is a matter of business application identified by the selected executives that does not directly relate to the scenario planning literature. For example, Freeth and Drimie (2016) concluded that scenario planning had been used by leaders in support of business transformation wherein a business attempts to alter situations, circumstances, and/or achieve a desired future state where volatility exists, an entire system approach is required, and direct transformation may not be possible. However, the Freeth & Drimie conclusions assumed that business transformation questions existed and were an underpinning of the effort. Additonally, the need to be willing to ask difficult questions was not addressed by Freeth and Drimie. This pattern was consistent across 100% of the scenario planning business application literature I reviewed.

**Emergent Theme 5: Scenario Planning for Adaptability Is Never Over**

If the intent of scenario planning is to foster organizational adaptability, all 20 of the selected executives described scenario planning is a living activity. Thus, Theme 5 emerged from the notion that from an organizational adaptability perspective scenario planning is not a once and done activity nor is scenario planning ever finished. The selected executives believed that scenario planning was never finished because the business environment is always changing. Therefore, leaders and scenario planning teams need to revisit scenarios and scenario planning efforts to assess and incorporate environmental changes; thus, remain adaptive in a continuously changing landscape. Participant 1 articulated this need when stating

> Well, I think it certainly provides a paradigm through which managers can view their scope of work in several ways so that when necessary, the execution of a

> change is less disruptive. Certainly, there's a presenting element that would require a change in practice or at least the evaluation of whether that's necessary. If managers engage in that line of thinking on a regular basis, I think they become, just by nature, more agile because they're thinking about different ways to accomplish something.

Furthermore, participants identified that scenario planning yields additional scenario planning. For example, the identification of complexity, uncertainty, and unknowns may yield complexity, uncertainty, and unknowns that leaders would also need to address; hence, additional scenario planning, potentially with a different group of stakeholders may be required. An example of this concept was made evident by Participant 19's statement that

> If you do scenario planning on a regular cadence, you kind of exercise that muscle, it becomes easier to do and the entity becomes more adaptable in the long run. I'm sure it will also trigger other scenario planning exercises, too. So that if other areas are going to be impacted, they can also do their own specific scenario planning exercises and adapt accordingly.

Emergent Theme 5 is consistent with the scenario planning as well as CAS and chaos theory business application literature. For example, the scenario planning process articulated by Stepchenko and Voronova (2014) concluded with maintaining and updating scenarios while integrating indicators with performance metrics, refreshing, and updating scenarios as the future unfolded, and repeating the planning process as needed. Furthermore, Wilkinson and Young (2013) found that leaders who integrated CAS and

chaos theories into their strategy development processes could produce *soft strategies* that were more dynamic and adaptive to environmental change than more traditional rigid strategies.

**Emergent Theme 6: Understand the Benefits to Capitalize on Them**

All 20 of the selected executives described benefits associated with scenario planning. However, Emergent Theme 6 appeared in 14 of the 20 cases (70%) wherein the participants believed that while there were benefits, leaders needed to understand the benefits to proactively attempt to take advantage of the benefits. Specific to organizational adaptation as it relates to extreme disruptive complex events, the selected executives sought, experienced, and/or stumbled upon several benefits that stemmed beyond the business application/s. Capitalizing on the benefits was sometimes deliberate; however, there was a common occurrence where the benefits, as well as the magnitude of the benefits was accidental, unforeseen, undeliberate, and/or exceeded hopes and expectations of the participants. The primary takeaway was that executives that were aware of and understood the benefits were in a better position to deliberately capitalize on; thus, maximize the potential benefits.

The benefits identified by the selected executives included continuous learning, double-loop learning, enhanced decision-making, enhanced creative climate, identification of uncertainty and unknowns, mental model development, organizational learning, overcoming bias, and an increased understanding of complexity. Some of the alignment between the literature and the lived experiences of the selected executives included the findings that scenario planning had a positive impact on (a) organizational

learning; (b) changing employee mental models; (c) leveraging the positive impact of scenario planning on dialog and inquiry, team learning, embedded systems thinking, leadership, system connection, and empowerment; (d) double-loop learning; (e) changing and enhancing individual worldviews including the reduction of political while enhancing efficiency, social, and systems-oriented thinking; (f) bolstering creative organizational climates; and (g) increasing resilience (Andersen et al., 2013; Bradley et al., 2015; T. Chermack, Coons, et al., 2012; T. J. Chermack et al., 2017; Harris, 2013). I have listed the benefits identified by the selected executives with an interpreted description synthesized across cases and the number of participants that identified each benefit in Table 10.

Table 10

*Scenario Planning Benefits Identified*

| Benefit | Synthesized description | Number of participants |
|---|---|---|
| Continuous learning | Via multiple applications of scenario planning, participants continuously learned how things worked within the organization and the environment while also continuously identifying complexity, uncertainty, cross-impacts, dependencies, and unknowns as they emerged. | 4 |
| Double-loop learning | Participants learned not only the what but also the why behind organizational and environmental characteristics and dynamics. | 3 |
| Enhance decision-making | Participants made better decisions based on their understanding of the cross-impacts associated with decisions as well as developed better critical thinking skills as well as better criteria and principles upon which to base decisions. | 5 |
| Enhance resilience | Through better decision-making and contemplation of types of events and potential futures that could exist/emerge, participants were better prepared to adapt to events and change as they occurred including events that were not previously considered. | 5 |
| Foster a creative climate | The act of scenario planning promoted an organizational climate where collaborative creativity and thinking was valued and encouraged which enhanced resilience. | 7 |
| Identify and understand unknowns | Participants were not only able to discover and understand both things they did not know, but also things they did not know they did not know. | 17 |
| Mental model development | Via the collaborative nature of scenario planning participants achieved additional visibility into the organization and environment and expanded the way in which they viewed the organization and environment (world). | 2 |
| Organizational learning | Because of the collective learning of the participants, the organization was better positioned for and successful at organizational learning. | 5 |
| Overcome bias | Participants identified their preconceptions/bias regarding how things did and should work and could challenge their preconceived notions/bias. | 1 |
| Understand complexity | Participants identified and had a better understanding of complexity including the relationships and dependencies that underscored complexity. | 5 |

**Emergent Theme 7: The True Measures of Value Are the Benefits**

All 20 of the selected executives (100%) believed that leaders underestimating the benefits and the degree to which leaders could achieve the benefits was a critical error. The participants also articulated that achieving the benefits associated with scenario planning as an outcome was just as useful if not better than any other outcomes such as plans and strategies. Outcomes such as strategies and plans may be useful if the potential future becomes a reality but tend to go on a shelf and may be no longer relevant when referenced. Therefore, the value of scenario planning lies with the benefits. For example, Participant 17 articulated the true value of scenario plan when stating

> I would reiterate that the value in doing scenario planning is two-fold. It's in the process itself because in walking through the process, you bring a bunch of insights, you bring a bunch of understanding of your business, you extract from the process of planning the criteria that you use for making decisions. So just the process itself ends up being a significant part of the value that you get. Then the second part of that is the results of your plan, the plan that comes as a result of planning has its own value. Its value is generally no plan survives engagement with the event. So the value is a little bit fleeting, but if you do the process right then you will have extracted the criteria so that your organization can adapt when they engage with the event.
>
> First and most important is to not believe that the value comes from having a plan. A plan is just a thing that you can deviate from intelligently. I think the biggest pitfall is once people build a strategic plan, they live in this

> world where they have to follow it. They have to do what they said they were going to do which just doesn't take into account the fact that by the time you're done drawing that picture or writing that document the market changed. The criteria is really the only thing that stays constant.

Additionally, when applying scenario planning leaders should target the benefits as much, if not more so, than specific business applications when considering the desired outcomes. Leaders should remain cognizant of the notion that the future is unpredictable, and leaders should not consider scenarios distinct predictions of the future. The specific scenarios used may never occur; therefore, strategies for adaptation and resilience as well as the benefits associated with the act of scenario planning should underscore assessments of the value associated with the use of scenario planning as a means of adapting to extreme disruptive complex events. Participant 16 reinforced this theme when articulating

> It's exercising that depth of muscle in people's brains. Well, the obvious first point is why with anything, so what is the business value in doing scenario planning? Scenario planning, the way that I've laid it out, the value there is around creating that adaptive culture because you have no idea what's going to come at you. The best laid plans are not necessarily going to actually protect and manage that risk. So the reason why, that I would say to those executives, is that the reason why you would exercise scenario planning is to build that muscle in the organization. So institutionally, you can be very adaptive and responsive

> and you can recover from all these unexpected events more quickly. That's the primary value.

Participant 4 articulated the same theme:

> A lot of times with scenario planning and adaptability, the value is involvement from personnel because a lot of the adaptability is people-centric. What is key is engagement and how do I engage staff, employees, people, and customers so that they're part of the solution so that they don't feel like they've had to adapt. It was so seamless or transparent, we evolved versus adapted.

Additionally, Participant 19 identified this theme:

> Value-add for the outcomes is that you've got a more engaged organization because my assumption is that you've got people from every area participating in these individual planning efforts or in a larger scale organization planning effort. Outcomes would be you've minimized disruptions to the best of your abilities, and in turn, I guess from a business perspective, that translates into you've maximized what you can, such as profitability or whatever level of success that you have. The value is in actually doing the scenario planning.

