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Complexity Leadership Theory: The Influence of Enabling Leadership and Experiential Learning on Emergent Outcomes and Organizational Knowhow

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by

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Abstract

Title: Complexity Leadership Theory: The Influence of Enabling Leadership and Experiential Learning on Emergent Outcomes and Organizational Knowhow

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As technology advances, businesses find that today's information age is increasingly complex. If an enterprise can prepare the workforce to succeed in a complex environment, it will have a competitive advantage. Complexity is characterized by unpredictability, no recognizable patterns, and nonlinear causes and effects, creating unique challenges for today's workforce. The core or overarching research question that guides the research is: In complex environments, what are the experiences of leaders and team members who use enabling leadership and experiential learning to influence emergent outcomes, and how does it create organizational knowhow? In this constructivist grounded theory study, the efficacy of synchronizing enabling leadership and experiential learning was examined by interviewing 27 participants who work in complex environments. The interview narratives were analyzed and coded into categories and themes.

This study identified three emergent themes: Breaking through the Uncertainty Barrier, Exploiting Capability and Organizational Structure, and Empowering

Leadership. An uncertainty breakthrough model was developed from the data and offered a path to navigate through complexity successfully. The findings emphasized the importance of recognizing operations in a complex environment and taking appropriate steps to navigate uncertainty. The implications and recommendations of this study stress the importance of aligning organizational systems and structures to operate in complexity. Furthermore, competency training is necessary but not sufficient to operate in complexity. Additional training in complexity coupled with enabling leadership and experiential learning can extend the organizational capacity to operate in a complex environment. This research provides the practitioner guidance and recommendations. This study contributes to the literature on influencing emergent outcomes and creating organizational knowhow by focusing on the approach needed to navigate complexity.

Keywords: complexity, emergence, complexity leadership, enabling leadership, experiential learning, knowhow

Table of Contents

List of Figures

List of Tables

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Dedication

To my wife Peggy, we spent 34 amazing years together. We lived life!

The love of my life left this earth in the middle of the DBA program.

For you sweetheart: Promise made, promise kept.

Chapter 1

Introduction

Overview

The world continues to experience more complexity and an acceleration in technology and its social implications (Toffler, 1971, 1981, 1991). Toffler (1981) describes the third wave as shifting employees from industrial to knowledge workers, creating new challenges for firms. Drucker suggests that managing the rapidly expanding information shock wave (Drucker, 1992, 1995, 2002) can bring more complexity. The information age brings accelerated change and an overwhelming amount of information to assess and absorb in a complex environment (Gerras, 1998). Gilder (2012) further posits that wealth is created by learning as the economy is "knowledge fueled."

If a firm can prepare the workforce to succeed in a complex environment, it will have a competitive advantage (Birkinshaw & Heywood, 2010). Managing complexity will allow an enterprise to quickly adapt to changes to improve its resilience (Birkinshaw & Heywood, 2010) in today's environment. Bettis and Hitt (1995) assert there is a fundamentally new competitive landscape. Securing knowledge in an information economy has become the new competitive advantage (Boisot, 1998).

In recent years, the way people perform their work has changed significantly with new technologies. However, the concepts of improving the

workforce's effectiveness have not made the same progress (Kegan & Lahey, 2016). The use of current talent management efforts to develop leaders is hampered by a limited understanding of how to deal with a volatile, uncertain, complex, and ambiguous environment (VUCA) (Mukherjee, 2016). Moore (2018) contends, "Leaders play a critical role in creating the requisite conditions for developing and honing these critical, creative skills and capabilities" (p. 1), and Risher (2019) confirmed the need to rethink the approach used to prepare leaders for a complex environment.

As business environments experience greater levels of complexity, the traditional methods of preparing the workforce have become less effective (Drucker, 1998; Mäkinen, 2018). For example, the current Naval Air Systems Command (NAVAIR) environment is experiencing accelerated VUCA and requires a new way of leading organizational systems for problem-solving in this environment (Moore, 2019). This instability brought on by more complexity impacts leaders significantly and increasingly has become the subject of business articles (Bennett & Lemoine, 2014). Fillion et al. (2015) note, "this shift of change of growing complexity is continually accelerating" (p. 73) and has become more complex and unstable.

As the nature of work and problem-solving continues to evolve, a pressing challenge for organizations is dealing with the new complex environments. The importance of knowledge and its management to the enterprise is echoed in both

the resource-based and knowledge-based view of the firm where resources are developed, and knowledge is created (Wernerfelt, 1989; Barney, 1991; Grant, 1996; Teece et al., 1997). A firm's resource-based view advocates that an organization's performance is determined by its available resources (Wernerfelt, 1984). However, the resources have yet to be prepared for a complex environment. If complexity guidance can be developed for practitioners, appropriate human resource practice instruments can provide a competitive advantage (Wright et al., 1994). As further emphasized in the knowledge-based view of the firm, enterprises need to find a way to leverage the workforce and its comprehensive set of knowledge to create a competitive advantage (Dess & Sauerwald, 2014).

In complex environments, connecting activities and networks play an increasingly important role (Arena & Uhl-Bien, 2016). Furthermore, Dess and Sauerwald (2014) emphasize that the social aspect of an organization is necessary for talent development. Developing social capital or networking relationships have become a differentiator for knowledge workers to acquire and build group cohesion and brokerage (Dess & Sauerwald, 2014) and has become essential for success in a complex environment (Arena & Uhl-Bien, 2016). Knowledge workers can benefit from social capital by reaching out to more resources and generating more ideas while developing solutions to complex problems (Dess & Sauerwald, 2014). The use of networks, as described by increasing social capital, is an essential link

between the operating and entrepreneurial sides of the business in complexity leadership theory (Baltaci & Balci, 2017).

Enterprises operate more frequently in knowledge-intensive and complex environments (Mäkinen, 2018). Complexity leadership theory posits that leadership is less about a person and instead centers on patterns and systems of action (Uhl-Bien et al., 2007). It is further described by Hazy and Uhl-Bien (2013) as the focus "on the importance of broader organizing effects that include both individual practices and complex system effects" (p. 2). Complexity leadership theory posits three leadership roles: entrepreneurial, operational, and enabling. The entrepreneurial leader assists in creating cooperative efforts to encourage creativity and innovation. The operational leadership role provides the administrative and hierarchical functions that provide strategy and assign work. Enabling leadership operates between the entrepreneurial and operational leadership roles and promotes the conditions for new knowledge and adaptability in the organization. Enabling leadership offers a balance between the roles and helps the organization navigate the tensions created between the "need to innovate and the need to produce" (Uhl-Bien & Arena, 2018, p. 10). Enabling leadership is a crucial component of the success of organizations in complex environments (Uhl-Bien & Arena, 2017). Complexity leadership theory provides enterprises with a unique approach to successfully navigating a complex environment (Lichtenstein et al., 2006).

In the Federal Government, supervisors bring technical knowledge to their leadership role. However, they are generally unprepared to lead people in a complex environment (Office of Personnel Management, 2001). Ingraham and Getha-Taylor (2004) reported that "more than half of the federal employees surveyed found leadership to be deficient" (p. 96). This deficiency can lower employee morale or productivity if leadership cannot handle today's challenges (Office of Personnel Management, 2001). Department of Defense (DOD) acquisition has undergone reforms but has not made enough progress in preparing leaders for roles in complex environments (Schwartz, 2013).

As Posner (2006) states, leaders "need universally valid leadership theories and principles that transcend cultures" (p. 14). Organizations would benefit from a learning approach to develop leaders in today's more significant challenges in complex environments. Deming (2018) emphasizes in his *system of profound knowledge* that it is important for leaders to understand the theory of knowledge where information alone is not enough to create knowledge. He further posits that information is useful but needs to be transformed to create knowledge and ultimately knowhow.

Experiential learning theory can help close the gap in leadership development by providing an approach that is more than knowledge delivery; it emphasizes that learning is a product of creating and assimilating knowledge through cognitive work effort (Kolb & Kolb, 2008). The authors point out that

learning is the process of creating knowledge and takes place not only as an individual effort but also as a group activity. Gherardi et al. (1998) contend that learning is derived from social interaction and complements the concept of social capital development as espoused by complexity science. Experiential learning theory's application has the potential to solidify learning by providing a mental model for grasping and transforming knowledge (Matsuo & Nagata, 2020).

Experiential learning theory (Kolb, 1984) offers an approach to help firms enable the workforce to make sense out of unpredictable outcomes and can be a valuable tool to develop leaders. Kolb and Kolb (2008) posit that experiential learning theory successfully operates at the individual, group, and organizational levels. Therefore, experiential learning provides a promising approach to operate more successfully in a complex environment.

Complexity leadership, as extended through experiential learning, can offer insight into successful performance in a complex environment. Complexity is recognized as more prevalent and accelerating in businesses (Fillion et al., 2015); complexity leadership theory offers a model to understand better the unique challenges in this environment (Uhl-Bien & Arena, 2017).

Background, Context, and Theoretical Framework

The Chief of Naval Operations (CNO) has stated that "leaders are essential to success" (Richardson, 2017, p. 2) and the principal measure of success is how well the team performs. The department's key document for workforce

development states, “We have entered a new age of competition. A defining feature of that competition is the pace and complexity of change" (Department of the Navy, 2016, p. 2). Well-designed training and development can make a difference in leadership performance in the public sector (Fernandez et al., 2016). The critical question is how to make leadership performance more effective in light of a new approach necessitated by the business environment's growth and speed of complex situations.

The Navy and Naval Aviation operating environments exhibit swift and increasingly complex challenges (Gilday, 2022; Richardson, 2016). The Chief of Naval Operations report, *A Design for Maintaining Maritime Superiority*, states, “the scope and complexity of the challenges we face demand a different approach” (Richardson, 2016, p. 4). The Nation's adversaries can operate in a complex environment and outpace the United States' efforts to improve aviation design (Department of the Navy Research, Development, Test & Evaluation, 2017). The National Defense Strategy describes how leaders must improve faster than the Nation’s adversaries and organize innovation (Mattis, 2018). General McChrystal (U.S. Army, Retired) emphasized in his book, *Team of Teams*, that our Nation's adversaries operate in complex environments and create unpredicted outcomes that the current force structure struggles to resolve (McCrystal et al., 2015). The Navy has recently emphasized complexity science to develop new approaches to enable innovation more quickly and operate in a complex environment (Moore, 2019).

Complexity theory has made its way into the social sciences (Cartwright, 1991; Doll, 1989; Goldstein, 1996; Marion, 1999; Regine & Lewin, 2000; Richardson & Cilliers, 2001; Sterman, 1994) and seeks to blend social and organizational behavior in knowledge-intensive environments (Henrickson & McKelvey, 2002). Uhl-Bien et al. (2007) use complexity science to develop a framework for complexity leadership theory and ground their efforts in classic organizational research (Barnard, 1938; Homans, 1950; Selznick, 1957). Complexity leadership is different from traditional leadership paradigms as it is characterized by agent interactions in a dynamic environment (Uhl-Bien et al., 2007).

Uhl-Bien et al. (2007) state, "much of what is taught and practiced in the name of management is hopelessly out of date" (p.298). The authors further state that leadership is no longer a hierarchal position or formal authority; instead, it is characterized by leadership behaviors that encourage learning and creativity (Uhl-Bien et al., 2007). Complexity leadership theory posits new concepts around adaptive space that do not exist in the traditional leadership theory realm (Kodama, 2018). The key concepts fundamental to understanding the theory and science of complexity leadership theory are complexity versus complicated, ordered versus unordered leaders' response, complex adaptive systems, the role of emergence, and the importance of networks and interconnectivity (Geer-Frazier, 2014).

Statement of the Problem

Firms commit significant resources for leadership and competency training for their workforce (Hrivnak et al., 2009). For firms to continue to be competitive and advance in complex environments, it will require greater use of leading practices and knowledge resources. Despite the resources committed, most federal agencies are not resolving these emergent issues (Trainor, 2017). The problem is complex issues do not follow a cause-and-effect relationship, and therefore, the emergent outcomes have not been what the organization expected (Clarke, 2013). Because of this, organizations need new or evolved approaches that can prepare leaders and team members to operate successfully in a complex environment. This study aims to challenge traditional leadership development assumptions (Alvesson & Sandberg, 2011) and embark on an exploratory study of leaders and team members whose efforts have yielded emergent outcomes that the organization wants and look for effective patterns and behaviors.

Currently, complexity leadership focuses on networks of interaction, interdependent relationships of agents and information flow (Uhl-Bien et al., 2007) and how it is embedded in the environment or context (Hunt, 1999; Osborn et al., 2002). A powerful computational model capable of tracking agents' relationships and interactions over a long period (Uhl-Bien et al., 2007) would be required to understand the mechanisms and their context as described in complexity leadership theory. Sawyer (2004) emphasizes that even with powerful computers, a

complexity model is limited by the programming inputted for the agents. This computational method is open to the human bias of those that create the algorithm ("Breathing Life into Artificial Intelligence," 2023).

Today's business problems resemble complex adaptive systems that traditional methods cannot solve, and firms need to solve emerging issues in complex environments that do not require extensive computational modeling (Schneider & Somers, 2006). Fundamental tenets of complexity leadership theory, as extended by experiential learning theory, can contribute in the near term to solving emergent challenges without extensive computer modeling. Since experiential learning theory is equally effective at the individual, group, and organizational levels (Kayes et al., 2005), the framework holds promise to provide an advantage when used in combination with enabling leadership. It is not known to what degree experiential learning theory can affect complexity leadership.

Purpose of the Study

This study explored the complexity leadership model by overlaying the experiential learning theory to gain a deeper understanding of how the workforce can utilize both enabling leadership and experiential learning to improve emergent outcomes and create organizational knowhow. It will guide practitioners in implementing the critical tenants of complexity leadership.

An integrated approach that provides a practical guide on employing complexity leadership is absent from the literature. The complexity leadership

theory currently offers principles but does not establish an explicit approach to successfully use complexity leadership. This study seeks to add to the body of literature and research more guidance for practitioners on successfully implementing complexity leadership theory in their organizations.

This grounded theory qualitative study's *research objective* was to address the literature's void on the details to employ complexity leadership theory effectively. The research discovered and categorized vital themes to build a model to aid the workforce in successfully navigating the luminal journey through complexity.

The *managerial objective* of this study was to utilize the findings and conclusions developed to help practitioners with a better understanding of how to influence emergent outcomes and create organizational knowhow in complex environments by effectively using enabling leadership and experiential learning. This study offers the practitioner guidance in the recommendations section to navigate through complexity.

Questions that Guide the Research

This research focused on leaders' and team members' experiences working in a complex environment. Enabling leadership supports adaptive space, which is fluid or transitory and is initiated by organizational pressures and tensions between the exploratory and exploitation sides of the business (Uhl-Bien & Arena, 2017).

Enabling Leadership attributes leverages adaptive space to create new ideas or adaptive responses to complexity.

Furthermore, the study examined the extension or superimposition of experiential learning theory on enabling leadership to aid in influencing emergent outcomes. Experiential learning posits that learning is more than knowledge delivery; it is knowledge creation through grasping and assimilating cognitive work effort (Kolb, 1984). Together, enabling leadership and experiential learning are investigated and sought to explore how they can support the influencing of emergent outcomes and the creation of organizational knowhow. The research questions are stated below:

RQ1. In complex environments, what are the experiences of leaders and team members who employ enabling leadership in order to influence emergent outcomes?

RQ2. In complex environments, what are the experiences of leaders and team members who employ experiential learning in order to influence emergent outcomes?

RQ3. In complex environments, how does enabling leadership influence the ability to create knowhow in the organization?

RQ4. In complex environments, how does experiential learning influence the ability to create knowhow in the organization?

Definition of Terms

Complexity Science has many unique terms that are the building blocks to understanding complexity leadership theory. The definition of these terms is clarified in the following section.

Adaptive Space. Adaptive spaces are physical or virtual areas where agents can engage in problem-solving and innovative thinking generated by the organization's pressures and tensions (Uhl-Bien & Arena, 2018). Adaptive space can be further described as where the genuine interaction occurs in informal communication (Bradbury & Lichtenstein, 2000) and acts as the connection between opposing areas of the business, exploratory and exploitation, to handle the tensions and pressure of business relationships (Kodama, 2018).

Adaptive Response. Uhl-Bien and Arena (2017) describe adaptive response as resisting "the pull to order and capitalize on the collective intelligence of groups and networks" (p. 10). This response does not use a top down approach but rather seeks to engage and combine the system's network for new ideas and ways of thinking. Heifetz and Laurie (1997) assert that adaptive challenges require responses that involve new learning and creativity as opposed to technical problems that can be solved with existing processes.

Agent(s). Agents are individuals or subsystems that self-organize through inter-dependency and create an emergent outcome (Schneider & Somers, 2006) and are the basic elements of a complex adaptive system (Dooley, 1996). Additionally,

Dooley (1996) further describes agents as "semi-autonomous units that seek to maximize their fitness by evolving" (p. 2) and exchange information in their environment to develop schema (Dooley, 1996).

Chaos. Cronbach (1988) describes chaos as "the science of surprises, of the non-linear and the unpredictable. Chaos explores the transitions between order and disorder, which often occur in surprising ways" (p. 47). Chaos theory is not an analysis of cause and effect but rather a view of unpredictable, non-linear things that cannot be controlled (e. g., weather, stock market). It explores the effects of minor occurrences since the trajectory depends on initial conditions (Kellert, 1993).

Complex Adaptive System. Complex Adaptive Systems are created by an aggregation of agents that exchange information (Horvat & Filipovic, 2018) and provide a dynamic complexity component (Dooley, 1996). The agents' decisions and interconnections produce emergent outcomes (Anderson, 1999) and cooperate towards a common schema by self-organizing (Skaržauskiene, 2010). Complex adaptive systems are non-linear and exhibit stable and unstable characteristics (Anderson, 1999). They are the cornerstone of complexity concepts (Auspos & Caba, 2014).

Complexity (Science). Complexity (science) is an area that does not have a univocal definition but is generally described as a system with agents or constituents that interact and create unpredictable outcomes (Cilliers, 1998). Unlike a complicated system, a complex "system as a whole cannot be fully understood

simply by analyzing its components" (Cilliers, 1998, p.viii). Agents interact and evolve to create an unpredictable or emergent outcome with no formula for a response (Kinni, 2017). It is difficult to determine the root cause of an agent or event (Kinni, 2017). Uhl-Bien and Arena (2017) describe complexity as a complete interaction with each component and become changed in ways that cannot be reversed.

Complexity Leadership Theory. Complexity leadership theory posits that success in complex environments is based on the understanding and leveraging the dynamic interactions and organizing processes of an enterprise (Lichtenstein et al., 2006). Additionally, Uhl-Bien et al. (2007) offer that "complexity leadership theory is a framework that enables the learning, creative, and adaptive capacity...in knowledge-producing organizations" (p.304). The complexity leadership theory framework emphasizes three leadership roles; entrepreneurial, operational, and enabling. The entrepreneurial and operational leaders represent the exploration and exploitation sides of the business, where the enabling leader bridges the gap between the two (Mäkinen, 2018).

Complicated. In contrast to the complex, complicated is predictable and can be solved with enough resources (Rickles et al., 2007). Leaders and employees feel the effects of complexity in the workplace but are challenged to distinguish between the two and, therefore, can choose the wrong approach to problem-solving. The segments of a complicated structure can be separated where they will retain

their original form and function. In a complex system, once units interact, the original form and function no longer exist. Auspos and Cabaj (2014) assert that complicated systems' cause and effect are uncertain but knowable, and in complex systems, that relationship is not usually predictable.

Cynefin Framework. According to van Beurden et al. (2013) Cynefin is a conceptual framework and sense making tool that helps practitioners decide whether they are working in an ordered or unordered domain. The framework provides insight on how to approach areas such as complexity and avoid a reductionist solution to complex problems. Nachbagauer (2021) describes the framework as being divided into two major domains, ordered which is characterized by straightforward cause and effect solutions and unordered where the system is defined as more than the sum of its parts.

Emergent outcomes (emergence). Emergent outcomes or emergence are a disruption that produces a novel or radical shift in how a system behaves or performs. Lichtenstein (2014) describes emergent outcomes a as new creations and development of order as opposed to resultant outcome that is characterized by adding or subtracting elements (Lichtenstein & Plowman, 2009). Uhl-Bien et al. (2007) define emergence as "the reformulation of existing elements to produce outcomes that are qualitatively different from the original elements, self-organization" (p. 308). The emergence to order concept is significant for

organizations; it provides a route to develop the firm's adaptability as it restores the system.

Enabling Leadership. Enabling leadership consists of individuals or teams that foster the conditions that influence or mediate the dynamic relationships between the operational and entrepreneurial structures of the business (Curral et al., 2016). Complexity leadership theory initiates the concept of enabling leadership to create "a new way of thinking arising in response to complexity" (Uhl-Bien & Arena, 2017, p. 16). The attributes of enabling leadership allow for the creation of healthy adaptive functions or spaces where new ideas can be developed and refined (Campbell, 2014).

Entrepreneurial Leadership. Entrepreneurial leadership consists of individuals or teams that provide new ideas or innovations for the enterprise. Entrepreneurial leadership is usually found at a local level, where the networks and relationships respond to the pressure to find new ways of working (Uhl-Bien & Arena, 2017). These new ideas may conflict with the operational side of the business, where organizations might not be set up to support the development of novel approaches or products (Kodama, 2018).

Explicit Knowledge. This type of knowledge is easily documented. It can be shared in written and verbal form which then can become entrenched in organizations (Zehir & Celebi, 2022). Explicit knowledge generally takes on the form of formal writings and technical data and is opposed to tacit knowledge which

is a cognitive mental models or perceptions of an individual (Bernat & Gasior, 2022)

Experiential Learning Theory. Experiential learning theory offers a view of learning's social dimension (Gherardi et al., 1998) instead of knowledge delivery. The theory posits that individuals and groups create and assimilate knowledge through the exercise of cognitive and work effort (Klimoski, 2005). The learning process takes place between the individual and the environment (Kolb & Kolb, 2008)

General Systems Theory. General systems theory is considered to study the 'wholeness' of an environment and its boundaries (von Bertalanffy, 1972). It attempts to explain the unit or individual behavior related to the environment (Richardson, 2004). Systems have traditionally been understood by observing patterns (Dooley, 1996), but that may only be possible in a micro view. The macro view is less organized and does not necessarily show cause and effect (Kaisler & Madey, 2009).

Knowledge, Skills, and Abilities (KSA). Knowledge, skills, and abilities (KSA) are individually based and represent the traits innate to a person as well as learnings through training or experience. The KSA are specified traits designed for position descriptions or roles in an organization. The KSA are used to construct competency models and consequently drive the competency training approach (McCartney et al., 2020).

Knowhow. In practical terms, knowhow is the organization's knowledge of accomplishing a task or activity. In contrast, knowledge is having a familiarity of certain a function where knowhow is the understanding of how to perform that function. Knowledge creation and knowledge management or sharing are the inputs to creating organizational knowhow (Newey & Verreynne, 2011). The creation and use of knowledge (hence knowhow) can be a significant business activity for the organization (Augier & Teece, 2006).

Knowledge. Knowledge is information retained and can be consider a resource if integrated into the Firm (Grant, 1996). According to Nonaka and Takeuchi's (1995) book, *The Knowledge-Creating Company*, there are two types of knowledge central to organizational knowledge management, explicit (know-that) and tacit (know-how).

Kuhnian Shift. A Kuhnian shift is more commonly known as a paradigm shift . Kuhn's (1962) book *The Structure of Scientific Revolutions* argued that scientific discoveries or significant progress was episodic and did not occur in linear or normal patterns.

Liminality. Turner (1969) describes liminality in anthropological terms as an in between state as transition takes place. It has been introduced into social science and according to Tempest and Starkey (2004) "suggests new ways of organizing and experiencing work" (p. 508). Furthermore, Hawkins and Edwards (2015) provide the comparison of anthropological ritual barriers to modern doubt,

uncertainty and ambiguity. In the context of this study, it appears as a precondition to emergence.

Mental Models. Mental models are the cognitive frameworks (Sandberg & Tsoukas, 2015) that allow people to make sense of their current perceptions (Jacobs & Heracleous, 2005). Changes in an individual's mental model are essential for critical thinking and continuous learning (Kim & Senge, 1994; Skaržauskiene, 2010) and a better understanding of complexity (Auspos & Caba, 2014).

Networks, Brokerage, and Interconnectivity. Networks consist of social actors forming relationships and interacting to benefit the individual or the organization (Cummings & Cross, 2003). Networks increase in size and complexity over time and create pathways and boundaries for information flow (Cross et al., 2009). These connections can span boundaries by a Broker or Bridger (Burt, 2005) that increase the flow of knowledge or influence across *structural holes.* Uhl-Bien and Arena (2017) express that the key to spreading and expanding creative solutions lies in the network structures and state that "brokerage and cohesion create the conditions for adaptive space" (p. 13).

Open Systems. Organizations can be considered open systems since they are affected by the external environment and should be viewed in the totality or holistic approach instead of as the sum of their parts (Schneider & Somers, 2006). The agents or groups in open systems are influenced by external pressures or

stimuli, creating internal tensions that can nudge a system into becoming dynamic and unpredictable (Clarke, 2013).

Operational Leadership. Operational leadership is described as individuals or teams that operate in the formal organizational structure to drive results efficiently with resources under their area of responsibility (Uhl-Bien & Arena, 2018). Complexity leadership theory postulates that operational leadership includes assisting the entrepreneurial side of the business with developing their emerging ideas through sponsorship (Uhl-Bien & Arena, 2017).

Order. Order requires energy input and will develop when the internal equilibrium is sufficiently developed to create new complex systems (Prigogine, 1997). Order is commonly considered systems or parameters where an input creates an expected output (Crutchfield, 2003). Complex systems can create order and is prime to the concept of emergence (Kauffman, 1993).

Ordered Response. Uhl-Bien and Arena (2017) describe ordered responses as "hierarchical approaches of leading and managing change top-down" (p.10). An ordered response is usually an effort by managers to increase control and employ previously successful solutions in response to a new issue.

Organizational Adaptability. "Organizational adaptability is the ability to react swiftly to new business opportunities, adapt to highly changeable market environments, and drive the transformation of the organization" (Kodama, 2018, p.1). Organizational adaptability is a *core component* of an enterprise's survival

ability (Thompson, 1967). It has become a hallmark of an organization's performance as the business environment becomes more complex (Shawn et al., 2006).

Organizational Knowledge Creation Theory. Nonaka et al. (2006) describe *Organizational Knowledge Creation Theory* as "the process of making available and amplifying knowledge created by individuals as well as crystallizing and connection it to an organization's knowledge system" (p. 1179). Organizational Knowledge Creation can be considered synonymous with knowhow (Boateng, 2011; Fang et al., 2010; D. Kim, 1993; Nicolini et al., 2003).

Outcome. The end state of multiple responses. These responses can create short or long term outcomes (Gerras, 1998). Adaptive responses to pressures and tensions can create beneficial outcomes (Uhl-Bien, 2021).

Pressures and Tensions. In complexity leadership theory, pressures and tensions are the necessary forcing functions that create interfaces for organizational adaptability to develop (Uhl-Bien & Arena, 2018). Tensions are internal conflicts that can be used to drive problem-solving or innovation, "tension creates an imperative to act" (Uhl-Bien et al. 2007, p. 311). Pressures are external to the system and are generated by the environment (Arena & Uhl-Bien, 2016). Together these two forces create the necessary catalyst to move the organization out of equilibrium and open up the opportunity for a novel solution (Kodama, 2018).

Reductionism. The concept of reductionism posits that dissecting a system into its parts and then analyzing the components will provide the whole system's information (van Beurden et al., 2013). This concept is in direct contrast to the general systems theory, which advances the importance of viewing the whole system to fully understand the interaction with its environment (Dooley, 1996).

Response. A singular reaction to a stimulus by an agent or individual. Schlak (2019) contends that responses are not fixed in individuals but change with experience and growth.

Resultant (Deliberate) Outcomes. Lichtenstein and Plowman (2009) describe resultant outcomes as a new state or product that can be measured and calculated by adding or subtracting elements. It is the product of intentions in the organization (Mintzberg & Waters, 1985). This predictable outcome is directly opposed to emergent outcomes that cannot be measured or examined by elements as they are new and distinct from where they originate (Turner, 1927; Uhl-Bien & Arena, 2017).

Schema. Schema is more than a mental model; and it is all the information a person knows. It provides the view that creates how a situation is interpreted and consequently develops the response for this perception of reality (Dooley, 1996). A pattern-making mindset (Kurtz & Snowden, 2003) uses experience to assimilate new knowledge (Corbett, 2007). "A cognitive structure that represents knowledge

about a concept or type of stimulus, including its attributes and the relations among those attributes" (Fiske & Taylor, 1991, p.98)

Sense-making. Sense-making can be an individual process or one provided by a leader (Ireland & Gorod, 2016) and is a framework that aids in understanding uncertain and complex situations (Klimoski, 2005). The sense-making perspective describes a process that provides an understanding of connections to facilitate decision-making (Weick, 1995). Sandberg and Tsoukas (2015) describe sense-making as a social mechanism based on an individual's beliefs.

Social Capital. Social Capital is defined by Dess and Sauerwald (2014) as ''the network of relationships that individuals have within as well as outside the organization" (p. 2) and helps problem-solving through membership in these networks. It is contrasted by human capital, which describes an individual's knowledge and skills.

Systems. Systems provide the processes and structures agents use to operate in their environment (Cross et al., 2013). Rickles et al. (2007) state, "systems possess properties that are represented by variables or observables...the values taken by a system's variables at an instant of the time describe the system's state and evolve" (p. 933). Systems can consist of many unique parts that interact inside the system's border (Drack, 2015). Systems can be either open where they are impacted by outside environmental factors or closed where there is limited to no outside stimulus.

Tacit knowledge. This type of knowledge is in contrast to explicit knowledge. Tacit knowledge exists in the minds of individuals in the organization and unlike explicit knowledge, cannot be easily written down or transferred easily (Yazici et al., 2022). Duan et al. (2022) emphasizes that "this kind of knowledge is more critical because a firm's innovation largely depends on the knowhow mastered in the employees' professional domain" (p. 1492).

VUCA. An acronym means a system or environment with traits or characteristics of volatility, uncertainty, complexity, and ambiguity; each represents a different managerial problem (Bennett & Lemoine, 2014). The acronym was coined by the U.S. Army War College (Gerras, 1998) and derived from *taking charge* strategies based on Bennis and Nanus (1985), where the authors emphasize a leader's mastery over confusion. Problem-solving and innovation have become more difficult in VUCA environments (Cousins, 2018).