Emergent Theme 7 is consistent with the literature. For example, the benefits attributed to scenario planning relate to an organization's ability to gain corporate foresight, deal with complexity, plan for uncertainty, develop contingencies, make robust decisions (advantageous decisions that address multiple futures and variables), and improve organizational performance (T. J. Chermack et al., 2017; Churchhouse et al.,

2017). The implication is that the act of scenario planning enables the achievement of desired benefits via the selected business applications. One scenario planning business application may facilitate multiple benefits such as organizational learning, double-loop learning, and enhanced resilience (Andersen et al., 2013; T. Chermack, Coons, et al., 2012; T. J. Chermack et al., 2017). All 20 of the selected executives felt that the true value in scenario planning was the benefits associated with conducting scenario planning and not the strategies or plans that may be a result of the effort although outputs like strategies and plans were valuable.

**Emergent Theme 8: It Is All About the Questions**

All 20 of the selected executives (100%) found that in their lived experience scenario planning must start with and focus on a question/s. Leaders and scenario planning teams must spark, and ground questions based on real concerns, issues, and/or opportunities. It is the question/s that underscore the activity by (a) setting context for scenarios and the planning activity (b) getting people to engage, (c) keeping the effort on track, (d) identifying the desired outcomes, (e) right-sizing the scenario planning effort, and (f) knowing when the outcomes have been achieved. For example, Participant 5 identified grounding questions:

> I think it would be, and this is just my whole belief system, that you should engage the people in identifying scenarios to focus on, first off and get them engaged from the very beginning. Ask which do you think are the most important that we should start with, rather than executives choosing.

Participant 9 articulated grounding questions:

> I think it's really around first identifying and listing out what are the possible things that could affect our organization. I don't think you ever fully plan for all of them, but I think you can look at all the lessons out there and say what are the common ones that affect organizations like us. What do we think are potential scenarios based upon our makeup and framework of our organization? What would we actually do? Let's talk about how we're going to deal with it.

Participant 14 highlighted grounding questions when using an event that was recently experienced to foster adaptability to potential future events.

> I think about living through some of these events, I think being deliberate and thoughtful, about the reflecting on the event is essential, rather than we've survived that event, now let's just go on with business as usual. It really is about saying okay, we just went through something crazy and it's not just a simple question of saying what did we learn from it. We adapted, and the reason we adapted is because we took the time to be thoughtful about it. I think after an event it is about being thoughtful about it, saying okay, we just went through a real-life scenario, this isn't fictitious, it's real. Then really spending the time to reflect and learn from that experience.
>
> I think we can do the same thing when you think about planning for and preparing for a scenario. We talk about disaster recovery all the time. We always use the phrase it's not a matter of if, it's a matter of when. Well, shoot, what are we going to do in the event of? Well, we're going to suffer as an organization.

> It's going to be a painful process. So really taking the time now to ask what does that really look like? What is the impact going to be?

Emergent Theme 8 is a matter of application identified by the selected executives based on their lived experiences and supports the scenario planning literature. For example, Emergent Theme 8 supports the findings of Bielińska-Dusza (2013) that leaders must strategically align scenario planning efforts with other strategy development processes and relevant to the organization, the organization's environment, and intended outcomes. Emergent Theme 8 also supports the conclusion of Amer et al. (2013) that asking the right questions was vital to ensure that scenario planning efforts remain inherently relevant and relevant in relation to any other tools used within an organization.

**Emergent Theme 9: Focus Participation on Those Who Can Affect Adaptation**

All 20 of the selected executives identified a myriad of types of individuals that should be included in scenario planning activities. The participants identified were senior leadership, internal stakeholders, external stakeholders, front-line personnel, and decision makers. However, it was also important to keep the number of participants manageable to make progress. The challenge was identifying the right type and number of participants to include. However, within 16 of the 20 cases (80%), one litmus test for whom to include did emerge. The litmus test was a question of whether the individual outright, or as a group representative, can or could affect the type of permanent change adaptation would require. If the answer was yes, then that individual should participate which was the foundation for Emergent Theme 9. Emergent Theme 9 supports and is supported by the scenario planning literature in so far as participants need to be change

agents with the temperament and influence to affect change (Konno et al., 2014b). However, regardless of the numerous types of participants, thinking patterns, and participant traits that could be useful, under Emergent Theme 9, it is the ability to have a positive effect on change that is the distinguishing factor as to who should participate.

Another caveat associated with participation is that an assumption that leaders and managers in the organization's hierarchy are the ones that can affect permanent change is inherently flawed. Most of the participants believed that individuals outside of the top-down organizational hierarchy might be more capable of affecting change based on their interactions with others. Additionally, the selected executives believed it was an arrogant presumption to believe that executives and senior leaders know best because those closest to where adaptation would need to occur usually had a better understanding of the type of adaptation that may need to occur. That said, when selecting participants where there is a need to limit participation, leaders should select individuals that can affect adaptation and assume that some of these individuals may exist outside of the organizational leadership hierarchy. Participant 17 highlighted the need to include individuals that can affect adaptation:

> One of the key things about what scenario planning does is it gives the leaders of any part of an organization (and not just the leaders, I was going to qualify that by saying not just the leaders but the individuals), who are actually stepping up, and making decisions, and drive things, regardless of whether they live in the management hierarchy, have a clear set of guidelines about what they are pre-empowered to do. They can just make decisions and move forward. In very

> dynamic adaptive organizations, people do not just understand what is presented, they understand the dynamics of the business around them and why what they presented got approved. They make decisions and adapt to changes in the market, in their staffing levels, and in their budget, etcetera, based on the rationale for why. If you have a truly adaptive organization and the leadership of your organization understands the criteria that got used, then you still have the ability to respond both individually and as an organization. You still have the ability to respond very quickly to changes in the marketplace, to new regulation, to all that.

Participant 20 illustrated the pitfall of thinking executives and senior leaders know best:

> The trap for executives in particular, is thinking that they're in control and that they're thinking that they're essential. So, one failure mode that I have seen repeatedly is, okay there is an event, all of the executives have to get together in a room, and we're going to figure out what we're going to do. As soon as we figure it out, then we will tell a few people, and we will tell a few more people, and eventually, it will get out to the rest of the organization. So, the belief that they are essential and that everything else is off, and that you're switched into response mode is, I think, a trap. The second trap is thinking that you are more capable as an organization than you are actually are. Executives tend to believe that the organization is more mature than it really is, that everybody will do the right thing the first time, that nothing will go wrong, and that with the right people in the room, anything can be done.

Participant 4 reinforced the flawed assumption that senior leaders know best:

> The things that I would recommend to avoid from an executive level is to think that you already know. We all have experience, so typically if you're an executive level person, you have some history of an experience that you're drawing from. There are so many blind spots that we all have and we don't know we have those because they're new blind spots perhaps. I call it *executhink*. Here's a great example, you buy the latest and greatest widget of something and in your mind, its the best change for your customers, the best change for your staff, and you buy it and you invest in it and you plop it down into your organization and your outcome is not achieved because your customers hate it and your employees hate it and they say this is the worst system that you've ever invested in.

**Emergent Theme 10: Focus Scenarios on Transformation and Collapse**

While none of the 20 selected executives named specific scenario classifications or types of scenarios as stated in the literature, all 20 (100%) of the participants described the scenarios they used as having some of the same characteristics as those within the literature. I interpreted the descriptions as a subset of the classifications and types presented in the scenario planning literature. Only two scenario planning classifications emerged as useful when the intent was to effect organizational adaptability. The first classification was transformation and the second classification was collapse.

Under the transformation classification, future structure and foundations change, assumptions change, and the future is transformed by internal and external change (Amer et al., 2013). Transformation, as it related to organizational adaptability, was centered around scenario planning based on the assumption that future extreme disruptive complex

events will cause fundamental change in the organization or environment and/or foundational change in the way business is conducted. Therefore, adaptation would require foundational and/or structural change.

One example of transformation was Participant 3's statement that

> You're going to have changes. And so, I think the more you talk about scenario planning, you talk about things that could happen. The more you talk about the different risks and the concerns that you have that could keep you from being successful, the more you can plan and minimize those risks.

Another example of the transformation scenario classification was Participant 7's description of a scenario where

> There's the bill out there that might pass. So does this change your strategic path? One thing to do is just sit back and let it happen. A second path might be craft this into something that we might like better. That may or may not change our strategic focus. Thinking about resources there's a bunch of things that go into that, thinking not just about our strategy, but resources. If the legislature just wanted to do this and there were no resources, how would we do it?

Under the collapse classification, continued growth does not occur, contradictions exist, and unknowns manifest in diverse ways (Amer et al., 2013). Collapse centered on scenarios wherein growth and/or business operations cease as uncertainties and unknowns became reality. Collapse was most prevalent in participant descriptions of response centric scenarios. One example of collapse was Participant 14's description of a network intrusion and data breach scenario wherein

> We weren't able to quickly identify and respond, as a result, it spread like wildfire. It led to a point where within a day or two, we had to make the hard recommendation to our director to essentially shut us down, to unplug us from the internet, turn off our online services, shut down our internal systems, to essentially take this department and just stop doing business for a period of time.

Regardless of scenario classification, the types of scenarios as defined in the literature included the use of anticipatory, descriptive, deductive, exploratory, inductive, normative, and research scenarios. The anticipatory scenario was by far the most common scenario type used by the selected executives. All 20 of the participants (100%) described the use of scenarios that aligned with the concept of anticipatory scenarios. I have outlined the scenario types along with an interpreted description synthesized across cases and the number of participants that described each type in Table 11.

Table 11

*Scenario Types Used*

| Scenario Types | Description | Number of Participants |
|---|---|---|
| Anticipatory | Scenarios that anticipated (not predicted) future events, circumstances, and/or dynamics including the effects thereof. | 20 |
| Descriptive | Scenarios that described potential future conditions to discover complexity, uncertainty, and unknowns. | 3 |
| Deductive | Scenarios designed to discover future-oriented relationships, dependencies, and possible cross-impacts as an event unfolds over time. | 4 |
| Exploratory | Explore the probability and means of adapting to potential future states based on a series of actions and or decisions as the actions were taken and/or the decisions were made. | 10 |
| Inductive | Scenarios designed to uncover relationships, dependences, and interconnectedness within the organization and/or environment. | 2 |
| Normative | Scenarios that evolved over time to determine what sort of actions should be taken and/or decisions that would be either required or made to successfully adapt given a specific type of event/s. | 11 |
| Research | Scenarios designed to discover and analyze relationships and cross-impacts to determine what decisions and/or actions would have the largest positive or negative impact on the organization. | 3 |

**Emergent Theme 11: Establish and Adhere to Principles**

In alignment with the scenario planning literature, all 20 of the selected executives (100%) felt it was critical that scenario planning efforts adhered to several principles to ensure efforts were relevant, added value, and were not academic. To that end, the participants identified several principles that leaders should apply to scenario planning and the scenarios used. The principles also appeared in the scenario planning literature as principles and validation criteria specific to the creation of scenarios. The difference between the principles in the literature and the principles discussed by the

selected executives was that the participants applied the principles to the development of scenarios and extended the principles to scenario planning in its entirety.

Furthermore, while the need to ensure scenario planning was relevant may have gone without saying, based on the lived experiences of the selected executives the application of these principles represented genuine issues with which the selected executives had to struggle. The selected executives identified five principles which included validity, utility, significance, plausibility, and probability, as well as accuracy and objectivity. The five principles that the participants identified were aligned with principles within the scenario planning literature and included significance, accuracy, and objectivity as discussed by Bielińska-Dusza (2013) and Amer et al. (2013); validity, plausibility, and probability as described by Alexande et al. (2012), Amer et al. (2013), and Moriarty (2012); and utility as presented by Amer et al. (2013).

The first principle was validity wherein the participants believed that scenario planning and the scenarios used had to be valid. The challenge was how to determine if the activity and/or scenario was valid. To overcome this challenge the selected executives expressed the need to ground the effort in reality. An example of this concept was described by Participant 14's statement that

> It needs to be based on reality. Reality based upon the current state of the organization for example, the resources that we currently have available. The staffing that we have available. We need to base it on where we're at today in order to make some decisions around what do we need going forward. It needs to

> be as real as possible. It needs to be grounded in reality. The catch is, don't pretend.

The second principle was utility. The selected executives felt it was critical to ensure that scenario planning efforts served a real purpose. Additionally, the participants felt that right-sizing and scoping the effort in a way that made sense was paramount to ensuring the activity served a real purpose. Participant 15 articulated this concept:

> I think with any methodology or tool, it's got to be the right tool for the right time. It's got to be something that's executed well. It can't be done amateurishly.

The third principle was significance. The selected executives felt that significance was a cornerstone for validity and utility. However, the applied issue was evaluating whether the scenario planning activity was significant while also ensuring that the effort remained significant once underway. The participants used several litmus tests to evaluate significance. The most common litmus tests were questions asked of the exercise and the scenarios developed to support the exercise. The questions that needed to be answered to establish significance were summarized in Participant 11's statement that

> What are you actually going to care about? How efficiently can you get from here to there without getting bogged down? There's so much noise in any large organization so what are you going to think about and what you really care about? What keeps you going? What do you care about?" I think unless these folks in this room who are making decisions can decide what they really care about, then they will never know when they got there. What does that mean? What do you

really care about for your organization? What can you just let go off your back? What do you have to fight for?

The fourth principle was plausibility and probability. Plausibility and probability represented some dialectical challenges. One of these challenges was reconciling the plausible with the probable to yield a significant, valid, and useful scenario and scenario planning exercise. Specifically, where are the lines drawn between how realistic a scenario is, the odds it could happen, and the impact if it did happen to determine if the scenario is significant, valid, and useful; thus, should or should not be considered by leaders and scenario planning teams. Participant 2 best articulated the dialectical challenge between plausibility and probability

> I think in one of the examples that we all know about is that no one in their scenario planning ever thought about what would happen if the planes hit the towers in New York. It was not a planned scenario. Was it a discussed scenario? Yes, but it was discarded because it was viewed to be too obscure. You look at the scenario and you assess it in terms of your degree of probability and certainty, but you still have to look at the scenario and say, "In the event the scenario would occur, even if it's improbable, what would my response be?"
>
> One of the good examples that I use often is how often does a child have a heart attack in school? Really, really, really, really, infrequently right, in the grand scheme of all the kids that go the school. But scenario planning says that, "In the event a child does have a heart attack in the school then I need to be able to tap the right response." That scenario planning has put an AED in a public

> place, where it's easily accessed, in every single public school in the nation. How often does it have to be exercised? Very, very, very, infrequently. How practical would it be through the experience of many of the people? Pretty impractical, but by having that scenario planning done and the response planned, when a child does collapse someone can go get the AED and perform the correct procedure. That kid's life had been saved, when otherwise would not have been. So the unthinkable is not a reason to reject a scenario, is my point.

The fifth principle was accuracy and objectivity. The selected executives felt it important to ensure that scenarios represented accurate depictions of potential futures and that scenario analysis was both accurate and objective based on how things really worked within the organization and the environment as well as what really needs to be done or occur. A prime example of accuracy was articulated by Participant 5:

> If it's too nebulous, I would say that your probably not going to find out, or going to the right people to find out, what the real scenarios that could be happening are. People do have ideas of potential risks but are they accurate? That's how I would think about it.

A prime example of the principle of accuracy and objectivity is illuminated by Participant 1's statement that

> You first have to know what is the X you're trying to solve for. Are you sure that X, that variable that you're trying to solve for, is truly necessary? Then I think it's a constant review of those things. Confirming that yes, this is the core product, the service we're obligated to provide. This is what is truly required to provide it.

**Emergent Theme 12: Do Not Get Bogged Down in Approaches and Methods**

None of the 20 selected executives consciously or deliberately applied any of the approaches and analysis methods presented in the scenario planning literature. Only two of the 20 selected executives were aware of the existence of structured or rigorous approaches and analysis methods. However, all the selected executives identified successes when it came to the use of scenario planning to prepare for, and adapt to, extreme disruptive complex events. As a result, Theme 12 emerged because the executives did not use the structured and rigorous approaches and analysis methods outlined in the scenario planning literature nor were they required for scenario planning efforts to be successful. Hence, leaders do not need to get bogged down using structured and rigorous approaches and analysis methods and should take care to ensure process does not get in the way of progress which is inconsistent with the scenario planning literature. Participant 17 articulated this theme best:

> What it boils down to is, at the end of the day don't worry about a plan, worry about the rationale for how you got to the plan. And it doesn't matter what technique you use, as long as you understand what the values of the organization are and the criteria that you use to make decisions. That's what you're going for.

However, based on interpretation, some of the selected executives described a few of the concepts behind the intuitive logistics and extreme worlds scenario planning approaches which may prove useful. For example, some of the participants described the understanding that complex and complicated relationships existed between economic, political, technological, social, resource, and environmental variables and that multiple

potential futures could exist along with multiple paths to each potential future. This type of understanding is consistent with the intuitive logistics approach as described by Amer et al. (2013), Cairns et al. (2016), and Derbyshire and Wright (2017) but, unlike the intuitive logistics approach these types of understanding were not underlying assumptions leading into scenario planning activities. Instead, the selected executives discovered the relationships, multiple potential futures, and multiple paths to a potential future during the scenario planning process and they did not assume them ahead of time.

Additionally, some of the participants hinted toward an extreme world approach. This was visible when exploring scenario planning related to *black swan* (catastrophic) events. However, unlike the extreme worlds approach presented by Moriarty (2012) the selected executives only considered the negative polar extreme (worst-case). The participants did not consider a positive polar extreme (best case) or the construction of scenarios based on the convergence of best and worst-cases.