Assumptions, Limitations, Delimitations

One primary assumption of this study is that the Naval Air Systems Command's technical workforce (program, research, development, test, and evaluation domains) frequently performs in complex environments. Participants were selected based on screening questions to discover if they are routinely exposed to complexity. The limitations of this study include the participants' honest and open answers to the interview. Delimitations are specific concerning the NAVAIR Enterprise as a general system and focused on how experiential learning

influences organizational knowhow and adaptability to create successful emergent outcomes.

Significance of the Study

The United States Air Force doctrine mandates control of the skies as a fundamental condition for success on the battlefield and a significant advantage in peacetime politics (Air Force Association, 2016). The Navy's carrier aviation is "a critical component of the Nation's ability to carry out full-spectrum operations in the 21st century … high-intensity sea control and power projection in a major contingency" (Galdorisi, 2011, p. 3). The United States' aviation assets are an essential component of the Nation's military and political strength. The United States maintains the first (Air Force) and third (Navy/Marine Corps) largest air forces in the world (National Interest, 2014; World Population Review, 2021).

The size and scope of maintaining these air forces with upgrades and technological improvements is a massive undertaking. The adversaries of the United States are rapidly improving their technological capabilities in their aviation programs and have created a new race for an edge in superiority (Richardson, 2016). The report *Providing for the common defense: The assessment and recommendations of the National Defense Strategy Commission* state, "Rivals and adversaries are challenging the United States on many fronts and in many domains" (United States Institute of Peace, 2018, p.V). The Department of Defense (DOD) recognizes the increased challenge of our near-peer adversities in protecting

systems from modern cyber threats (United States Government Accountability Office: Report to the Committee on Armed Services, 2018). Maturing technology for new capabilities and upgrading existing aircraft offer unique challenges that require different approaches to outpace near-peer adversaries.

The long-range vision of the Navy's research, development, test, and evaluation competency requires that the development of learning, collaboration, and innovation in the future workforce is paramount (Department of the Navy Research, Development, Test, & Evaluation, 2017). Sense-making has been described as critical to assimilating vast amounts of information into actionable efforts. The workforce will need better approaches to handle the size of data and the resulting complexity (Office of Naval Research, 2017). Leaders' key role include their ability to "facilitate problem-solving for new challenges" (Department of Defense, 2015, p. 1). NAVAIR has asked in a MOWGLI (massive multiplayer online wargame leveraging the internet) with thousands of participants: "complexity rises all around us, what new organizational constructs should we consider?". The overwhelming answer was the need to organize the enterprise differently by using a grouping of complex adaptive systems (Jensen & Largent, 2017).

Enterprises consider developing leaders at every level critically important (Conger & Ready, 2003). Most leadership programs do not have the desired impact (Gurdjian et al., 2014). Corporate Executive Board research states that 66% of

companies have programs that develop key leaders, but only 24% of senior leaders believe the programs are effective (Fernandez-Araoz et al., 2017). As stated earlier, complexity science and by extension complexity leadership theory is built on a social context (Cartwright, 1991; Doll, 1989; Goldstein, 1996; Marion, 1999; Regine & Lewin, 2000; Richardson & Cilliers, 2001; Sterman, 1994) which opens the theory's pragmatic side for exploration.

The literature shows a gap in developing a practical approach that leaders and team members can employ to influence successful emergent outcomes. Businesses need to create successful emergent outcomes (Brown, 2011) as they are a significant factor in increasing knowhow (Bäcklander, 2019). When an enterprise routinely increases its knowhow, it will improve its success (Kodama, 2018). This qualitative study explored complexity leadership theory by examining enabling leadership and experiential learning theory as extensions for facilitating attributes and behaviors to influence successful emergent outcomes and create organizational knowhow. The existing literature describes properties and mechanisms of emergence (Lichtenstein 2014), traits, qualities, and conditions (Uhl-Bien 2018), but minimal information on how to (directly) influence emergent outcomes. This study builds on previous work and attempted to address that void in the literature.

Organization of the Remainder of the Study

This dissertation uses a five-chapter format (Mortara, 2012) to examine the importance and significance of the problem, the foundational theories from the

literature, the methodology, analytical findings, and research conclusions. Chapter one introduces the study's background and rationale, followed by the statement of the problem, the purpose of the study, questions that guided the research, the definition of common terms, and the study's significance. Chapter two provides a literature review and relevant models and theories that ground the study in past methodologies such as general systems theory, Cynefin framework, complexity science, complexity leadership theory, and experiential learning theory. Chapter three provides the research design and approach, population and sample used for the study, selection of participants, instrumentation and procedures for the study, approach to collecting and analyzing the data, ethical considerations, researcher positionality, and validity checks.

Chapter 2

Literature Review

Introduction

This chapter summarizes relevant literature and provides an overview of the prior studies, theories, and frameworks associated with complexity science and complexity leadership theory. As shown shortly in Figure 1, the chapter begins by introducing the research on general systems theory, and it then funnels down to the different business environments described by the Cynefin framework. The study narrows to Complexity Science and the unique conditions present while operating in complex environments. A review of the relevant literature describes the challenges a firm faces today in the complex domain. Next, the literature review focuses on discussing the elements in complexity leadership theory as necessary components to provide leadership in a complex environment.

Complexity leadership theory is the foundational framework leveraged in this study to explain and explore operations in complex domains. Complexity leadership theory illustrates how adaptive space, enabling leadership, and emergence plays a key role in complex systems. This study examined how enabling leadership and experiential learning can influence emergent outcomes and impact organizational knowhow in the complex domain. Finally, the research explored how the experiential learning model can provide a practical tool for leaders and team members to operate more successfully in a complex environment.

Method for Reviewing the Literature

This literature review used a scoping literature review approach and selection criteria (Boote & Beile, 2005) that included the appropriate theories and frameworks for synthesis (Rocco & Plakhotnik, 2009). Additionally, methods employed for the literature review included keyword searches using backward and forward approaches from the Florida Institute of Technology Evans Library database.

Use of sample, the phenomenon of interest, design, evaluation, and research type (SPIDER) literature search approach (Cooke et al., 2012) aided in refining the literature search and maintaining focus on the research questions. Table 1 shows an example of the SPIDER tool. Explicit tools such as SPIDER provide transparency and orderly inquiry in the literature review process (Cram et al., 2020).

Table 1

SPIDER literature search tool example

Sample	Research, Development, Testing & Evaluation team member or leader
Phenomenon of Interest	Complexity leadership Theory: How enabling leaders use experiential learning
Design	Interviews: current theory not addressing categories of interest
Evaluation	Examine topic from different angle to explore and develop explanation
Research Type	Qualitative

To be comprehensive, new relevant journal articles are discovered by exploring the references of previously reviewed articles. Further, supplementary articles were resourced from other sources such as Naval Post Graduate School and the Navy's Acquisition Research Program (ARP) library and relevant books, dissertations, and conference proceedings. A backward reference search was done using selected key articles until saturation had been achieved, where reviewed concepts began to keep reappearing (Levy & Ellis, 2006). Peer-reviewed journal articles and other written material were selected based on the abstract's relevance to the study. This study began with the most current literature research and used their reference section to work backward to earlier relevant journal articles (Galvan & Galvan, 2017).

Overview

Research has shown that an enterprise seeks to improve firm performance and optimize human capital by developing and retaining key talent (Barney, 1991, 1995, 1997; Teece et al., 1997; Wernerfelt, 1984). Researchers estimate that up to 30 billion dollars are spent annually to train and develop senior leaders in companies (Hrivnak et al., 2009). As talented leadership is an essential aspect of the enterprise's success, human resource professionals focus on strategies to find and recruit top talent. (Somaya & Williamson, 2008); a more effective approach is to develop your current talent (Beechler & Woodward, 2009).

However, traditional human capital development and management approaches are not enough to ensure success and increase enterprise knowhow (Beechler & Woodward, 2009). IBM's senior leader's study showed that business uncertainty and market volatility have created an increasingly complex environment and are the biggest challenges for today's leaders (International Business Machines, 2010). Amory Lovins, a distinguished physicist, has described today's speed of technological advances as 'colliding' with existing rules and institutions designed for the last century (Lovins, 2011). Competency models, leadership development programs, and performance appraisal systems do not provide all needed to develop the talent for enterprises to succeed in today's environment (Kinghorn et al., 2005).

Conger and Ready (2004) suggest that many leadership theories are centered on the development of the individual, as evidenced in the historical approach to developing leaders based on the competency model (Naquin & Holton, 2006). In the competency model approach, employees are given training and education within their functional areas and exposure to the leadership tools (Boyatzis, 2008). Boyatzis et al. (2017) contend that current leadership programs are deficient in providing essential emotional and social intelligence skills, and "the leadership development process often appears non-linear and discontinuous, being experienced as a set of discoveries" (p. 299).

Competency models provide a base of standards for leaders to follow but are based on past realities that may not apply in today's complex environments (Conger & Ready, 2004). The current business environment requires leaders to problem solve and transform their organizations to reach peak value (Bass, 2008; Burns, 1978). The emphasis on competency training and development has neglected to develop a leader's ability to make sense of complex environments and created a less effective decision-making process (Woodside et al., 2016).

Today's leadership problem-solving decisions in technological fields and the general marketplace do not have historical precedence or follow a discernable pattern and therefore are more complex (Trainor, 2017). Organizations need to prepare leaders to take on these challenges confidently and consistently, especially in military engineering and technology domains, as evidenced by peer competitor comparisons (Richardson, 2016).

Complex systems are confounding the minds of well-trained and operationally qualified subject matter experts who can routinely resolve yesterday's complicated problems (Office of Personnel Management, 2001). These new complex problems appear faster than ever before, and current leadership capability and organizational approaches have not delivered consistent success (Risher, 2019). The problem is that complex issues do not follow a cause-and-effect relationship, and therefore, the emergent outcomes have not been what the organization expected (Clarke, 2013). Because of this, organizations need new or evolved approaches that

can prepare leaders and team members to operate successfully in a complex environment.

Questions that Guide the Research

This research focused on leaders' and team members' experiences working in a complex environment. Enabling leadership supports adaptive space, which is fluid or transitory and is initiated by organizational pressures and tensions between the exploratory and exploitation sides of the business (Uhl-Bien & Arena, 2017). Enabling Leadership attributes leverages adaptive space to create new ideas or adaptive responses to complexity.

Furthermore, the study examined the extension or superimposition of experiential learning theory on enabling leadership to aid in influencing emergent outcomes. Experiential learning posits that learning is more than knowledge delivery; it is knowledge creation through grasping and assimilating cognitive work effort (Kolb, 1984). Together, enabling leadership and experiential learning are investigated and sought to explore how they can support the influencing of emergent outcomes and the creation of organizational knowhow. The research questions are stated below:

RQ1. In complex environments, what are the experiences of leaders and team members who employ enabling leadership to influence emergent outcomes?

RQ2. In complex environments, what are the experiences of leaders and team members who employ experiential learning in order to influence emergent outcomes?

RQ3. In complex environments, how does enabling leadership influence the ability to create knowhow in the organization?

RQ4. In complex environments, how does experiential learning influence the ability to create knowhow in the organization?

Relevant Models, Theories, and Frameworks

This study builds on the concepts in the academic literature from the highest level of systems theory to this study's area of research on complexity leadership. At the top level is general systems theory, an area of study that endeavors to transcend the physical and social sciences. The theory contends that shared features across the science disciplines can be viewed at the system level to explain phenomena (von Bertalanffy, 1968). The next level is the Cynefin framework, which describes the different areas that constitute the general environments for the workforce. Snowden (1999) designed the Cynefin framework as a sense-making approach and decision-making aid for the workforce to understand their environment.

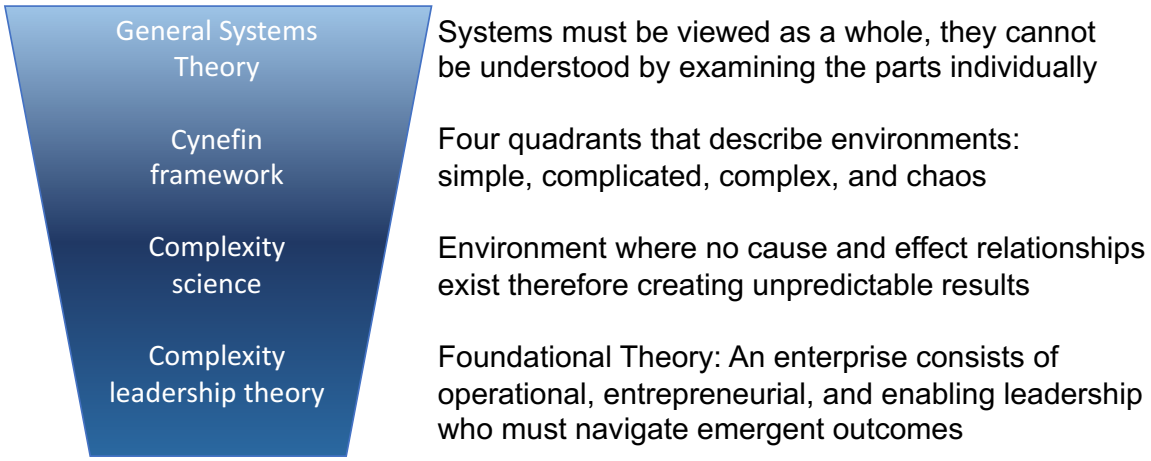
At the next level, complexity science investigates the emergent nature of operating in a complex environment. Complexity is one of the quadrants described in the Cynefin framework characterized by unpredictability with no linear cause and effect (Snowden & Boone, 2007). Complex systems cannot be analyzed by

deconstructing their parts; patterns only emerge when viewed retrospectively. The final level is complexity leadership which examines the organizational dynamics and agent interactions in a complex environment (Hunt, 1999; Osborn et al., 2002). Complexity leadership theory posits that leadership in a complex environment is more of a process than what a person does (Rost, 1991).

As previously mentioned, Figure 1 is a visual drill-down of the systems leveraged in this study. The visual shows how the concepts in the literature funnel down from general systems theory to the complexity leadership model. This study pursues deeper into complexity leadership by investigating enabling leadership and experiential learning and their influence on emergent outcomes and creating organizational knowhow.

Figure 1

Stratified View of General Systems to Complexity Leadership Theory



General Systems Theory

Boulding (1956) first published his paper on general systems theory and described it as the skeleton of science (p. 127). His efforts brought together the behavioral studies in the physical sciences with the social sciences and offered an approach to integrating ideas and a departure from reductionism (Wilby, 2006). Boulding's work has become foundational for complexity practitioners in developing complexity in their scientific area of expertise (Richardson, 2004). Richardson (2004) offers that modern complexity theory advocates share a common root with the general systems thinker as complexity science is a subgroup or natural outflow of general systems theory.

General systems theory is described by von Bertalanffy (1968) as "a theory, not of systems of a more or less special kind, but universal principles applying to systems in general" (p. 32). Von Bertalanffy (1968) implies that knowing one system element enables information about other parts of the same system. However, to understand the system, the interrelationship between its parts must be known (von Bertalanffy, 1972). Wilby (2006) suggests that general systems theory provides a hierarchy or series of relationships that explain interactions. General systems theory is a view counter to the scientific method of reductionism. Reductionism posits that a set of individual components could be broken down and analyzed sequentially to inform the system as a whole (von Bertalanffy, 1972).

In contrast, general systems theory views the system as a whole and more than the sum of its parts (Behl & Ferreira, 2014). General systems theory is a framework to view how a group of parts works to produce a result. Drack (2015) offers additional insight into Ludwig von Bertalanffy's open systems and steady-state view of equilibrium and emphasizes that von Bertalanffy considers the systems to be integrated and constantly seeking equilibrium even in the face of outside stimuli or changes.

As described in general systems theory, a system is constantly changing entities governed by feedback and producing an output (Walonick, 1993). They can be non-linear, adaptive, and evolving and seem to be counterintuitive (Sterman, 2006). Systems extract information and energy from the environment (Holman, 2010), shaping their response to events outside the system. Feedback loops map how interactions influence each other and exhibit self-regulation among autonomous drivers or agents (Holman, 2010). This concept lays a foundation for complexity science and the constraints and pressures in a system.

Furthermore, research by Katz and Kahn (1978) presents an open system model that describes how the environment inputs resources and signals into the organization that becomes transformed through internal processes to output (services and products) back into the environment. The environmental inputs aid in defining the critical elements of a system and further how a system gains energy

from its environment and adapts and grows rather than succumbs to entropy and degrades.

Organizations exist to work toward common objectives and focus on the total system of work teams to achieve these goals (Mitchell, 1978). Systems thinking is a mental model that allows one to see past the parts of a system and discover the entire pattern (Senge, 1990). The Cynefin framework can help organizations recognize the environments they are working in and make sense of systems and patterns that may appear.

Cynefin framework

Kurtz and Snowden (2003) provide a view that further refines general systems into four quadrants and defines complexity as one of the domains in their framework. The authors propose a framework for seeing the world and label it "Cynefin," the Welsh word for habitat or environment. The framework groups its domains into simple, complicated, complex, and chaotic. The Cynefin is a sense-making device and has a fifth dimension called disorder which is used to categorize an issue that cannot be positioned in the four quadrants and will need to be classified collaboratively (van Beurden et al., 2013). This view allows leaders to identify which domain they are operating in and better understand its characteristics.

The simple domain is rules-based and demonstrates a clear cause and effect. This realm is characterized by a linear relationship and empirically has one correct

answer (Ilieva et al., 2018). The complicated domain exhibits a cause-and-effect relationship that is not fully known and requires resources such as time, money, and subject matter experts to solve (Ilieva et al., 2018). This domain may contain more than one correct answer and relies on expert advice, fact-finding, and scenario planning. (Kurtz & Snowden, 2003). Complicated problems can be resolved or analyzed using segmented approaches or techniques (Kaisler & Madey, 2009).

In the Cynefin framework, the complex domain has no linear cause and effect and is unpredictable. Patterns only emerge when viewed in retrospect. Complex environments exhibit non-linearity, self-organization, order/chaos dynamics, and emergence (Kaisler & Madey, 2009) as their patterns are not easy to observe or predict (Kurtz & Snowden, 2003). Complexity leadership theory offers a model for engaging problem-solving in a complex environment. The chaotic domain has high turbulence and no relationship between cause and effect. There are no constraints, no relationships, and there is, in effect, no system to work (Ilieva et al., 2018; van Beurden et al., 2013).

Kurtz and Snowden (2003) posit that the Cynefin framework is a device for sense-making and enables leaders to break away from old ways of thinking and adjust their approach to the existing environment to choose the best approach to problem-solving. After leaders use the described attributes to identify the governing context of each environment, their reaction to the challenge should be tied to the

operating environment. The assumption of order portends a direct cause and effect relationship that is not always true or predictable (Kurtz & Snowden, 2003).

Leaders should respond differently to each domain, as represented in the Cynefin framework (Snowden & Boone, 2007). The leader should ensure that best practices and policies are in place in the simple domain. Delegation and clear communication are the predominant approach. In the complicated domain, leaders will require the assembly of subject matter experts. Detailed involvement in adjudicating conflicts and deciding on the best advice to accept is at the forefront for leaders. This quadrant needs analysis to arrive at the best decision, but the leader may need to curtail the resources available to match what the business can afford.

The complex domain requires increased levels of interaction and collaborative experiments to solicit the best ideas (Auspos & Caba, 2014). Leaders in this domain will need to encourage or enable creative environments in the organization that exposes emergence. The final domain, chaotic, requires immediate action to establish command and control of the situation. This area is marked by searching for answers that stabilize and create a temporary solution. Leaders operating in the chaotic region should concentrate their primary efforts on transitioning to another domain to provide a more manageable approach. Marion (1999) suggests that chaotic systems (stock market, weather, families, organizations) have unpredictable trajectories over time but have minor trends or

weak signals that provide discoverable near-term patterns (Snowden & Boone, 2007).

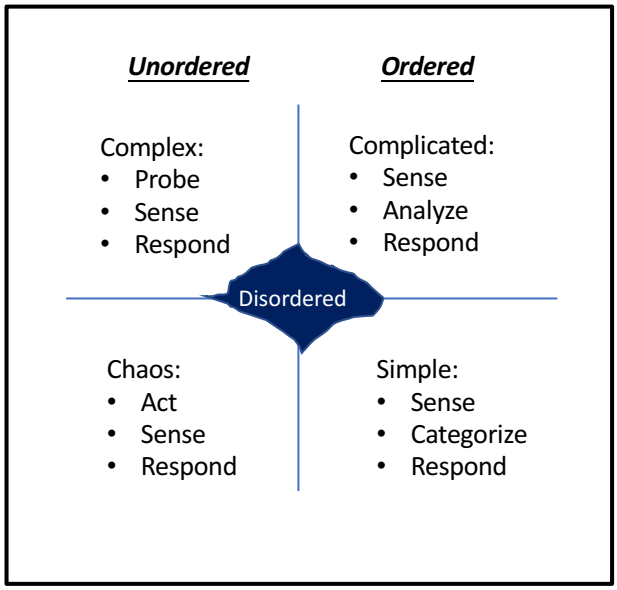
The final area the authors describe is disorder. This is graphically represented as being at the center of the four quadrants but pragmatically is on the borders between two or more domains (Snowden & Boone, 2007). The authors contend that this becomes hard to classify and could be interpreted differently by observers. This area may have some of the subtle attributes of more than one quadrant and therefore is a challenge to categorize. Snowden and Boone (2003) suggest a collaborative effort among teams operating in this area to narrow the disorder area and create a consensus on which quadrant's response is most appropriate. This study will focus on environments categorized as in the complex domain.

Figure 2 provides an overview of Snowden and Boone's (2007) Cynefin framework and the suggested response. The illustration depicts which domains are generally categorized as ordered and unordered. In the ordered context, the leader's response would be to use a fact-based approach to sense and analyze the challenge and then respond with best practices or a panel of experts. In the unordered context, the leader would use a probing or action-oriented approach to discover minor patterns and then respond and adjust. Crutchfield (2003) emphasizes that systems will evolve to create a balance between order and unorder and can provide an opportunity for leaders to influence the outcome. The Cynefin domains are

separated by ordered and unordered and posit how leaders should match their behaviors to the environment. For this study, the complex domain is the focus.

Figure 2

Cynefin Quadrants – Leaders' response



Adapted from Snowden and Boone, 2007

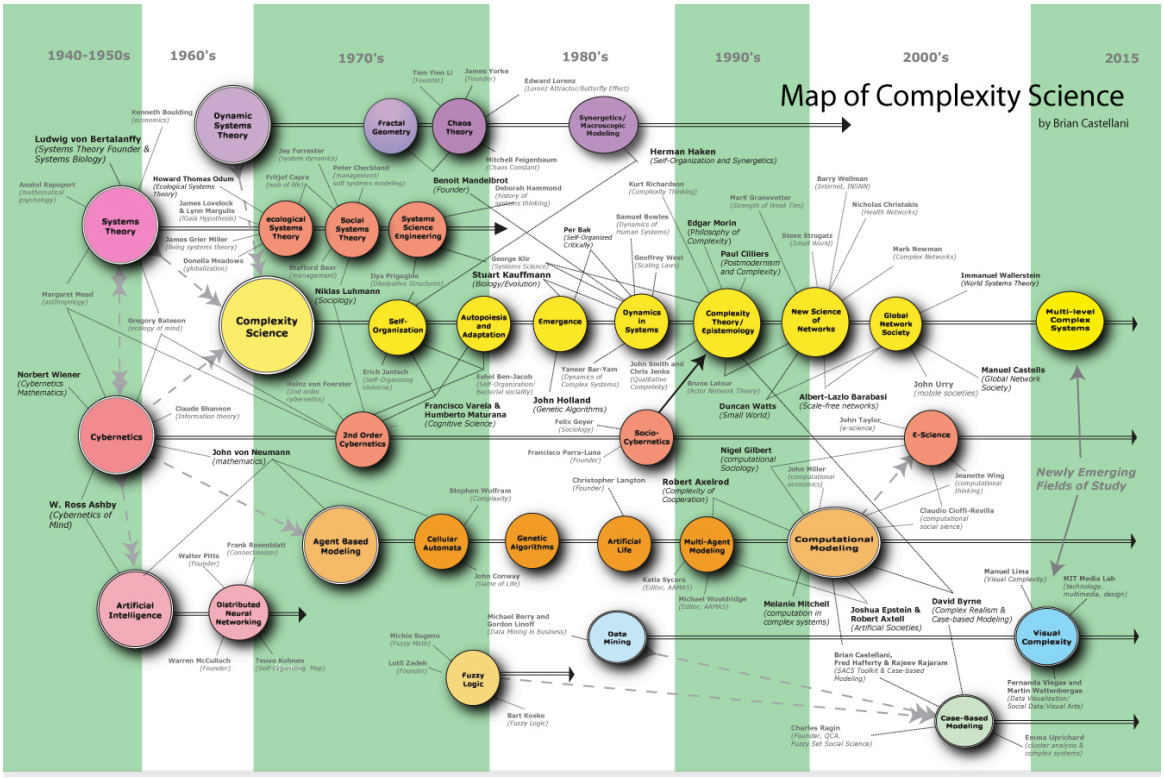
Complexity Science

Complexity science is grounded in general systems theory, which proposes explaining and modeling complex systems that "are self-organizing, emergent, non-linear, evolving, dynamic, networked-based, interdependent, qualitative and non-reductive" (Castellani, 2014, p. 4). Not all systems are complex; some environments are complicated and should not be confused with complexity (Kauffman, 1995; Schneider & Somers, 2006). These distinctions have been further identified in the Cynefin framework.

Complexity science has roots in the social sciences as well (Cartwright, 1991; Doll, 1989; Goldstein, 1996; Marion, 1999; Regine & Lewin, 2000; Richardson & Cilliers, 2001; Sterman, 1994). Castellani and Hafferty (2009) offer that grounding social inquiry in a complex systems framework has provided insights into conventional social science methods. Figure 3 graphically shows how complexity science and sociology have long been associated with each other and continue to evolve (Castellani & Hafferty, 2009). Complexity theory integrates many fields of science, including social science, game theory, economics, computer science, philosophy, and cognitive science (Kaisler & Madey, 2009). Each of these fields of science is grounded in the concepts of non-linearity in that they do not exhibit a cause and effect relationship that can be routinely replicated (Castellani, 2014).

Figure 3

Map of Complexity Science



(Castellani & Hafferty, 2009)

Research on complexity science has begun to refocus leadership views as "dynamic interactions between individuals, explaining how those interactions can, under certain circumstances, produce emergent outcomes" (Lichtenstein & Plowman, 2009, p. 617). Leadership and leading teams effectively in complex environments are being reframed as a process rather than an individual's attributes (Clarke, 2013; Dinh et al., 2014). Additionally, Hazy et al. (2007) posit that "leadership is an emergent phenomenon within complex systems" (p. 2). This new

view of understanding organizations in complex environments is increasingly becoming a focus of academic research.

Complex systems cannot be analyzed by deconstructing their parts. Snowden and Boone (2007) state, "complexity is more a way of thinking about the world than a new way of working with mathematical models" (p. 71). In complex systems, agents constrain one another and seek the best solution. This best solution becomes the stage for a complex adaptive system, "the very essence of the system lies in the interaction among all its parts, with the overall behavior of the system emerging from these interactions" (Casti, 1997, p. 11). Understanding the interaction of a complex system's parts is essential to explain the behavior and its outcomes, as posited by Casti (1997).

Three characteristics of complexity offered by Bohórquez and Espinosa (2015) are non-linearity, abrupt changes, and network interaction. Since complexity is reasoned to exhibit non-linearity, there are no standard cause and effects that can be studied in a classical sense. These non-linear effects are unpredictable (Tourish, 2019) and result from interactive and dynamic agents (Avolio et al., 2009). This unpredictability confounds short-term analysis and creates issues for leaders solving business challenges. Additionally, systems endure and evolve from abrupt changes, and these are often described as emergence Brown (2011). The changes are often low-intensity rather than the occasional high-intensity and are generated by dynamic actions (Brown, 2011). These small or low-intensity changes can make

significant impacts in the long term (Osborn et al., 2002). Finally, a complex system focuses on the networks that interact. These interactions provide both positive and negative feedback to the system. Understanding the full range of feedback and studying network interactions can explain emergent outcomes (McKelvey, 1997).

Complexity science, as defined by Kaisler and Madey (2009), is a "scientific framework that explains how rules govern emergence and the constraints mediating self-organization and system dynamics" (p. 15). Complex organizations do not exist in stable equilibrium (Plowman et al., 2007), but rather, the ongoing interactions of system components or agents emerge in unexpected ways. Osborn et al. (2002) posit that complexity theory views organizations as dynamic systems composed of parts or agents that create new behavior for the whole system and environment when interacting. This impact is especially relevant in complexity leadership theory as small behavior changes to the organization or marketplace can throw the normal process into an unknown and non-linear problem that needs a new approach to solve the emerging issue.

Hill et al. (2017) contend that “a key management challenge is learning what to structure and what not to structure” (p. 43) in a complex business landscape. An organization will use its hierarchy and standard problem-solving processes to drive order and a consistent outcome (Osborn and Hunt, 2007). Striking a balance between order and disorder can give an organization the freedom

to adapt to change (A. Y. Lewin et al., 1999). Although order creates stability for short periods, many leaders still experience catastrophic events. Imposing too much structure can create minor and more frequent changes in complex systems and impact the organization as if it were a catastrophic event (Kaisler & Madey, 2009).

Emergence. Lichtenstein (2014) illustrates that emergence is different than organizational change or transformation; change or transformation modify existing elements where emergent outcomes create new systems or structures. Goldstein (1999) describes emergence as "the arising of novel and coherent structures, patterns and properties during the process of self-organization in complex systems" (p.49). These new patterns explain the system's properties that have evolved and created new levels of order that could not be predicted from the start (Bohórquez & Espinosa, 2015). This concept is key to complexity science as it focuses on studying how the relationships and activities that occur between parts or agents create new behaviors of the system and therefore evolve new relationships with its environment (Schneider & Somers, 2006). Lichtenstein (2014) suggests that emergence can be enacted intentionally by creating the conditions as evidenced in the adaptive model in ecosystems.