Regarding analysis methods some of the participants described the concepts of past casting, backcasting, collaborative analysis, and the Delphi method which they found useful. I based this interpretation on shared descriptions of scenario planning efforts that collaboratively leveraged the collective experience, knowledge, and expertise of the participants which is consistent with collaborative analysis and the Delphi method as described in Borch et al. (2013) and Harris (2013). There was also discussion of scenario analysis starting from the potential future state then working backward to the present and/or starting from the past and working forward to the present which is consistent with backcasting and past casting as described by Deal et al. (2017).

**Emergent Theme 13: Rigorous or Rigid Processes Are Not Required**

All 20 of the participants (100%) stated that they did not use a formal scenario planning process. In fact, none of the selected executives seemed to be aware that there were formal or structured processes associated with scenario planning. This gave rise to the theme that a formal structured process was not required to successfully (as success was described by the participants) engage in scenario planning. Instead, the selected executives used a process that they believe was right-sized, based on the scenario planning effort. Furthermore, the participants believed that keeping the effort as simple as possible was crucial. The sentiment to keep things simple was best described by Participant 8's comment that

> Keep it simple. As you go through these different scenarios, you can go down the rat hole and lose the minutia pretty quick, and you get bogged down. Start with the big rocks and then as you iterate, you can break those rocks down smaller and smaller. Take it in passes. Start with the big rocks. Get agreement on direction, strategy, and those types of things, and then compartmentalize. Don't try to do everything at once.

The notion that a rigorous or rigid process is not required runs contrary to the scenario planning literature; however, there were some common threads related to several of the process outlined within the literature. For example, four steps within the 8-Step general scenario planning process outlined by Konno et. al. (2014b) aligned with activities conducted by the selected executives. Furthermore, three-steps from the 5-Step transformative scenario planning process identified by Freeth and Drimie (2016) aligned

with activities described by the participants. Overall, only one general 3-Step process emerged within 7 of the 20 cases but did not span more than 50% of the cases. Therefore, the general 3-Step process did not rise to the level of a theme. Step 1 was to select participants and identify the objective behind the scenario planning effort and the desired outcome. Step 2 was to develop and analyze the scenarios. Step 3 was to produce any artifacts (such as plans, strategies, decisions, etc.) associated with the desired outcomes. One of the selected executives reversed Steps 1 and 2.

**Emergent Theme 14: Structured Tools Can Be Useful but Are Not Required**

All 20 of the selected executives (100%) stated they had conducted scenario planning without integrating any formal tools into their scenario planning efforts. However, all of the participants stressed that this did not mean that tools were not useful. All 20 of the selected executives relied on informal and less structured tools like quick brain exercises, whiteboarding, unstructured brainstorming, and liberating structures. When the selected executives did use tools, they warned that the tools needed to be the right tools for the task and that using tools must not eclipse progress, thus, the use of tools needs to be right-sized for the scenario planning effort. For example, Participant 14 identified the lack of a need to rely on tools:

> No specific tool, it really is about saying okay, how are we going to do it. It's collectively figuring out what sort of questions we're going to ask, what an agenda might look like, what artifacts we can bring in and look at, what sort of preparation, what kind of questions we can give to the distance participants

> beforehand. Here's a tool that we can use to help us get from here to there. It's just coming together and figuring it out.

Participant 17 articulated the need to select the right tool for the job at hand:

> There are almost too many of them to go over. I think every senior leader that I'm aware of has their own toolkit and they apply that toolkit in different ways to different degrees as they see fit. SWOT is probably the iconic example of that. Nobody I know has gotten past first-level manager without knowing how to do a SWOT analysis.

The lack of tools being required is not inconsistent with the literature because the authors of the literature identified tools from the standpoint of how they could be used, there were no assertions that tools must be used or which tools were the best for any given scenario planning effort. Consistent with the literature, the executives that did integrate formal tools that also appeared in the literature identified SWOT analysis as described by Ramooshjan (2014), Porter's Five Forces as discussed in Dobbs (2014), as presented in, detailed value chain analysis as presented in Konno et al. (2014b), and structured brainstorming and visualization as described in Alexander et. al. (2015). Four of the selected executives also identified tools that did not appear in the scenario planning literature including LEAN exercises, PESTLE analysis, and structured tabletop exercises. The participants used these tools to identify questions going into scenario planning as well as frame and analyze scenarios. Regarding the use of LEAN, the selected executives used scenario planning to assess the impact of process change. The point was to attempt to assess whether the process change would represent actual improvement. I have

presented the tools identified by the selected executives with a synthesized description of how the participants used each tool in Table 12.

Table 12

*Scenario Planning Tools Identified*

| Tools Identified | Description |
|---|---|
| Tabletop exercises | The use of a collaborative exercise wherein participants took action and made decisions as an event unfolded then conditions were injected into the scenario by a moderator/s based on the actions taken and decisions made. |
| SWOT analysis | The analysis of organizational strengths, weaknesses, opportunities, and threats the organization would have or face if certain future conditions existed. |
| Porter's Five Forces | The use of porters five forces to assess impacts on the organization and environment should certain types of events occur. |
| PESTLE | The use of PESTLE analysis to identify the organizational and environmental conditions that could exist and could represent threats or opportunities should a type of event occur. |
| Detailed value chain analysis | The detailed analysis of how a value chain would be positively or negatively impacted based on future events, decision, and/or actions. |
| Structured brainstorming and visualization | A moderated/facilitated brainstorming exercise that included the creation of visualizations such as mind maps to structure and/or facilitate brainstorming activities. |
| LEAN | The use of LEAN techniques to assess processes improvement and assess whether the improvements would lead to greater resilience given potential future events or conditions. |

## Applications to Professional Practice

Based on the 14 themes regarding the information executives need to use scenario planning to adapt to extreme disruptive complex events, there are implications for application to professional practice because the ability to adapt to extreme disruptive complex events is crucial to survival. The implications for professional practice include three primary areas. Each area serves to reinforce the others. The first area is the application of scenario planning with an eye toward adaptability regarding extreme

disruptive complex events. The second area is the application of scenario planning using a CAS and chaos theory lens. The third area is potential ways to assemble a scenario planning machine using the plethora of options that geared toward the desired outcome/s.

**Application of Scenario Planning With an Eye Toward Adaptability**

Applying Theme 1 (there is a difference between adaptability and response) and Theme 8 (it is all about the question) means that the question/s behind a scenario planning effort associated with adapting to extreme disruptive complex events must focus on adaptation versus response. However, the answers to response related questions may provide input to adaptation focused questions. Therefore, leaders need to frame scenario planning overarching questions in a way that specifically targets adaptation. One simple means of framing adaptation versus response centric questions would be to focus on the action verbs in the questions.

The key difference between response and adaptation expressed by the selected executives was that event response was reactive and controlled while adaptation was the ability to proactively change and morph due to an event which could be deliberate and controlled but also tends to be more organic. Therefore, response centric questions would contain action verbs such respond, react, and do if. Examples of response centric questions may include (a) how leaders and the organization would respond to a reorganization, (b) how the leaders and the organization would react to the sudden loss of resources, or (c) what would the leader and organization do if a certain type of disaster occurred questions. Conversely, adaptation centric questions would include action verbs such overcome, survive, and change. Examples of adaptation centric questions could be

(a) how would leaders and the organization overcome the sudden loss of resources, (b) how would leaders and the organization survive a certain type of disaster, or (c) how would leaders and the organization need to change if a reorganization needed to, or had happened.

A common epiphany most of the selected executives had because of exploring their lived experiences and perceptions is that they conducted numerous types of scenario planning to various degrees far more often than they consciously or intentionally thought. For example, arguably, scenario planning with an eye toward adaptability using a CAS and chaos theory lens in its most basic form can be relatively simple and applied by an individual prior to and during a simple conversation.

Anytime a leader seeks a specific outcome (objective) and plans a conversation ahead of time, taking into account various ways the conversation could play out (scenarios) and how they would adapt if the conversation started to play out in certain ways to achieve the outcome, the leader has engaged in scenario planning with an eye toward adaptability. Furthermore, if the leader also considered how the conversation (local interaction) could have a butterfly effect in other parts of the organization (nonlinear remote effects), then the leader has engaged in scenario planning with an eye toward adaptability using a CAS lens. Moreover, anytime a leader enters a conversation (local interaction) with a desired outcome (objective) and alters what they say (adapts) based on potential reactions (scenarios) and the potential far-reaching implications (nonlinear remote effects) then the leader has engaged in real-time scenario planning with an eye toward adaptability using a CAS and chaos theory lens.

Based on the 14 themes associated with what leaders need to know about the use of scenario planning to adapt to extreme disruptive complex events, leaders could scale-up the basic form of scenario planning for application to larger-scale and more formal scenario planning efforts. In this regard, the application of scenario planning would include putting prior thought into setting up the scenario planning effort as a structured conversation. For example, the thought put into the effort would include developing preliminary answers to some basic, albeit sometimes difficult questions. These preliminary answers could, and in some cases should be refined by the scenario planning team.