The key question is how to create these conditions in an organization. Small fluctuations in one part of the system can bring unexpected change to another part of the system, and this change is often described as an emergent process (Casti, 1997). This outcome occurring in a complex system creates a new level of order at

the system level due to agents interacting at a lower level in the system (Plowman et al., 2007). A layman may refer to these concepts as *The Butterfly Effect.* In order to prosper, a system will create ways to stabilize its environment (J. A. Goldstein, 1994; Lissack, 1999).

Lichtenstein and Plowman (2009) contend that traditional resultant outcomes can be calculated by adding or subtracting elements, whereas emergent outcomes cannot be calculated; they are new or distinct from where they originate. The authors also posit that emergence or the dynamic interactions producing emergence have four necessary conditions "dis-equilibrium, amplifying actions, recombination and stabilizing feedback" (Lichtenstein & Plowman, 2009, p. 617). Lichtenstein and Plowman (2009) further empirically studied the four sequential conditions for emergence and concluded that these conditions would generate emergent order. Table 2 shows the attribute of emergence. Activities outside the norm initiate the first condition, dis-equilibrium. The second condition, amplifying actions, indicates that feedback and agent self-reinforcement amplify the system's small actions. The third condition is the creation of a new level of order. Finally, the emergence stabilizes itself in the system.

Table 2

Attributes of Emergence

Dis-equilibrium	A system is pushed into a highly dynamic state or dis-equilibrium for an extended period
Amplifying actions	Fluctuations in the system can be amplified through feedback and a cycle of self-reinforcement
Recombination or Self-organization	A new level of order comes into being increasing the overall capacity of the system to operate
Stabilizing feedback	A new emergent order will stabilize itself and find the parameters that best increase its overall sustainability in the system

Adapted from: Lichtenstein and Plowman (2009)

Uhl-Bien et al. (2007) offer a clearer view of two mechanisms that drive emergence; reforming components to create different outputs and self-organization. They view emergence as the creation of *spaces between* conflicting new ideas (p. 308). Hazy et al. (2007) contend that openness and accessibility are key components for generating emergence as information is critical to new ideas. Successful leaders in a complex environment make sense of emergent events and outcomes (Plowman et al., 2007) and subsequently create an enabling environment instead of strict control of the future outcome. Lichtenstein et al. (2006) consider leadership itself an emergent event, and the emergent outcomes are the natural result of interactions among agents. Holman (2010) offers that a leader's role is not to predict the future but to enable it (p. 68).

Complex Adaptive Systems. The concept of complex adaptive systems is closely related to emergence. A subunit or group of agents in a system is self-organizing and becomes the forcing function for emergence, which is a new level of order (Schneider & Somers, 2006). Schneider and Somers (2006) describe complex adaptive systems as having elements in complexity theory with three building blocks: non-linear dynamics, unordered and adaptive. They describe the non-linear outcomes from complex adaptive systems as unknowable until they develop. No cause and effect relationship can be analyzed before the event (Kaisler & Madey, 2009). Complex adaptive systems do not have a repeatable pattern that can be identified and confound those using standard operating procedures to solve these challenges.

The unordered component is sometimes described as a disorder or near chaos. Schneider and Somers (2006) propose that complex adaptive systems operate in the disorder realm and result from the interdependence of system components. Plowman et al. (2007) state, "organizations exist far from equilibrium where the ongoing interaction of system components leads to emergent and self-organizing behavior" (p.341). Complex adaptive systems are more open to change and increase adaptiveness by operating in the unordered realm. The adaptive nature of complex adaptive systems is described by Holland (2006) as "systems that involve many components that adapt or learn as they interact – are at the heart of important contemporary problems" (p. 1). The author further offers that the unique

nature of complex adaptive systems' inhibits or limits the use of current mathematical tools and other measuring systems. Schneider and Somers (2006) further point out that the emergent characteristics of self-organization result from the interdependencies of its components. Complex adaptive systems are "open, evolutionary aggregates whose components (or agents) are dynamically interrelated and who are cooperatively bonded by common purpose or outlook" (Uhl-Bien et al., 2007. p. 320).

Uhl-Bien et al. (2007) contend that complex adaptive systems have become the unit of analysis for complexity science (p. 314) "at its most basic level, complexity leadership theory is about leadership in and of complex adaptive systems" (Uhl-Bien & Marion, 2009, p. 631). Complex adaptive systems have become an approach to modeling social behavior and interpreting phenomena (Kaisler & Madey, 2009) that are difficult to explain with traditional social theories. Complex adaptive systems are "open, evolutionary aggregates whose components (or agents) are dynamically interrelated and who are cooperatively bonded by common purpose or outlook" (Uhl-Bien et al., 2007. p. 320).

Gell-Mann (1994) provides examples of a complex adaptive system that includes economies, ecologies, weather, traffic, social organizations, and cultures. Further examples of complex adaptive systems in nature can be seen in the actions of swirling flights of birds or dense schools of fish that have no defined leader providing direction or signals to act but exhibit an adaptive approach to emerging

conditions. The interdependence of the subsystems or individual units drives their behavior or actions, and no one agent is in command. Elements of complex adaptive systems interact on a needs-based feedback loop and change through self-organizing behavior (H. J. Coleman, 2006). Uhl-Bien and Marion (2009) describe how complex adaptive systems are entangled with existing functions and neither favor linearity nor respond to top-down leadership. Complex adaptive systems interact bottom-up or in response to a new stimulus.

Complex adaptive systems and the related concept of emergence are the basic building blocks for complexity science (Uhl-Bien et al., 2007). More specifically, these have become challenges that organizations will continually be required to solve. Arena and Uhl-Bien (2016) contend that in each case, the organization must bring together the right subject matter expertise and create an adaptive workspace to meet the challenge. Sound ideas and solutions can come from unique and sometimes unexpected places in the organization. Guastello (2007) states, "the complex adaptive system places a strong emphasis on an organization's ability to enact successful creative problem solving as a matter of routine" (Guastello, 2007. p. 364). Complex adaptive systems and the accompanying emergence are foundational to complexity (Brown, 2011; Holland, 2006).

Complexity Leadership Theory

As exemplified in Castellani and Hafferty's (2009) map (Figure 3), complexity science has its roots in the social sciences (Cartwright, 1991; Doll, 1989; Goldstein, 1996; Marion, 1999; Regine & Lewin, 2000; Richardson & Cilliers, 2001; Sterman, 1994). According to Henrickson and McKelvey (2002), complexity science combines social and organizational behavior and provides knowledge intense environments, a model that explains the high-velocity dynamics of today's enterprises. Urry (2005) described this emphasis in the last few decades as the complexity turn where the shift to social thought centers on non-linearity and disorder (chaos) in system dynamics.

Complexity theory has become an important research topic (Manson, 2001) and uses social theory to explore how organizations operate in complexity (Schneider et al., 2017). Although complexity science is early in its maturity, researchers have suggested that it represents a Kuhnian shift (Marion & Uhl-Bien, 2001) or a fundamental change in concepts for the physical sciences (Regine & Lewin, 2000). Some have argued that the effect on the social sciences can be equally as dramatic (Marion, 1999). In the simplest terms, complexity theory moves away from linear, mechanistic views of the world, where cause and effect are primary considerations, to one where an emergent outcome is neither predictable nor repeatable.

Rost (1991) believes this new environment requires a different understanding of leadership, a model based on complexity science. Scholars are developing updated approaches to leadership grounded in complexity theory (Boal & Schultz, 2007; Lichtenstein et al., 2006; Lord, 2008; Osborn & Hunt, 2007; D. Plowman et al., 2007; M. Schneider & Somers, 2006; Surie & Hazy, 2006) complexity leadership theory leverages classic research in organizational behaviors (Barnard, 1938; Homans, 1950; Selznick, 1957) and extends further to examine an organization's emergent and dynamic side.

Complexity leadership examines the context of systems dynamics and has less focus on variables (Hunt, 1999; Osborn et al., 2002). The contexts in complexity leadership and adaptive systems are not mediators or moderators per se but the output of interactions between agents (Cilliers, 1998; Dooley, 1996; Hosking, 1988; Osborn et al., 2002). Osborn et al. (2002) contend that complexity leadership research should understand the mechanisms and conditions that emerge in this context view of leadership. Uhl-Bien et al. (2007) state that leadership should be viewed "as a complex interactive dynamic through which adaptive outcomes emerge" (p. 314).

Complexity leadership theory posits a different understanding of leading in a complex environment (Arena & Uhl-Bien, 2016; Uhl-Bien & Arena, 2017). The leadership approach considers the realities of dynamic social components of problem-solving. Uhl-Bien et al. (2007) emphasized that “complexity leadership

occurs in the face of adaptive challenges (typical of the Knowledge Era) rather than technical problems (more characteristic of the Industrial Age)" (p. 300). Leadership trends focus on transforming an organization to become more agile and responsive to emergent requirements but drive it from a top-down change leadership perspective (Kotter, 1996, 2008; Kotter & Cohen, 2002).

Complexity leadership theory offers an embedded approach to driving change in an organization to address emerging challenges (Plowman et al., 2007) and distinguishes the difference between leaders and leadership (Uhl-Bien et al., 2007). Leaders cannot consistently execute strategies the way business intends without influencing emergent ideas to become the realized strategy (Mintzberg & Waters, 1985).

Complexity leadership enables problem-solving rather than controlling the outcome (Lichtenstein & Plowman, 2009) and provides insight into developing and using the adaptive space necessary to leverage the whole organization and solve emerging challenges. The theoretical background for complexity traces its roots to systems thinking, where a problem is viewed through the whole context (Plowman et al., 2007). Clarity is lost when a problem is broken apart to be solved and then attempted to be reassembled (Senge, 1990). Complexity thinking embodies the ability to see emergence and successfully enable positive results (Marion & Uhl-Bien, 2001).

A primary difference between complexity leadership theory and traditional leadership theories is how leaders approach conflict and problem-solving. They are not confronted and resolved but instead allowed to create the right amount of pressure in the organization's transition space to create a healthy tension for problem-solving (Arena & Uhl-Bien, 2016). Complexity leadership theory shifts away from leadership as an individual focus to examining how leadership processes are organized in their context (Hazy & Uhl-Bien, 2013). Leaders should consider the organization's design and its leadership development program to improve the effectiveness of the firm's ability to learn and adapt. Cohen and Levinthal (1990) state that the ability of "a firm to recognize the value of new information, assimilate it, and apply it to commercial ends" (p. 128) is critical to success. Complexity leadership theory offers insight into successfully recognizing and creating the adaptive space used to engage today's emergent outcomes successfully.

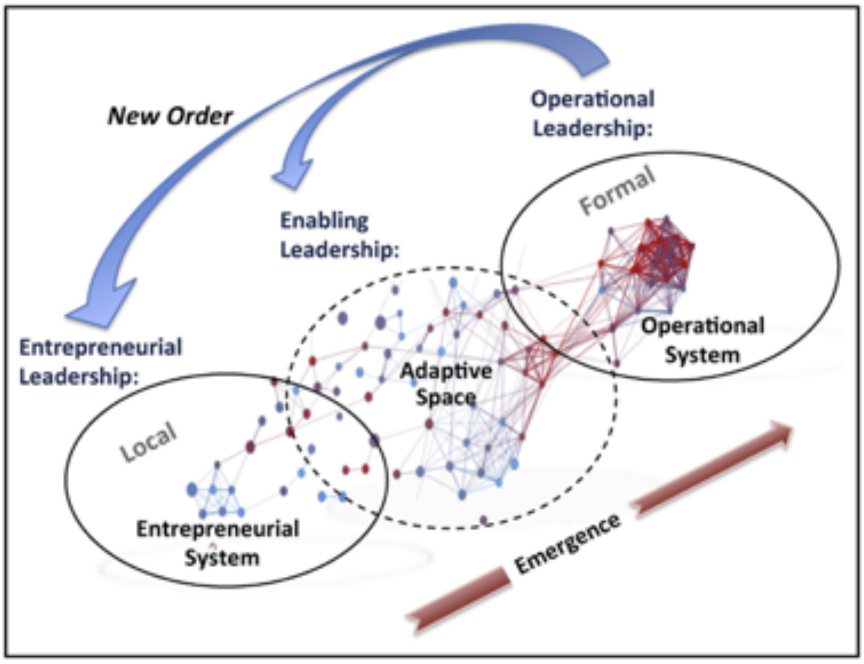
Uhl-Bien et al. (2007) illustrate detailed definitions and concepts of complexity leadership theory to address a path to successfully operating in today's complex environment. Uhl-Bien and Arena (2017) updated and refined complexity leadership theory to answer the current nonstandard and non-recurring problem dilemma. Complexity leadership theory has two systems, operational and entrepreneurial, that act as the exploitation and exploration sides of the firm (Arena & Uhl-Bien, 2016; Lord, 2008; Uhl-Bien et al., 2007). Tensions exist between these two systems. Complexity leadership theory seeks to understand and creatively

apply the tension created between these systems to influence emergent outcomes the business wants (Uhl-Bien & Arena, 2017). Complexity leadership theory focuses on "the complex interactive dynamics of complex adaptive systems" (Uhl-Bien et al., p. 314, 2007) and how leaders in both complexity leadership theory systems can leverage this dynamic.

Complexity leadership theory analyzes the three types of leaders to create adaptability in today's volatile and ambiguous business environment. The three roles of leaders are operational, entrepreneurial, and enabling (Lord, 2008; Marion & Uhl-Bien, 2001). The operational leader executes the routine functions of the business as the entrepreneurial leader creates new ideas and is the innovation engine for the business. In contrast, the enabling leaders influence the dynamic interaction between the first two. Figure 4 graphically displays how the three spaces are interconnected and are overlaid with the organization's internal network. Maintaining the correct balance and the presence of all three spaces (entrepreneurial, adaptive, and operational) can be the most effective approach to creating agile responses to new business challenges (Arena & Uhl-Bien, 2016; Uhl-Bien & Arena, 2017). Complexity leadership theory suggests that all three leadership roles must be present to successfully lead to adaptability (Arena et al., 2017). Leadership in a complex environment is becoming more of a process than what a person does (Rost, 1991). Leaders will rely on more than one area of leadership for success in a complex environment (Mäkinen, 2018).

Figure 4

Complexity Leadership Theory



(Uhl-Bien & Arena, 2017, p. 15)

Entrepreneurial leadership. Ireland and Gorod (2016) describe entrepreneurial leadership as supporting and developing new ideas or products that allow an organization takes advantage of unique opportunities. Venkataraman (1997) further defines the study of entrepreneurship as how "goods and services are discovered, created and exploited" (p. 119). Entrepreneurship is not about individuals but rather opportunities and the enterprising groups who bring the concepts to fruition (Shane & Venkataraman, 2000). Matei & Antonie (2015) conclude that there is a connection between innovation and complex adaptive systems and further offer that it can be “managed, supported and nurtured” (p. 62).

Entrepreneurial leadership is a group or team process, a conclusion consistent with creativity research findings (To et al., 2015).

Entrepreneurs are well known for their bias for action, which can create tensions between entrepreneurial and operational leadership. The organization dealing with that pressure is an essential concept in complexity leadership theory (Uhl-Bien & Arena, 2018). These "pressures from the environment open adaptive space and loosen up the system for change" (Uhl-Bien & Arena, 2017, p. 16). Anderson et al. (2012) describe how entrepreneurship creates and employs disruption to form a new level of order that can become new products, processes, or businesses.