The first set of questions would be grounding questions related to the scenario planning effort and include questions such as (a) what is the topic of conversation; (b) what are the questions leading into the scenario planning effort; (c) what are the challenges and/or opportunities that would drive the conversation/effort; (d) who should be included in the conversation; and (e) what are the desired outcomes (business application, benefits). Answering this first set of questions could support the application of (a) Theme 3: Scenario planning can be applied to any business area, (b) Theme 4: Do not be afraid to tackle difficult questions, (c) Theme 6: Understand the benefits to capitalize on them, (d) Theme 7: The true measures of value are the benefits, and (e) Theme 9: Focus participation on individuals that can or could have a direct impact adaptation.

A second set of questions would be around the context and boundaries of the conversation. Preliminary answers to these questions would include things like extreme

disruptive complex event type, scenario classification, scenario types, and potentially the actual scenario/s as well as the criteria and principles leaders and scenario planning teams should apply to the effort. Answering this second set of questions could provide the opportunity to apply Theme 10: Focus scenarios on transformation and collapse and Theme 11: Establish and adhere to principles.

Leaders could center a third set of questions on how the conversation should be structured and what tools, methods, and/or process would be beneficial and appropriate. This third set of questions is pertinent because scenario planning efforts should be right-sized based on the scope and magnitude of the effort as well as available resources. Answering this third set of questions would afford the opportunity to apply (a) Theme 12: Do not get bogged down in approaches and methods, (b) Theme 13: Rigorous or rigid processes are not required, and (c) Theme 14: Structured tools can be useful but are not required.

The answer to all three sets of questions provides the scaffolding for leaders to assemble a scenario planning machine. Furthermore, answering the three sets of questions is one way of right-sizing the scenario planning effort. Thus, apply scenario planning as a means of adapting to extreme disruptive complex events while incorporating the 14 themes the selected executives identified as items leaders and executives need to know.

**Application of Scenario Planning Using a CAS and Chaos Theory Lens**

Based on the synthesis of what information leaders need (what leaders need to know) to use scenario planning to adapt to extreme disruptive complex events as well as

the business applications of CAS and chaos theory within the literature there are numerous ways leaders could use CAS and chaos theory concepts as a lens for scenario planning with an eye toward adaptability. Specifically, to apply Theme 2: CAS and chaos theories provide a lens for scenario planning with an eye toward adaptability, leaders could use the elements of CAS and chaos theory to view and focus the analysis of scenarios as well as create dynamic strategies and tactics to adapt if a type of extreme disruptive complex event were to occur. CAS and chaos theory concepts could represent things to look for and influence in favor of positive adaptation. Some of the CAS and chaos theory concepts to look for, assess, and try to influence could include strange attractors, attractors, sensitive/historical dependence, bifurcation, nonlinearity (butterfly effects), self-organization, creative destruction, emergence, and ultimately navigating the edge of chaos. Additionally, looking at these concepts could help identify uncertainty and unknowns as well as help identify and understand complexity that may be nonobvious while uncovering known unknowns. I have presented some of the CAS and chaos theory concepts, what to look for, and some related potential ways to influence positive adaptation using each concept in Table 13.

Table 13

*Application of CAS and Chaos Theory Concepts as an Adaptability Lens*

| Concept | What to look for | Ways to influence |
|---|---|---|
| Strange attractor | What are the event characteristics that would generate behaviors that seem random, but represents a pattern that irregularity and instability have become normal and steady conditions? How has the event resulted in predictable unpredictability and what would become predictably unpredictable? | Probably none, however, this examination could be used to inform dynamic strategies and tactics to drive successful adaptation as well as help identify complexity, uncertainty, unknowns, and unpredictability. |
| Attractor | What are the specifics regarding what happened or is happening that created the conditions driving the need to adapt? What are those conditions? | How can the conditions be anticipated in preparation for and how can they be influenced during an event? |
| Sensitive/historical dependence | How and why are parts of the organization sensitive to the characteristics of the event and how could sensitivity (large or small) spark irreversible reactions that would have significant long-term effects on part or the entire organization? | How can sensitivities be leveraged in such a way that the irreversible reactions could support positive adaptation? |
| Bifurcation | What would be the points of no return associated with the event and how would the organization reach points of no return? | How could leadership anticipate and steer towards points of no return while taking advantage of them as a means of influencing positive adaptation? |
| Nonlinearity | How are the parts of the organization interconnected and interdependent in such a way that an action in one part could have a disproportionate impact on other parts of the organization? How would these butterfly effects propagate throughout the organization and how rapidly could the effects spread? | Via understanding what organizational interconnectedness looks like, identify who can influence the connections and become positive change agents. What tactics could make use of potential butterfly effects so each tactic has the greatest rapid positive effect? |
| Self-organization | How would the parts of the organization and the entire organization organize around adapting to the event outside of, or without, centralized control? | How could leadership provide enough structure but still enable enough flexibility to allow the organization to adapt organically? |
| Creative destruction | How could parts of the organization or the entire organization be restructured in support of adaptation and/or what would need to be restructured to adapt? | How could resources be redistributed based on required changes and/or to enable successful adaptation? |
| Emergence | What organizational patterns of behavior would emerge from the cumulative behavior of parts of the organization as the parts responded and/or attempted to adapt. | How could individual behaviors be influenced to promote the positive emergence of organizational behaviors? |

Once leaders have considered the characteristics of CAS and chaos theory including uncertainty, unknowns, unknown unknowns, and complexity as well as tactics to address them, leaders could turn their attention to successfully navigating the edge of chaos. Leaders should also take into consideration the new realities associated with living in a post-event environment. Leaders could collectively consider the characteristics of the event as well as the CAS and chaos theory based characteristics of the organization, and environment including opportunities and traps to avoid to develop comprehensive and dynamic strategies that would enable the organization to navigate the edge of chaos; thus, successfully adapt. Furthermore, leaders could pay attention to how the strategies and/or tactics could be reused to prepare for and adapt to other types of extreme disruptive complex events. These strategies and/or tactics could also include the prioritization of decisions and actions based on the mitigation of the biggest threats to survival if the type of event were to occur.

Because organizations and the environment constantly change, the variables associated with scenario planning driven adaptive strategies and tactics will also change. This reality gave rise to Theme 5: scenario planning is never done because environmental and variable changes would require the organization to revisit adaptation focused strategies and tactics including decisions that leaders would need to make and actions that leaders would need to take. Therefore, as part of the scenario planning effort, it would be beneficial to identify triggers that would spark the need to revisit the scenario planning effort to adapt to new realities that emerge over time.

**Application of Scenario Planning Via Machine Assembly**

Using the scenario planning machine metaphor, each of the selected executives assembled their machine differently; however, there were some common themes associated with how the participants assembled their machines. These themes support the notion that leaders could tailor scenario planning efforts to the specific needs of an organization and the desired outcome by selecting from a buffet of options I have illustrated as gears. The themes that emerged also underscored the notion that there is not, nor does their need to be, a one-size-fits-all or one-size-fits-most prescriptive approach to scenario planning. Furthermore, the application of scenario planning should be right-sized to the organization and the desired outcome/s.

Through the combination of (a) the way the selected executives engaged scenario planning, (b) the 14 themes regarding what leaders need to know to use scenario planning as a means of adapting to extreme disruptive complex events, and (c) the scenario planning literature there are numerous ways in which leaders could assemble their scenario planning machines and in so doing apply scenario planning to professional practice. To that end, based on a synthesis of the findings and the literature, I have identified three potential ways leaders could assemble their scenario planning machine to apply scenario planning as a means of adaptation to extreme disruptive complex events. The first machine is an illustration of one way leaders could assemble a scenario planning machine to adapt to changes in organizational structure such as mergers and reorganizations. The second machine is an illustration of a machine assembly leaders could gear toward adapting to resource events including the loss of financial and/or

human resources. The third machine is an illustration of how leaders could design a scenario planning machine in support of adaptation to natural or human-made disasters.

**Machine 1, adaptation to mergers and reorganizations**. If the intent of scenario planning was to develop strategies and plans regarding adaptation to a merger or reorganization; however, the real desired output was to enhance an organization's ability to adapt to mergers and reorganizations, the business application gears could include business process management, contingency planning, organizational change management, operations management, and supply chain management due to the likelihood that these areas would be impacted by an event. The desired benefit gears that leaders would need to understand that could provide the real value might be understanding complexity, the identification of uncertainty, the identification of unknowns, resilience, better decision-making, double-loop learning, and continuous learning. Given the potential magnitude of a merger or reorganization executives could limit the initial pass at scenario planning to senior leaders and key internal stakeholders at least until leadership has devised an approach to the issue that would not instill panic. Thus, the participant gears would be senior leadership and key internal stakeholders. The scenario gear could be a transformational scenario given that a merger or reorganization may shake an organization to its foundation using exploratory, deductive, descriptive, or anticipatory scenario types. The principle gears would need to include validity, utility, and significance to ensure the scenario properly, effectively, and comprehensively addresses a potential future state where a merger or reorganization has occurred or is occurring. While leaders would not need to use formal tool gears, brainstorming and

visualization, as well as SWOT analysis, might be of benefit during an initial pass at scenario planning. Development and analysis gears would not need to be rigid but could at least be loosely based on the Delphi and collaborative analysis methods. Leaders could limit the process gear to a basic 3-step process especially if the first pass is informal and only includes a handful of senior leaders and key internal stakeholders. I have illustrated the construction of this type of scenario planning machine in Figure 12.

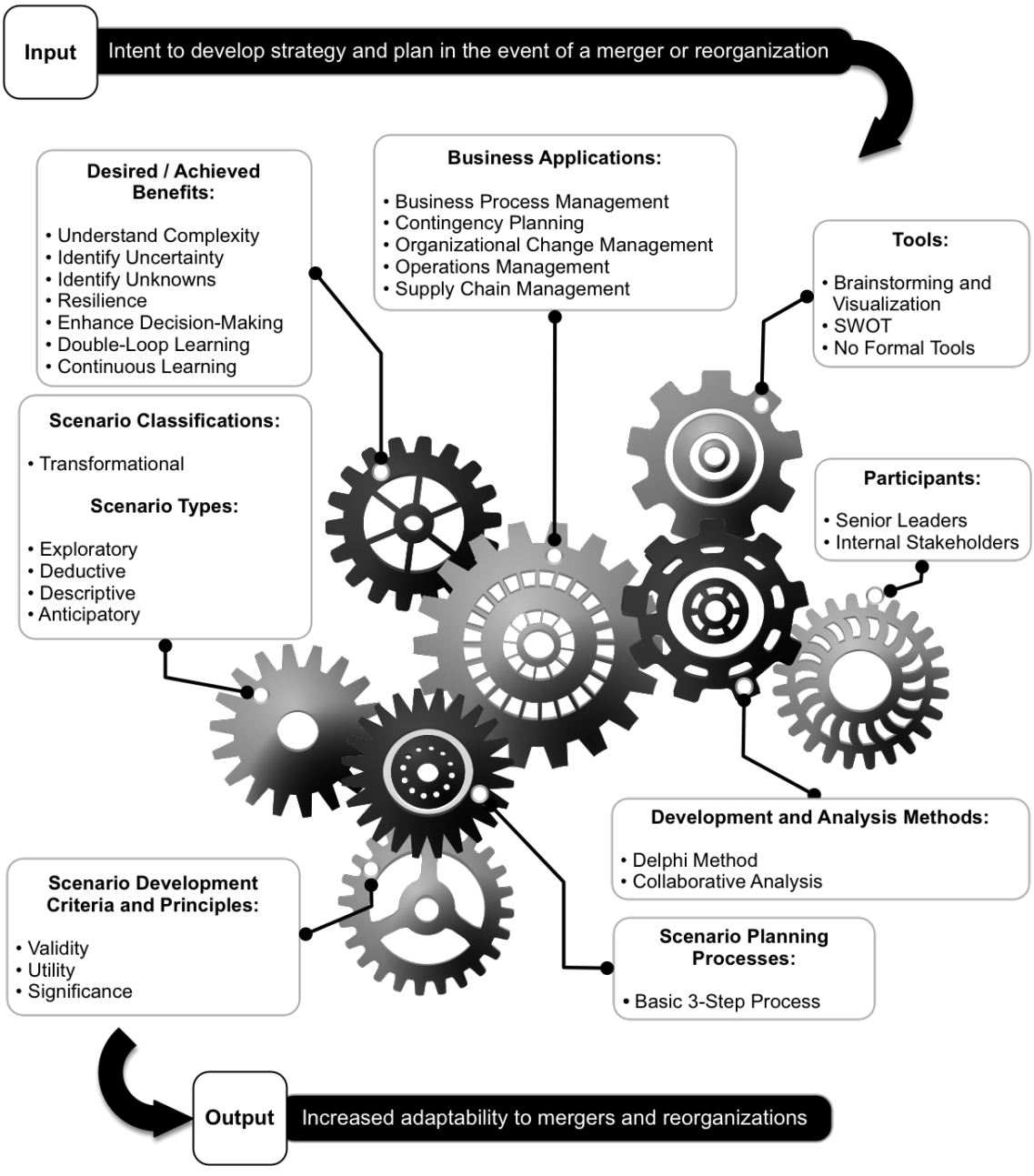


*Figure 12.* Machine 1, adaptation to mergers and reorganizations.

**Machine 2, adaptation to the loss of resources.** If the intent of scenario planning was to develop strategies and plans regarding adaptation to the major loss of fiscal and/or human resources; however, the real desired output was to enhance resilience

to the lack of or loss of resources, the business application gears could include business process management, contingency planning, organizational change management, operations management, program and project management, risk management, and technology management due to the probability that these areas would be impacted. The desired benefit gears that leaders would need to understand that could provide the real value might be understanding complexity, identifying uncertainty, identifying unknowns, resilience, enhanced decision-making, double-loop learning, continuous learning, mental model development, and overcoming bias. Given the potential impact of the lack or loss of resources, the participant gears would include senior leadership, internal stakeholders, and front-line decision-makers that would need to make the real-time decisions that could affect adaptation. The scenario gear could be collapse scenario using exploratory, deductive, descriptive, anticipatory, inductive, research, and/or normative scenario types given the sudden lack or loss of resources could have the potential to interrupt or cause operations to cease to some degree. The principle gears could include validity, utility, significance, and accuracy and objectivity to ensure the scenario properly, effectively, and comprehensively addresses a potential future state where a loss of resources has occurred or is occurring. Leaders would not need to use formal tool gears; however, based on the scope of the scenario, scenario planning effort, number of participants, and the need to maintain focus, tool gears like PESTLE, Porter's Five Forces, detailed value chain analysis, and/or SWOT analysis might be beneficial. Development and analysis gears would not necessarily need to be rigid but could include Delphi, back-casting, and/or past-casting to keep the effort collaborative but also understand how the

organization got into a loss of resources predicament; thus, use that insight when considering the future decisions and actions that leaders would be required to make to adapt to the potential future state. Leaders could limit the process gear to a basic three-step process; however, leaders should consider a more formal process if there are a lot of participants and/or a high degree of complexity to keep the effort on track and adhere to the principle gears. I have illustrated this type of scenario planning machine construction in Figure 13.

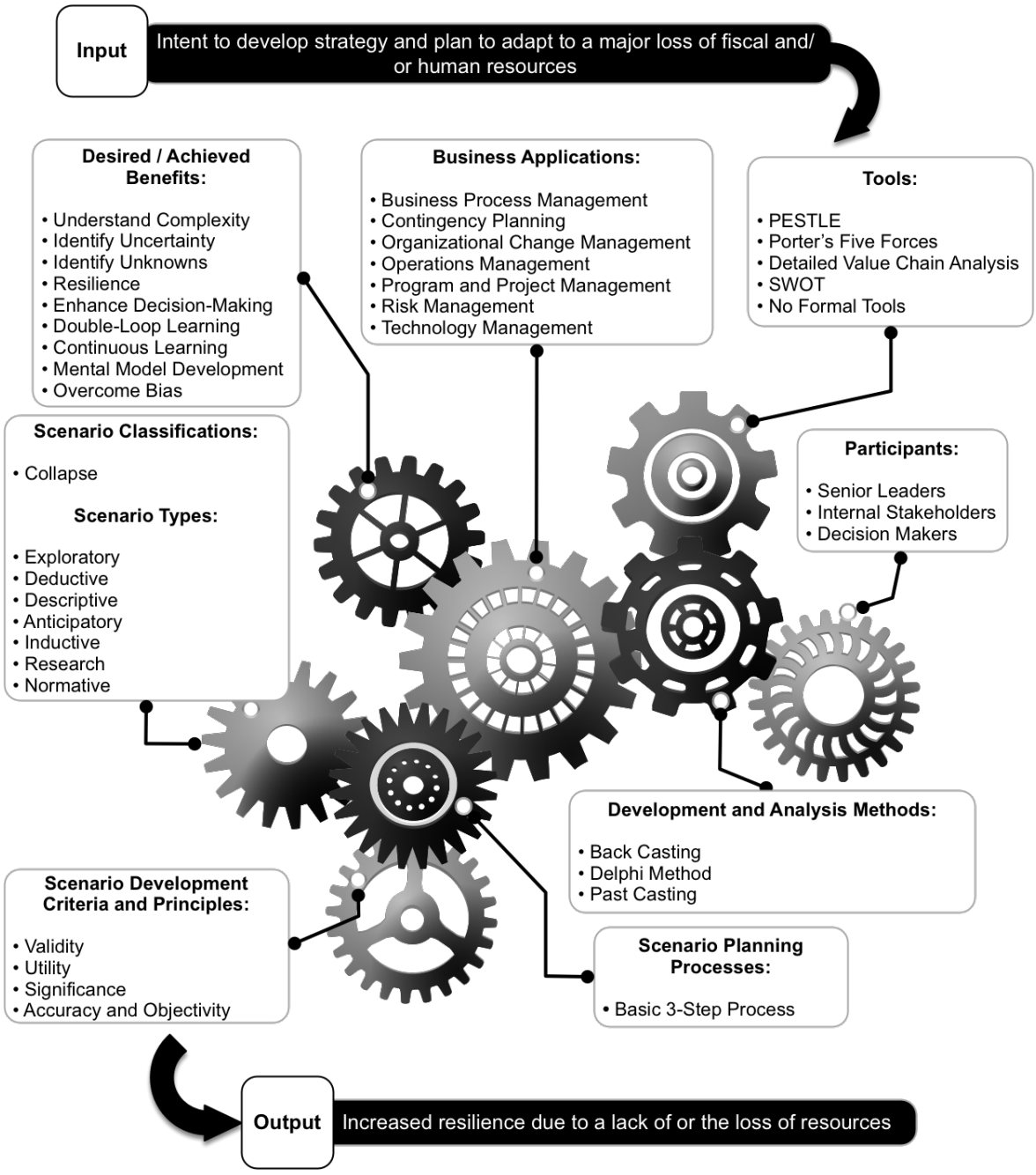


*Figure 13.* Machine 2, adaptation to the loss of resources.