In the complexity leadership model, entrepreneurial team members operate locally and depend on how the entrepreneurial leader's cohesive network is constructed. If the entrepreneurial leader's network is small, they will need help moving their ideas across organizational boundaries. Connecting isolated small networks are where leaders who can bridge or link teams across their local networks are critical in sustaining the forward momentum and delivery of new ideas (Cross & Cummings, 2004).

Buekens (2014) contends that entrepreneurs keep organizations vibrant and fuel their innovation for a competitive advantage. Given the importance of the entrepreneur's contribution to the future of an organization's competitive advantage,

leaders have an essential role in bridging the operational side of the business to mature the innovative ideas of the entrepreneurs.

Enabling Leadership. Enabling leadership has been described in the complexity leadership theory as a newer approach to successfully navigating a complex environment (Uhl-Bien & Arena, 2017). Proponents assert that the principles or tenants of enabling leadership are enabling adaptive space, leveraging networks, engaging in complexity thinking (complex adaptive systems and emergence), and using pressures and tensions in the organization to influence successful outcomes. Many of today's leaders may be engaged in some of the aspects of enabling leadership, but sense-making without a leadership model and accompanying language is difficult.

Since the tenants of enabling leadership do not fit the traditional leadership models, many organizations may not value these efforts. Mintzberg (1980) described that organizations divide labor and task across areas but that a coordinating mechanism is needed to accomplish the mission. Complexity science views enabling leadership as this coordinating mechanism and provides a significant influencing process (Goldstein et al., 2010). The enabling leadership approach interacts across the organization and creates new knowledge through emergence, also described as a new order level. Bäcklander (2019) studied sixteen agile coaches at Spotify and concluded that enabling leadership was “a key balancing force in complexity leadership” (p. 42). Enabling leadership takes full

advantage of the opportunities to use coaching to strengthen key aspects of problem-solving (Fernandez-Araoz et al., 2017).

The enabling leader can drive innovation and change but, more importantly, needs to enable the team members to influence decisions with a minority view that is counter to cultural norms (Blair & Bligh, 2018). The complexity leadership theory hypothesizes that enabling leadership interfaces between operational and entrepreneurial leadership (Uhl-Bien & Arena, 2017). The concept of enabling leadership centers on the premise that these leaders not just allow or tolerate new ideas being translated into the operational side but actively support the construct and development of new ideas from the entrepreneurial space and inject them into the operational side of the organization (Arena et al., 2017). Without this direct and formal support, the entrepreneurial responses to complex challenges would not receive the necessary energy and transition to the operational systems and structures that can implement the idea.

Enabling leadership is vital in leveraging the adaptive space needed to facilitate the creation of new ideas and linking agents to foster learning and innovation (Anderson, 1999). Lichtenstein et al. (2006) state, "leadership (as opposed to leaders) can be seen as a complex dynamic process that emerges in the interactive space between people and ideas" (p. 2). In this vein, successful adaptive leadership is a function of the organization's managerial maturity and how they empower the individual leader. The measure of the importance the organization

places on understanding and developing the leaders who can compete in a complex environment will dictate their success in dynamic environments.

Operational Leadership. Operational leadership describes the managerial or administrative functions that most of us associate with traditional or transactional (Bass, 2008; Burns, 1978) roles. Uhl-Bien and Arena (2017) define operational leadership as the systems and processes designed to execute ideas into business outcomes. Operational leadership exploits or delivers ideas or products that provide a going concern (Havermans et al., 2015). This category of leaders is expected to generate results within the existing framework and will generally make efforts to create as much order as possible out of the complex conditions (Uhl-Bien & Arena, 2017).

Uhl-Bien and Arena (2017) emphasize that operational constraints are essential in making certain realistic and executable entrepreneurial activities. The entrepreneurial leaders may not understand how to implement their ideas and products in the existing operating system. It is up to the operational or administrative leaders to make it a reality and bring ideas to fruition. Uhl-Bien and Arena (2017) state, "a key role of operational leaders in the complexity leadership framework is converting emergent ideas into organizational systems and structure that produce innovation and ongoing results" (p. 15).

Although operational leadership may seem mundane, it carries a vital responsibility in complexity leadership theory, the vital role of helping the

entrepreneurial side of the organization bring new ideas and products to maturity. Uhl-Bien and Arena (2017) offer caution to the operational leaders where they must resist the "pull to order" effect that is natural on the transactional side of the business and can be detrimental to the entrepreneurial members and efforts of the business. The exploitation (operational) side of the business can restrict the exploration (entrepreneurial) side of the organization and dampen adaptive learning (Zabiegalski, 2015).

Senge (1990) describes the system's response to the leader's pull to order as "the harder you push, the harder the system pushes back" (p. 58). Leaders may unknowingly restrict the team members essential to solving the problem by exercising an ordered response. In an overly ordered or hierarchical response, leaders generally can only access people in their function and do not always realize that the best solutions come from cross-boundary subject matter experts. This reaction may create a narrow view of problem-solving and resort to over-reliance on current practices and procedures.

Adaptive Space. Adaptive space is the area where the operational and entrepreneurial systems of the business interact to resolve tensions and pressures; they provide the conditions that allow networks and agents to better use their connections in the process of growing new ideas (Kodama, 2018). Uhl-Bien and Arena (2017) describe adaptive space as a "rich interconnectivity of networked systems and their agents" (p. 12). The authors emphasize that this space is

temporary and fluctuating, requiring leaders to remove organizational barriers and foster connectivity consistently. The space can be physical or virtual and is generated by enabling leaders who bring together diverse or heterogeneous agents. Subject matter experts need adaptive space to bridge the two systems in complexity leadership theory of exploitation and exploration to trigger emergence and create a new order level (Uhl-Bien & Arena, 2018). This adaptive space jumpstarts a place for healthy conflict and tensions in dealing with unique organizational constraints without immediately reverting to a hierarchical process (Mäkinen, 2018).

Liminality. Liminality began as an anthropological term denoting an in between state as a ritual or transition takes place (Turner, 1969). The concept has been introduced into social science and according to Tempest and Starkey (2004) it "suggests new ways of organizing and experiencing work" (p. 508). Furthermore, Hawkins and Edwards (2015) provide the comparison of anthropological ritual barriers to modern doubt, uncertainty and ambiguity. In the context of this study, it appears as a precondition to emergence.

Network Theory. Figure 4 shows how networks are layered across all three complexity leadership theory areas; Operational system, Adaptive Space, and Entrepreneurial System. Network theory plays a crucial role in the construct of complexity leadership theory. It accelerates information flow and learning which is essential in the theories of Resource-Based View (RBV) (Wernerfelt, 1984) and sustained competitive advantage (Barney, 1991, 1997) and offers a reason why

firms can have varying degrees of performance (Gulati et al., 2000). Upon examining the Resource-Based View of the firm, networks could be considered an asset or resource to exploit and remain unique to the company (Singh & Kundu, 2002). Gulati et al. (2000) state, "a firms' networks can be described as creating inimitable and non-substitutable value as an inimitable resource by itself" (p. 685).

The performance advantage of networks for subject matter experts can be seen in the value they create (Gulati, Nohria, and Zaheer, 2000), and are aligned to dynamic capability (Teece et al., 1997), where the firm develops, integrates, and shifts resources for the business. The shifting of resources is an area well suited for networks; as Singh & Kundu (2002) state, "within dynamic markets, value is created by manipulating resources into value-creating strategies" (p. 693). Technology has made networks more accessible. With the advent of social and market connection applications, the playing field has become more dynamic, facilitating the leveraging of networks and their inherent dynamic capability (Singh & Kundu, 2002). According to Arena & Uhl-Bien (2016), cohesion and brokerage are essential to effective networks in complexity leadership theory. The authors define cohesion as a strong group connection and brokerage as the connections across groups (Arena & Uhl-Bien, 2016, p. 23). Reagans and McEvily (2003) report that networks and interconnectivity are critical for knowledge transfer and the flow of new ideas to create and develop new products.

Gulati et al. (2000) offer that "a firm's networks allow it to access key resources from its environment, such as information and capital, goods, services, and so on that have the potential to maintain or enhance a firm's competitive advantage" (p. 207). Granovetter (2005) contends that social networks can reward or discourage the speed and quality of information transmitted through the organization and impact an organization's financial results. The free flow of information and knowledge are essential aspects of organizations in today's highly technical environment. Cross & Cummings (2004) state, "job performance is, to some degree, a product of obtaining the right information to solve novel, challenging problems" (p. 928). Teams or cohesive groups play a critical role in problem-solving. Creativity is a collective process that begins at the local level and must be scaled up to impact the business (Uhl-Bien & Arena, 2017, p.16).

Networks have become a necessary preliminary step to having a functioning entrepreneurial space or domain for developing creative ideas (Osborn et al., 2002; Uhl-Bien & Arena, 2017). The cohesive groups formed in the organization's networks are the core building blocks for networking. The power of employee networks fuels the emergence of new ideas (Arena et al., 2017). Networks and their development are essential factors in an organization's successful launching of innovative ideas and fostering entrepreneurs (Bair, 2012). Without well-developed and sustained networks, enterprises will find it difficult to react to emerging challenges dynamically.

The effective sharing of knowledge in firms is becoming increasingly more critical to the success of the firm (Levin & Cross, 2004). They contend that people prefer to receive essential knowledge from other people rather than documents (Levin & Cross, 2004), further showing the importance of networks and how people get their key information. The network provides a social connection in complex environments to facilitate and speed up the innovation process (Goldstein et al., 2008; Uhl-Bien & Arena, 2018). Huang and Wilkinson (2013) propose that network ties are necessary to conduct trusted knowledge flow. Developing a network in complex systems is essential for knowledge transfer (Reagans & McEvily, 2003). Levin and Cross (2004) further emphasize that the effective use of networks has become a key component of knowledge transfer.

Organizational Knowledge Creation Theory

The importance of knowledge and its management to the enterprise is echoed in both the resource-based and knowledge-based view of the firm (Barney, 1991; Grant, 1996; Teece et al., 1997; Wernerfelt, 1984). The resource-based view emphasizes the importance of knowledge as an asset or firm resource (Barney, 1991). Similarly, the knowledge-based view of the firm posits that knowledge is a resource, and organizations must integrate that knowledge to develop a competitive advantage (Grant, 1996). Grant (1996) further argues that knowledge application is a firm's primary role. Understanding organizational knowledge dynamics and creating knowhow is crucial to organizational success.

Knowledge Creation. According to Nonaka and Takeuchi's (1995) book, *The knowledge-creating company*, there are two types of knowledge central to organizational knowledge management, explicit (know-that) and tacit (know-how). Competency training provides the basic individual knowledge and skills to operate in a domain and is generally explicit knowledge transfer (Trainor, 2017). To provide an advantage to the firm, Swan et al. (1999) posit that knowledge is created and then transcends through the organization from the individual to the larger organizational boundaries. Consequently, knowledge should be elevated in the organization to impact the firm.

In order to make the best use of knowledge, Sabherwal and Becerra-Fernandez (2003) contend that knowledge conversion is necessary and consists of transforming tacit and explicit knowledge. Nonaka and von Krogh (2009) consider the socialization and conversion of explicit and tacit knowledge a fundamental function of the enterprise. Nicolini et al. (2003) further describe knowledge creation in organizations as social interactions or *knowledge in action* and does not solely reside in a person's mind. Organizational knowledge is the ability to apply knowledge and provide value to the firm (Augier & Teece, 2006); therefore, the development of knowhow is a principal objective of the firm.

Organizational Knowledge Creation. Nonaka et al. (2006) describe *Organizational Knowledge Creation Theory* as "the process of making available and amplifying knowledge created by individuals as well as crystallizing and

connection it to an organization's knowledge system" (p. 1179). Nonaka et al. (2006) further describe the individual learnings are applied to benefit the larger organization. Creating knowhow is more than individual learning; it requires knowledge conversion to add value to the firm (Nonaka et al., 2006).

Thompson et al. (2015) identify one of the forces that drive change in an industry as *diffusion of technical knowhow* where the capability of a firm dilutes "as knowledge about how to perform a particular activity or execute a particular manufacturing technology spreads...and becomes more commodity-like" (p. 66). Creating and sustaining *technical knowhow* is a dominant factor in organizational success (Thompson et al., 2015). The implications are that organizations are powered by knowhow (Augier & Teece, 2006), which is key to understanding and solving the firm's challenges (Gordon, 2019). It stands to reason; the creation of knowhow will offset the *diffusion of technical knowhow.*

Augier and Teece (2009) describe tacit knowledge as an individual and organizational knowhow. Knowhow is practical skill and knowledge used to achieve goals and is vital for business operations (Elzinga, 2019). Firms value knowhow because of its direct link to success (Pavese, 2018). Knowhow is the application of knowledge gained in the firm, and therefore has a significant impact on organizational success (Boateng, 2011; Cousins, 2018; Fang et al., 2010; Fillion et al., 2015; Kim, 1993; Ng, 2009; Nicolini et al., 2003; Shin et al., 2017). Given the evidence in the literature that knowhow is derived from gathering and

transforming knowledge, the researcher will use the term *knowhow* to reflect both organizational knowledge creation and technical knowhow.

In summary, the literature on complexity leadership theory provides an approach for enabling leaders to link the two systems of the enterprise: operation and entrepreneurial. As adaptive space is created, enabling leaders can leverage its existence and facilitate the creation and development of new ideas (Campbell, 2014). This linkage can provide a structure to influence emergent outcomes. Research by Uhl-Bien and Arena (2017) reports that as firms encounter complexity, new methods are necessary to influence the emergent outcomes for the benefit of the enterprise and the development of knowhow. Knowhow is essential in executing business solutions (Pavese, 2018). Additionally, as knowhow is created, it can complement other business areas and continue to build on itself for the firm's benefit (Helfat, 1997). These ideas are postulated in the following propositions:

Proposition 1: In cases where enabling leadership is used, enabling leaders will influence desired emergent outcomes.

Proposition 2: In cases where enabling leadership is used, the enterprise influences the ability to create knowhow.

Experiential Learning Theory

Today's workplace is dominated by the notion that learning and education are information delivery from a teacher or self-study by reading (Gherardi et al.,

1998). Experiential Learning Theory offers a different view: learning is a cycle where knowledge is created and transformed. Levin and Cross (2004) contend that creating and effectively sharing knowledge is an increasingly central role for leaders of firms today and offer that it is a necessary condition for success in complex environments. Nonaka et al. (2006) offer that organizations today should no longer rely on given information but instead on new information for the enterprise. Experiential Learning Theory owes its roots to Lewin's approach to creating knowledge by conceptualizing phenomena (Kolb & Kolb, 2008). Experiential learning theory posits that learning is a cyclic process where knowledge is created "through the transformation of experience" (Kolb & Kolb, 2009, p. 44). The learning through cognitive work effort (Kolb & Kolb, 2008) can also be seen in Shewhart's cycle of *plan, do, check, act*. Deming described in his *system of profound knowledge* that experience and knowledge combined with theory can transform management (Leonard, 1997).