**Machine 3, disaster resilience.** If the intent of scenario planning was to plan for continuity of operations in the event of a disaster; however, the real desired output was enhanced resilience to natural disasters, the business application gears could include contingency planning, emergency management, operations management, and strategy development due to the potential impact of a disaster and the effect these areas would have on the organizations ability to respond and adapt. The desired benefit gears that leaders would need to understand that could provide the real value could be the identification and understanding of complexity, resilience, enhanced decision-making, double-loop learning, and continuous learning. Given the potential impact of disasters participant gears would include senior leadership and front-line decision-makers that would need to make the real-time decisions that could affect adaptation. The scenario gears could be both transformation and collapse scenarios with exploratory, deductive, and/or anticipatory, scenario types given that disasters have the potential to shake an organization to its foundations and have the potential to interrupt or cause operations to cease for some amount of time. The principle gears could include validity, plausibility, and probability, as well as accuracy and objectivity to ensure the scenario properly, effectively, and comprehensively addresses a potential future state where a disaster has occurred or is occurring while also taking into account the plausibility and probability of the disaster occurring. Leaders would not need to use formal tool gears; however, based on the scope of the scenario, scenario planning effort, number of participants, and the need to maintain focus tool gears leaders may want to consider include structured

brainstorming and visualization as well as tabletop exercises. Development and analysis gears would not necessary need to be rigid but could include Delphi and back-casting to keep the effort collaborative but also understand the future decisions and actions that leaders would need to make to adapt to the potential disaster over time. Leaders could limit the process gear to a basic three-step process; however, leaders should consider a more formal process if there are numerous participants and/or a high degree of complexity to keep the effort on track and adhere to the principle gears. I have illustrated this type of scenario planning machine construction in Figure 14.

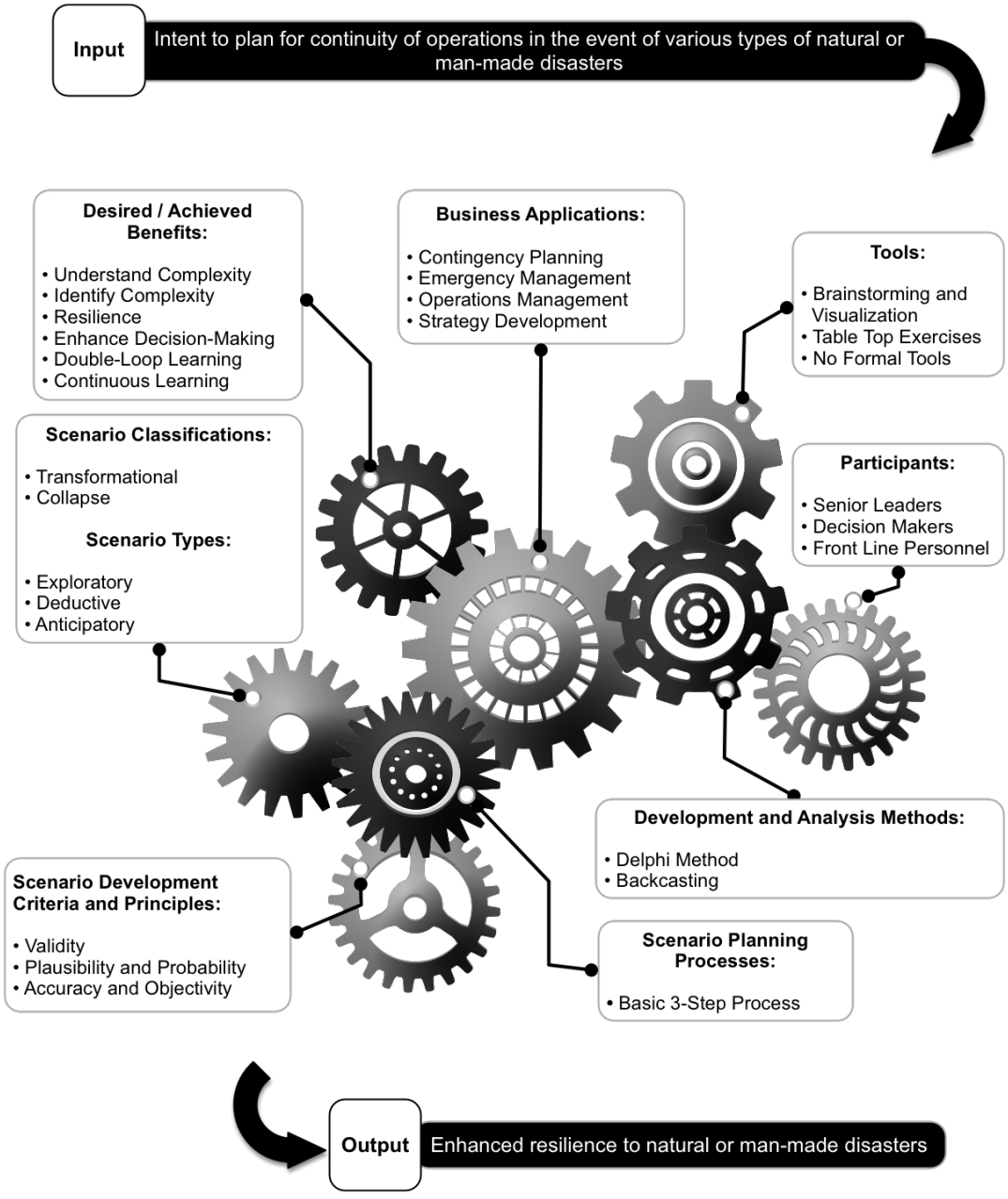


*Figure 14.* Machine 3, disaster resilience.

## Implications for Social Change

One of the most significant implications for social change is an increased ability for leaders (and by extension their organizations) to adapt to extreme disruptive complex events enhances the resilience of the communities and populations they serve. Executives having the information needed to engage scenario planning as a means of adapting to extreme disruptive complex events has the potential to influence the amount of disruption organizations (and by extension industries and communities) experience. Additionally, the use of scenario planning as an adaptability tool can contribute to an organizational ability to survive extreme disruptive complex events via successful navigation of the edge of chaos. The experience of the selected executives confirms that the use of scenario planning to address complexity, uncertainty, and the unknown as a means of adaptation reduces the risk of both economic injury and the impact of business disruption. Furthermore, the reduction of economic injury and the effects of disruption reduces the social and societal impact of business injury, disruption, and recovery such as the extended negative impacts of job loss and reduced revenue on communities and local economies.

## Recommendations for Action

I recommend that leaders use the study findings as a means of vicarious learning to the degree that the findings are transferable to their organization and/or environment. Furthermore, leaders can use this study to evaluate ways in which they have or could leverage scenario planning as a means of bolstering organizational adaptability and

resilience related to extreme disruptive complex events. Such an evaluation could include (a) ways in which leaders could apply scenario planning, (b) ways in which leaders could improve scenario planning efforts, (c) how to right-size scenario planning efforts, and (d) a lens to use if turning the scenario planning eye toward adaptability.

However, the applicability of these findings may not be limited to executives. Any individual/s serving in a leadership and/or managerial role at any level of an organization should be able to derive some vicarious learning and/or guidance value from the study findings. Moreover, organizational leaders/managers may be able to use these study findings to bridge any perceived divide or confusion between the scenario planning literature and what is necessary to engage scenario planning as an organizational adaptability tool.

## Recommendations for Further Research

I drew conclusions from the experiences and perceptions of the selected executives which required interpretation of participant responses. The phenomenological interviews were limited to one hour in average due to the availability of the participants. Furthermore, since this was a qualitative interpretive phenomenological study, the generalizing findings is not possible. Therefore, there are several areas of future research that when considered collectively could provide the foundation for a research agenda.

Future phenomenological research could include longer contact time with participants thus, provide a deeper exploration of their lived experiences. Future grounded theory research could include the creation of new theory regarding the use of CAS and chaos theories as a lens for scenario planning with an eye toward organizational

adaptability. Future case study research should include an exploration of how executives have used scenario planning to foster organizational adaptability in a specific context or organization to refine the general context explored in this study. I also recommend future quantitative or mixed method research to measure the relationship between scenario planning and organizational adaptability using CAS and chaos theories as the theoretical framework.