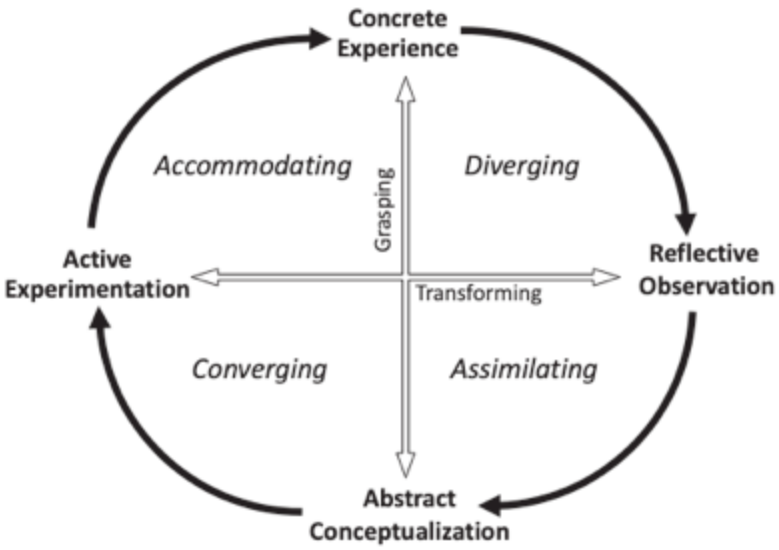
Experiential Learning Theory offers a method to acquire and retain knowledge. Learning is both cumulative (Cohen & Levinthal, 1990) and occurs by action and experiences of those actions (Fillion et al., 2015; Kim & Senge, 1994). The relationship between learning and improving practices in an organization is more than what individuals retain in their minds; it is a process of significant knowledge transfer to improve knowhow (Nicolini et al., 2003). Tacit knowledge is most effectively transferred or transformed in a structured experiential environment

(Nonaka et al., 2009). The firm's knowledge-based view (KBV) suggests that firms can be viewed as bundles of knowledge (Denford, 2013), making the learning and retention process key to maintaining a competitive advantage. Teece et al. (1997) further argue that learning through experimentation is a crucial component of dynamic capabilities in firms. Effective learning is the core of management and adaptability (Kolb & Kolb, 2008).

Kolb and Kolb (2008) offer a detailed description of experiential learning theory as a holistic and dynamic view of a learning cycle gained through experience and reflection. Figure 5 graphically represents experiential learning theory as a cycle and shows where a person will experience, reflect, conceptualize and experiment to complete the progression. Kolb and Kolb (2008) state, "knowledge is created through the transformation of experience" (p. 44). Krumboltz et al. (2013) contend that individuals who learn how to engage in exploratory efforts will generate ad hoc or unexpected positive outcomes. Matsuo and Nagata (2020) further extend the experiential learning concept by addressing the importance of unexpected experiences that are not a result of active experimentation. Upon reflection, these experiences require new learnings and may also require unlearning of obsolete knowledge or behaviors (Matsuo & Nagata, 2020).

Figure 5

Kolb's Model of Experiential Learning



Adapted from (Kolb, 2014, p. 44)

Experiential learning contributes to organizational adaptability as it accelerates the ability of a company to grow its knowledge organically through everyday operations and research (Shawn et al., 2006). When a learning organization actively promotes the concept of an experiential learning approach, it will gain an advantage in how well it can absorb information. Kolb and Kolb (2008) noted that experiential learning is a cycle where knowledge is gained by the two major phases; acquiring and transforming the experience. Kolb and Kolb (2008) state, "Experiential learning is a process of constructing knowledge that involves a creative tension among the four learning modes that is responsive to contextual demands" (p. 44). The complete cycle of creating and transforming

knowledge is a recursive process that includes four modes; concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb & Kolb, 2009). Deming (2018) asserts that individuals learn at different speeds and in different ways. Experiential learning theory offers a mental model to help use the best learning style for individuals to gain knowledge.

As team members consciously use an effective organizational and individual learning process, the capacity of the organization and individuals to speed up the cycle of learning and, therefore, the organization's adaptability improves (Kim & Senge, 1994). Focusing on the transforming experience versus the outcome is essential for creating an entrepreneurial spirit (Corbett, 2005). Reflective listening and key conversations are essential parts of the experiential learning process (Jacobs & Heracleous, 2005), as well as an existing knowledge foundation (Corbett, 2007) which serves as a base for understanding new experiences (Kolb, 1984).

Experiential learning theory posits that the model is effective at all levels of the enterprise; individual, team, and organizational levels. Complex environments place more demands on leaders, allowing less time for organizations to learn together encouragingly and safely. Experiential learning theory is much more than on-the-job training; it is a structured model to apply at all levels of the organization. The research literature has not explored any crosswalks between effective patterns of enabling leaders and experiential learning theory as an effective tool in a

complex environment. Experiential learning theory has not been fully applied or utilized in the complexity leadership model.

Organizational Adaptability

Organizational adaptability is an important concept in organization success; it explains how well an enterprise can react to the speed of business challenges (Clarke, 2013). Organizational adaptability is defined as the ability of an enterprise to adjust its internal resources and processes to dynamic conditions or new environments confronting it (Trainor, 2017; Uhl-Bien & Arena, 2018). Organizational adaptability has even been described as the new competitive advantage (Reeves & Deimler, 2011). Improving an organization's adaptability can increase problem-solving speed by removing outdated hierarchal problem-solving approaches (Uhl-Bien & Arena, 2018). For an organization to succeed in a complex environment, it must adapt to changing conditions and organize the business and leadership approach for adaptability (Uhl-Bien & Arena, 2017).

Leading for organizational adaptability has a different look and feel than traditional approaches (Shawn et al., 2006) and is a model that approaches problem-solving differently than traditional transactional leadership approaches as described in the literature (Bass, 1985; Burns, 1978). Dushnitsky and Lenox (2005) point out that finding knowledge and integrating it within the firm provides dynamic capability and improves organizational adaptability. Kolb (2008) emphasizes that learning is adapting and that organizational learning can also lead

to organizational adaptability (Sorenson, 2003). Organizational adaptability is seen as a critical performance criterion in enterprises (Koller & Ramón, 2016; Shawn et al., 2006). Furthermore, Newey and Zahra (2009) emphasize the importance of organizational adaptability as finding valuable new information, absorbing it, and applying it to the firm's needs.

Key elements of the designed approach for adaptability are the absorptive capacity of the organization and the inclusion of thoughtful experiential learning for the team members. Absorptive capacity indicates how well a firm can apply new knowledge through acquisition, assimilation, transformation, and exploitation (Newey & Zahra, 2009). It addresses the very core of the ability of an organization to see the potential value of new information or product.

Sources of knowledge from outside the organization can be precious to the organization by increasing the speed and reducing the cost of new idea generation, "most innovations result from borrowing rather than invention" (Cohen & Levinthal, 1990, p. 126). The exploitation of new ideas requires a certain level of prior knowledge and the ability to adapt to the changing knowledge base in the market. A company's investment in research and development will increase its ability to utilize outside technical knowledge. This increase in research and development funding will create a compounding effect where the researchers examine the internal knowledge resources and associated gaps and scan the environment and competition for the most recent and relevant information available

to problem solve. Continuous striving for adaptability begins a cycle of exercising the enterprise's knowledge and capacity muscle.

As outlined in the previous paragraphs, experiential learning theory contributes to the knowledge of the enterprise and improves the organization's adaptability. Therefore, incorporating experiential learning theory in enabling leaders' approach to ensure the emergent outcomes are what the business desires is critical to explore. Hence the following propositions are advanced.

Proposition 3: In cases where experiential learning is used, enabling leaders will influence desired emergent outcomes.

Proposition 4: In cases where experiential learning is used, the enterprise influences the ability to create knowhow.

Theoretical Framework

Synthesis

Uhl-Bien and Arena (2018) discuss the critical role that pressure and tensions play as the forcing functions to drive a balance between the operational and entrepreneurial components of the system. Pressure can be internal or external and show up as technological, economic, or regulatory challenges. These challenges create tension crucial in developing the adaptive space necessary to generate out-of-the-box solutions. Arena and Uhl-Bien (2016) state, "a primary role of pressures is to move a system out of equilibrium" (p.25). This pressure is fundamental in creating a sense of urgency amongst the team members in the

organization. Under complexity leadership theory, an adaptive space will be created for the team members to brainstorm ideas and new approaches to solving the problem. Arena and Uhl-Bien (2016) sum it up best when stating that in complexity leadership theory, “the role of leaders shifts from a focus on driving and managing outcomes to a focus on enabling adaptive space, and leveraging pressure are essential to this role" (p. 25). How leaders react to this pressure can take these two different forms.

Many leaders' initial responses to pressure is to pull the challenge into an orderly position which involves leaders leveraging their existing framework and system to force-fit the issue into a routine solution model that uses control and a top-down approach. Driving to exiting procedures is a natural output for leaders who have been taught transactional or traditional leadership roles (Bass, 2008). They were taught that all problems should be brought to order and made right (Uhl-Bien & Arena, 2017). The order response can cause more damage than it solves (e.g., requiring employees to follow policies that will not solve the issue). Pulling a problem back to equilibrium may not solve the issue and might hide the underlying damage that created it. Uhl-Bien and Arena (2017) state, "leaders are trained to jump into management mode and drive control" (p. 10). This drive to order can dampen the interactions needed to create a long-term solution to the problem. This response to complexity can be as inadequate as allowing chaos to take over. No

problem is solved, and there can be unintended consequences to this ordered approach.

In complexity leadership theory, the best response to a complex problem is an adaptive one. As Uhl-Bien and Arena (2017) state, "adaptive responses resist the pull to order and capitalize on the collective intelligence of groups and networks" (p. 10). The theory suggests that when a complex challenge and adaptive space are appropriately created, networks become energized, and an emergence of a new approach is created (Marion & Uhl-Bien, 2001). These interactions seed new ways to frame and solve the problem. The dynamics of adaptive space take the place of the traditional ordered response and require the leaders to enable innovative solutions in the space between chaos and order. If the leader understands the placement of the conflict in the continuum between chaos and order, it will make a difference on influencing a successful outcome (Zabiegalski, 2019). According to Uhl-Bien and Arena (2017), quality information flow is critical in driving and sustaining the links needed for a coherent and purposeful response to a complex challenge. This substantive information sharing becomes a facilitator in encouraging a successful response when an opportunity presents itself.

There is a difference between leaders and leadership (Uhl-Bien, Marion, and McKelvey, 2007). Modern organizations should embrace that developing good leaders is only a starting point; individuals alone cannot solve emerging issues. It takes balance and the appropriate leveraging of the complexity leadership theory's

three elements: entrepreneurial, enabling, and operational leadership. As open system theory suggests, complex adaptive systems are non-linear and do not return to previous equilibrium states (Lewin, 1999). In complexity leadership theory, the system is not open but complex. Adaptive space is created at the tactical level to become the tool to bring the ideas together and efficiently deal with the appearance of a new complex adaptive system. The emergence of a complex adaptive system is resolved when the solutions become translated into the organization's new operating system. Uhl-Bien and Arena (2017) state, "at the core of enabling leadership principles and practices is complexity thinking-the understanding of how to read a system for signs of emergence and engage with it" (p.17).

A key component of the complexity leadership theory is the establishment of adaptive space. Uhl-Bien and Arena (2018) state, "leaders enable adaptive space by engaging conflicting and connecting to advance ideas into the operational system that lead to new adaptive order" (p. 11). They define conflict as engaging the tension (internal) and pressures (external) of the organization to create unique solutions to emerging problems (Uhl-Bien & Arena, 2018). Solving conflict requires the involvement of cross-boundary members of the organization. Cross-boundary work creates a connection for team members to bring unique skills and perspectives on the nature of an issue and create new approaches to problem-solving. The creation of adaptive space is facilitated by a series of networks that are

its foundation; it is sustained by the support and engagement of enabling leadership.

Theoretical level. Arena and Uhl-Bien (2016) offer key adaptive principles for creating effective adaptive space (p.26). Arena and Uhl-Bien, (2016) quote, "if adaptive pressures act as the spark and adaptive practices are the catalyst; adaptive principles are the fuel or energy that keeps it going on an everyday basis" (p. 26). The authors view the principles as the underlying base across all three leadership areas. They need to become embedded in how the organization works for the enterprise to become more adaptable.

A key concept for networks superimposed on the complexity leadership model is the notion of a small workgroup or cluster solving problems collaboratively (Dess & Sauerwald, 2014; Reagans & McEvily, 2003). Consequently, it creates the energy needed to scale up across organizational boundaries. To be successful, the small team needs to embrace conflict and create a healthy tension that sparks action and encourages others to join the effort. According to adaptive principles, as these solutions are matured, the team members are to leverage the energy from the network and boundaries that have been created to enlist a pivotal sponsor to incorporate a new solution into the existing operating system (Arena & Uhl-Bien, 2016).

Organizational level. The key leaders of the NAVAIR Research, Development, Testing, and Evaluation (RDT&E) team operate in a complex and

rapidly changing environment. Complexity leadership theory can be used to investigate how to develop enabling leaders who can effectively use the adaptive space created between the operational and entrepreneurial systems. Following the description given by Creswell and Poth (2018), this research should take the ontological philosophical approach, where individuals can have a different interpretation of realities. In this area of study, the author offers that there can be multiple viewpoints by the participants because they experience events differently (p. 20).

Adaptive practices are an essential component of effectively employing adaptive pressures created by the challenge and successfully problem-solving adaptive space. Arena and Uhl-Bien, (2016) state that the practices used are often comprised of tools and methods that have been around for years but are applied in the context of complexity leadership theory. The authors further contend that using adaptive practices in a routine and systematic way will improve the organization's ability to solve emergent and non-linear challenges more quickly. These practices also depend on how well the organization employs its networks. Without an understanding of how to energize the existing networks (Curral et al., 2016), it is difficult to take advantage of key team members' tacit (vs. explicit) knowledge (Hayduk & Walker, 2017).

Explicit knowledge is specific knowledge that can be written down, such as policies and procedures. On the other hand, tacit knowledge describes heuristic or

intuitive information and requires shared activity to transfer. This tacit knowledge can only be tapped into if the adaptive practices efficiently use the networks and existing frameworks that allow smaller work teams and cross-functional groups to tap into the energy of new ideas and drive action. As Arena and Uhl-Bien (2016) state, "each adaptive practice can improve performance and enhance innovation when combined; they can catalyze bold, emergent change across an organization" (p. 26).

Individual level. Complexity leadership theory offers a new working relationship between the supervisor and employee (Lord, 2008; Uhl-bien, 2008). The theory provides a different approach to the interactions a leader will have with their team. Firms' problems emerge faster than the typical solution cycle can resolve them. Today's rapid and unfamiliar problems facing team members leave them struggling to make sense of how to approach the solution. Sense-making plays a significant role in dealing with the complexities of complex challenges. As Kurtz and Snowden (2003) discussed, the assumptions of order and rational choice are not as firmly grounded today as they have been in the past. The complexity leadership theory approach will require rethinking the model for training and preparing leaders and team members in new roles.

Arena and Uhl-Bien (2016) describe the forces that take advantage of the pressures and tensions between the operational and entrepreneurial spaces of the complexity leadership theory model. The authors argue that the key is to efficiently

use these pressures and quote a familiar business mantra, "never waste a good crisis" (p. 25). Taking advantage of the pressures can help enabling leaders show their strength and operate in complexity effectively. The authors also state that the technique uses just the right amount of pressure or tension to stimulate the workforce's energy into a creative solution space.