## Reflections

When designing this study, I was concerned that my prior experience with scenario planning would pose challenges due to personal biases and preconceived notions. However, the opposite turned out to be true. I realized that my experience had been response centric so when collecting data and interpreting the responses, the focus on adaptation and use of CAS and chaos theories as the conceptual framework launched me into unfamiliar territory. Therefore, epoché and bracketing, as well as the analysis of my experience and perceptions as the first case, was easier because I too was learning vicariously throughout the research process. Vicarious learning from the participants reached the height of confirming the potential and significance of vicarious learning as well as the assumption of benefice underlying this study. I can apply what I learned to my future scenario planning efforts; thus, as a leader inform situations and circumstances that I can do something about and actions taken to bolster organizational adaptability. As a result, my vicarious learning served to reinforce that other executives may be able to derive value from the experiences and perceptions shared by the selected executives that

was a significant underlying assumption for this study as well as the foundation of benefice.

Another interesting phenomenon that emerged was the participant's responses to the interviews and interview questions. I had thought that it would be easy for the participants to relay their experiences and perceptions. However, during every interview the questions provoked each participant to reflect on their experiences and perceptions; the result of which caused their own perceptions to change. This phenomenon also generated strong participant interest in seeing the study findings that seemed genuine and sincere.

In reflecting on the research process, several of my opinions and perceptions regarding business research as well as the development and analysis of actionable intelligence changed. A major challenge that coworkers and I have faced was the ability to derive objective actionable knowledge, business intelligence, and reliable metrics that were not easily quantifiable or derived from unstructured subjective information. What I learned about designing a study, interviewing, data collection, and the analysis of subjective unstructured data (such as the use of coding) illuminated structured and methodical ways of overcoming this significant challenge. During the research process, I applied what I discovered to knowledge generation, business intelligence, and the development of metrics in support of existing strategy development and portfolio management activities. Therefore, it is easy to stipulate that these reflections will be applicable and useful when applied to a plethora of other existing and new business activities.

## Conclusions

The ability to adapt to extreme disruptive complex events is crucial to the survival of an organization. Because adaptation means survival, there are several things that executives need to know when using scenario planning to adapt to extreme disruptive complex events. First, know the difference between organizational adaptability and organizational response. Second, CAS and chaos theory can provide a lens for scenario planning with an eye toward adaptability. Third, leaders can apply scenario planning to any business area. Fourth, do not be afraid to tackle the difficult questions. Fifth, when adaptability is the target, scenario planning is never over because the environment constantly changes. Sixth, take full advantage of the benefits meaning leaders need to understand the benefits. Furthermore, the true measures of value are the benefits achieved. Seventh, scenario planning is all about the question; thus, have a clear question that drives the effort. Moreover, asking what should the questions be, is a valid question leading into scenario planning activities. Eighth, focus participation on individuals that can or could have a direct impact adaptation and these individuals may fall outside the organization's leadership hierarchy. Ninth, when considering extreme disruptive complex events focus scenarios on transformation and collapse and adhere to a set of principles, established ahead of time, during the entire scenario planning process. Tenth and foremost, do not get bogged down in structured and rigid processes, methods, and/or tools because while sometimes useful, leaders do not need to use them to be successful. Scenario planning efforts must be right-sized based on the question and organizational dynamics. Executives need to assemble their scenario planning machines by selecting

the right options (gears) from the litany of options available. Finally, organizations will face extreme disruptive complex events and will have to adapt to survive. Taking the time to consider potential future states and adaptation ahead of time will preposition the organization to adapt when events occur and reduce the chaos associated with extreme disruptive complex events.

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# Appendix A: Interview Guide

**Introduction**:

Thank you for meeting with me today. I am grateful for your assistance in completing this research. I am a student at Walden University working on a doctoral degree in business administration. I am conducting a research study entitled Scenario Planning for Organizational Adaptability: The Experiences and Perceptions of Executives. The purpose of this study is to study is to explore the lived experiences of selected executives regarding the application of scenario planning and what it means to an organization to engage scenario planning as an organizational adaptability tool related to extreme disruptive complex events. Through a deeper understanding of what it means to apply scenario planning as an organizational adaptability tool, I hope to help some business leaders to develop scenario planning strategies and evaluate scenario planning efforts using an organizational adaptability lens via an exploration of the experiences of other business leaders such as yourself. Additionally, I hope the achievement of organizational adaptability will have a positive social effect by mitigating the societal impacts of business economic loss and failure.

**[Give interviewee an INFORMED CONSENT FORM to read and sign.]**

Do you have any questions concerning the informed consent to participate in the study?

[Interviewee must sign the informed consent before continuing]

**Read the following script before each interview:**

You have read and signed the informed consent form, which explained the purpose of this study. Thank you for agreeing to be interviewed for the study and for volunteering

your valuable time. Today, we will conduct an interview using questions about your experience business leader. The interview may take up to two hours. If you wish to spend additional time discussing your experience, we may do so. Please remember that this interview is confidential. Any information that you wish to share that is significant to the study will be used without revealing your identity or the fact that you participated in the study. During this interview please try to refrain from referring to yourself, anyone you have worked with, and the organizations you have worked for by name. Within the study, you will be referred to as a participant or by your participant number. Do you have any questions about the study before we begin? To help ensure I capture your experience correctly, may I record this interview?

**[if the participant gives permission to record the interview, start the recording]**

Time of Interview:

Date:

Interviewee participant number:

I would like to ask for some background and demographic information before we begin the interview questions.

1. How many years of senior-level leadership experience do you have
2. What industries have you worked in/with at a senior-level and how many years did you work in/with those industries at any level and at a senior-level

I would like to ask you a question about your past and present experiences and perceptions regarding scenario planning as a tool to enhance adaptability to extreme disruptive complex events and what it means to and organization to apply scenario

planning as an organizational adaptability tool. I may ask additional questions for clarification.

[Begin Open-Ended Interview Questions]

**Open-ended Interview Questions:**

3. Based on your experience how can scenario planning be used help and organization adapt to extreme disruptive complex events?
4. Based on your experience what should executives know in order to engage scenario planning as a means of adapting to extreme disruptive complex events?

**Prompting Questions**

1. How have you experienced extreme disruptive complex events?
2. How would you describe an organization as a system?
3. How would you describe the difference between organizational response and adaptation if any?
4. Based on your experience how would you describe scenario planning?
5. How would you describe the benefits of scenario planning?
6. How have you participated in scenario planning and how was it conducted?
7. How would you respond to criticisms that scenario planning is too nebulous, lacks foundation, and lacks value add?

Is there anything else you would like to add based on the initial question and any clarifying questions I asked. Thank you again for taking the time to speak with me and for your participation in this study. I will be providing you with a synopsis of our

conversation today and will ask that you review it to ensure I have captured your experience correctly.

## Appendix B: Redacted Letter of Cooperation and State IRB Approval

Appendix B contains the redacted version of the letter of cooperation from the organization selected and the redacted IRB approval letter from the selected state. The full version of this letter has been provided to the Walden University Institution Review Board (IRB) as part of the IRB approval process. A copy of the un-redacted version of the letter of cooperation and State IRB approval will be kept for 5 years from the completion date of this study.

[redacted] [redacted]

October 5, 2015

Dear Robert:

I am approving your request to conduct the study entitled *Scenario Planning for Organizational Adaptability: The Experiences and Perceptions of Executives* [redacted] As part of this study, you are authorized to recruit and interview senior leader participants from within the American Red Cross under the following conditions:

[redacted]

- The identity of the [redacted] is to remain confidential. The name [redacted] will not be used in the study. The [redacted] will only be referred to as a large national organization that operates within four industries, with senior leadership distributed across the United States within the study.
- Participation is voluntary. Participants may withdrawal from the study at any time.
- Participation is confidential. The names of the participants will not be used in the stud. The identity of the participants as well as who participated will remain confidential.
- Initial participant interviews and follow-up interviews will be conducted by you as the sole researcher. Participant interview will be the only form of data collection. No organizational documentation or other types of data will be collected.
- You must obtain informed consent from each participant prior to conducting an interview.
- You, as the sole researcher, will obtain Walden University Institution Review Board (IRB) approval before engaging in any participant recruitment activities. You will strictly adhere to the terms of the Walden University IRB approval.
- Your research is conducted under the supervision of your doctoral committee.

- The [redacted] is not responsible for providing any other support (meeting rooms, teleconference lines, etc.) for the study. However, at the convenience of the participants, you may conduct interviews on site or via teleconference, which may include video teleconferences.

- You provide a one to two-page summary of the study findings and/or a copy of the completed study once approved by the Walden University Chief Academic Officer (CAO) to the American Red Cross and any participants that would like to receive a summary of the findings and/or a copy of the study in return for their participation.

We understand that sole responsibility of the [redacted] includes:

- Allowing you to recruit voluntary participants from within the [redacted] that hold senior leadership positions which may include conducting interviews on site at the convenience of the participants. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies. I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

If you have any questions or concerns, please feel free to contact me at [redacted]

Sincerely,

[redacted]