Uhl-Bien and Arena (2017) describe the four elements needed for adaptive pressures. The first element is the need to create a novel solution that creates adaptive space, which becomes the forcing function. The second element is the new relationships required to be created and further develop the local networks. The third is the fertile ground created by conflicting perspectives and approaches to problem-solving. The fourth and last necessary condition is the need for interdependence to get a solution. Each area relies on the other, motivated by self-interest, to adapt and solve problems for the good of the future. The result of correctly applied adaptive pressure is the advancement of social capital across the organization. Arena and Uhl-Bien (2016) refer to social capital "as the competitive advantage that is created based on the way an individual connected to others" (p. 22).

Conceptual Framework

Figure 6 outlines the conceptual framework, provides a view of what was studied and delimited (Miles et al., 2020), and guides the research. Maxwell (2013)

emphasizes the importance of developing a conceptual framework to show "what theories, beliefs, and prior research will guide or inform your research" (p. 4).

Figure 6

Conceptual Framework

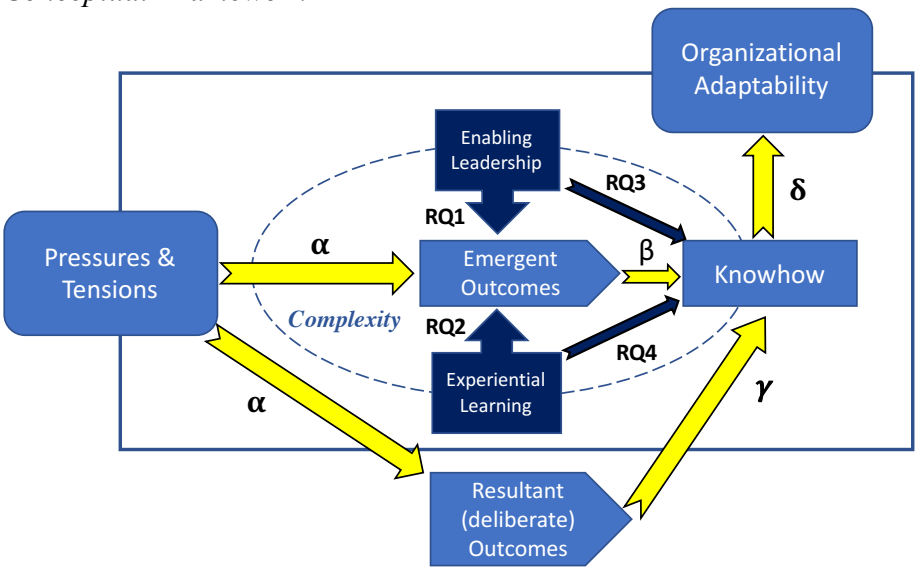


Table 3 describes the areas of the conceptual framework addressed in the literature and is annotated with Greek letters next to the arrows in Figure 6. The summary in Table 4 outlines the propositions for the study that examine the experiences of enabling leaders who use experiential learning to influence emergent outcomes and create organizational knowhow.

Table 3

Conceptual Framework areas addressed in the literature.

Area	Statement	Citations
α	Pressures and tensions create resultant (deliberate) and emergent outcomes	(Lichtenstein et al., 2006; Lichtenstein & Plowman, 2009; Marion & Uhl-Bien, 2001; Mintzberg & Waters, 1985; Uhl-Bien & Marion, 2009)
β γ	Resultant/emergent outcomes impact business knowhow	(Augier & Teece, 2006; Boone & Ganeshan, 2008; Levin & Cross, 2004; Nonaka, 1994; Nonaka & von Krogh, 2009)
δ	Knowhow impacts organizational adaptability	(Boateng, 2011; Cousins, 2018; Elzinga, 2019; Fang et al., 2010; Fillion et al., 2015; D. Kim, 1993; Ng, 2009; Nicolini et al., 2003; Pavese, 2018; Shin et al., 2017)

Table 4

Summary of Propositions

P1	*In cases where enabling leadership is used, enabling leaders will influence desired emergent outcomes*
P2	*In cases where enabling leadership is used, the enterprise influences the ability to create knowhow*
P3	*In cases where experiential learning is used, enabling leaders will influence desired emergent outcomes.*
P4	*In cases where experiential learning is used, the enterprise influences the ability to create knowhow.*

The contribution to the body of knowledge is the research on how emergent outcomes and knowhow can be influenced using enabling leadership and experiential learning. Emergent outcomes and knowhow become an enterprise asset which is then passed on to individuals or the organization (Kim, 1993; Nonaka et al., 2006). Organizational adaptability only exists with knowhow. If a leader does not have knowhow on their team, there is nothing for leaders to manage. Knowhow is an asset the enterprise maintains, which feeds into organizational adaptability. The dark-colored or blue arrows are RQs, whereas the lighter or yellow arrows are areas already addressed in the literature and annotated with Greek letters. The arrows in Figure 6 visually display the delimits and boundaries for the study.

Summary

Chapter 2 includes relevant literature on the important theories and frameworks that feed into complexity leadership theory. The overview included general systems theory, complexity science, and the Cynefin framework that further defines complex environments. The literature review summarizes the theories and frameworks that describe the conditions and concepts necessary to illustrate complexity, such as complex adaptive systems, emergence, and networks. Complexity leadership theory includes concepts on the business's traditional operational and entrepreneurial systems. The theory further postulates that unique conditions are present while operating in complex environments. Traditional leaders are facilitated by enabling leaders and the use adaptive space (Uhl-Bien et

al., 2007). Key elements of complexity leadership theory are necessary components to provide leadership in a complex environment. These elements positively impact organizational adaptability and enterprise knowhow.

The problem is that complex problems are emerging without common patterns and standard solutions, and therefore, the emergent outcomes have not been what the organization expected (Clarke, 2013). Because of this, organizations need new or evolved approaches that can prepare leaders and team members to operate successfully in a complex environment. This research explored how the experiential learning framework can extend enabling leadership in complex environments and provide a practical tool for leaders. It is proposed that enabling leaders can successfully use experiential learning theory to influence the desired emergent outcomes and create organizational knowhow in a complex environment. Firms should adapt their approach to the new complexity and effect emergent outcomes the business wants.

A significant gap in the literature is the lack of a process approach on how to guide practitioners on the use of enabling leadership and experiential learning to influence emergent outcomes and create organizational knowhow in a complex environment. The references to approaches in the literature have been descriptive and are untested. Enabling leadership attributes in the complexity leadership theory and literature does not provide methods or techniques to influence successful emergent outcomes. This study aims to investigate and explore the experiences of

leaders and team members who use enabling leadership and experiential learning to create the emergent outcomes the organization needs.

Chapter 3

Methodology

Overview

This chapter explains the research design, approach, and data analysis used to answer the research questions. Golafshani (2003) posits that investigators who use qualitative methods are seeking "illumination, understanding, and extrapolation to similar situations" (p. 600), and there are different ways to measure a person's reality or experience (Hunt & Ropo, 1995). This study explored the experiences using grounded theory to understand the interaction between complexity leadership theory and experiential learning theory. The research focused on leaders and team members of Naval Air System Command's (U.S. Navy, U.S. Marine Corps, and U.S. Air Force) program and RDT&E acquisition domains. These employees operate in a complex and rapidly changing environment.

Jacobs (2013) argues that problem statements should be clarified by a historical review of previous literature and then framed into a problem statement. Glaser and Strauss (1967) initially developed the grounded theory approach to build on and expand theories of people's lived experiences (Collingridge & Gantt, 2008). Leadership is a process, and a literature review shows a gap in presenting an operational process for complexity leadership theory leaders and team members to employ. Developing relationships and constructs (Rocco & Plakhotnik, 2009) that do not currently exist in complexity leadership theory and experiential learning

theory literature can provide new understandings of operating more successfully in a complex environment.

The most significant gap in the literature for complexity leadership theory centers on the lack of approaches for practitioners to develop enabling leadership more fully in their enterprises. The current attributes listed in complexity leadership theory literature for enabling leadership in a complex environment do not translate into a deep understanding of the degree experiential learning and enabling leadership can influence successful emergent outcomes. Creating successful emergent outcomes can increase knowhow and organizational adaptability (Augier & Teece, 2006). Unlike other research methods, grounded theory provides the best approach to systematically exploring and developing an operating framework.

This study sought to explore the problem that complex issues do not follow a cause-and-effect relationship. Therefore, the emergent outcomes have not been what the organization expected (Clarke, 2013). Because of this, organizations need new or evolved approaches that can prepare leaders and team members to operate successfully in a complex environment. This study proposes a grounded theory method to study the theoretical interaction between complexity leadership theory and experiential learning theory to effect emergent outcomes. Grounded theory provides a structured method to uncover and make sense of the participants' experiences. The grounded theory method was chosen based on the research questions and the feasible type of research suited for the studied phenomena (Jeon,

2004). Grounded theory is more than describing experiences; it provides an inductive method to construct theory and explain phenomena from the data collected from individual experiences (Lewis, 2015). The researcher believes that grounded theory is the best approach and can provide a deeper insight into the phenomena experienced by the participants and leads to new or unanswered questions (Sutton & Staw, 1995) to further this area of study.

An extensive body of research (Anderson, 1999; Lewin, 1999; McKelvey, 1997, 1999, 2004) describes how complexity theory has become a common social research topic. Since complexity science combines social and organizational behavior (Henrickson & McKelvey, 2002), there has been a paradigm shift in approaching leadership in complex environments (Campbell, 2014). Complexity leadership theory is the model to investigate emergent outcomes and examine the impact on knowhow and organizational adaptability with experiential learning theory. Research in this area can provide valuable insights to organizations and teams that deal with complexity.

Questions that Guide the Research

This research focused on leaders' and team members' experiences working in a complex environment. Enabling leadership supports adaptive space, which is fluid or transitory and is initiated by organizational pressures and tensions between the exploratory and exploitation sides of the business (Uhl-Bien & Arena, 2017).

Enabling Leadership attributes leverages adaptive space to create new ideas or adaptive responses to complexity.

Furthermore, the study examined the extension or superimposition of experiential learning theory on enabling leadership to aid in influencing emergent outcomes. Experiential learning posits that learning is more than knowledge delivery; it is knowledge creation through grasping and assimilating cognitive work effort (Kolb, 1984). Together, enabling leadership and experiential learning are investigated and sought to explore how they can support the influencing of emergent outcomes and the creation of organizational knowhow. The research questions are stated below:

RQ1. In complex environments, what are the experiences of leaders and team members who employ enabling leadership to influence emergent outcomes?

RQ2. In complex environments, what are the experiences of leaders and team members who employ experiential learning in order to influence emergent outcomes?

RQ3. In complex environments, how does enabling leadership influence the ability to create knowhow in the organization?

RQ4. In complex environments, how does experiential learning influence the ability to create knowhow in the organization?

Worldview

Creswell (2014) states that worldviews are "a general philosophical orientation about the world and the nature of research that a researcher brings to a study" (p. 6). Creswell and Poth (2018) further describe four levels for a research study: paradigm worldview, theoretical lens, methodological approach, and data collection methods. The worldview this author portends is constructivism. Creswell and Poth (2018) describe constructivism as a qualitative method that seeks to understand and provide meaning through a participant's view and state, "this form of inquiry research is shaped from the bottom up-from individual perspectives to broad patterns and, ultimately to broad understandings" (p. 36). Using constructivism grounded theory allowed the researcher to use theoretical sensitivity and provide an understanding of the data's nuisances (Gray, 2018) in the development of the grounded theory.

The theoretical lens or philosophical viewpoint selected for this work would take on an ontological aspect where individuals can interpret what constitutes reality differently (Gray, 2018). The participants can have multiple viewpoints in this study area and experience events differently. Since the researcher has a constructivist worldview and theoretical perspective, the grounded theory approach advocated by Charmaz (2014) is a good fit. This method allows subjectivity and researcher involvement when investigating a phenomenon where the researcher can use their background and knowledge to further the study. The data collection

method was semi-structured interviews. They provide depth of discovery and ensure that the study's areas of interest are covered in each interview (Carter et al., 2014; Kim, 2011). Qualitative inquiry is an inductive process that seeks to make sense of the accumulated data and construct generalizations (Gray, 2018). This study allowed the researcher to explore, explain, and expand on complexity leadership theory and experiential learning theory.

Organization of the Remainder of this Chapter

This methodology chapter describes the research questions, research design and overview of the approach, sampling and selection of participants, procedures, data collection and analysis, ethical considerations, research positionality, and validity.

Methodology

Creswell (2014) contends that qualitative research is used to explain behaviors and attitudes through the theoretical lens of the researcher. Denzin and Lincoln (2005) assert that qualitative research is a method that seeks to make sense of phenomena in terms of people's experiences. Qualitative research explores the experiences of participants and their experience with a phenomenon or concept to derive its meaning (Corbin & Strauss, 2015). The research methodology used in a qualitative study is linked to the research questions being examined and the stated purpose of the investigation, where the researcher is discovering relationships, not testing theory (Creswell & Poth, 2018). Creswell and Poth (2018) reported that the

five most common qualitative methods are narrative, phenomenology, grounded theory, ethnography, and case study. Table 5 shows the details of each qualitative method.

Table 5

Qualitative Research Approaches

	Narrative	Phenomenology	Grounded theory	Ethnography	Case Study
Focus	Explores the life of an individual	Attempts to understand experiences or a phenomenon	Investigates the process or action with the goal of developing a theory	Interprets ethnic, cultural, or social group	Examines episodic events in a definable framework to explain 'how'
Data collection	Interviews and documents	Primarily through interviews	Interviews with enough individuals to gather sufficient data	Interviews, observations, and immersion into the culture	Documents of the case, archives, interviews and observations
Data analysis	Stories, review of historical content, development of themes	Study and describe experiences, examine the meaning and context. Look for themes to classify	Coding methods are used to categorize the data and describe the implications of the categories	Describe and interpret findings by analyzing data and developing themes	Develop a detailed analysis, identify themes, make assertions
Written report	Detailed picture of the person's life; often a chronology or biography	Report and describe the 'essence' of the experience including the context of the phenomena	Results in a theory, theoretical model or figure that represent the phenomena	Description of the culture behavior of a group	In-depth study of a case that describes its themes and possible lessons learned

Adapted from: (Center for Innovation in Research and Teaching, 2022a)

The narrative approach uses the participants' experiences to tell a story and often involves just one or two people. The researcher gathers data to chronologically order the meaning of those experiences (Czarniawska, 2004). Phenomenology endeavors to describe the common meaning through the lived experiences of several participants (Moustakas, 1994). It seeks to make sense of a concept to describe its universal essence (van Manen, 2016).

Grounded theory is a designed inductive inquiry that seeks to create a unified theory explaining a process experienced by individuals (Creswell & Poth, 2018). The theory is generated directly from the data collected from individuals (Boychuk-Duchscher & Morgan, 2004). It seeks to uncover aspects that are little known in the phenomenon or process (Boadu & Sorour, 2015).

The ethnography method studies "shared patterns of behavior, language, and actions of an intact cultural group in a natural setting over a prolonged period" (Creswell, 2014, p. 14). An entire culture-sharing group is examined in ethnographic research, making the unit of analysis much more extensive than in grounded theory (Creswell & Poth, 2018).

Finally, a case study allows the researcher to examine a program, event, or process bounded by time and place where the in-depth data collection produces case descriptions and themes (Creswell & Poth, 2018). This case study approach involves the intensive investigation of people or a situation of interest over a specific period.

Grounded Theory

Based on a review of qualitative methodologies described by Creswell and Poth (2018) and the need to examine the research problem from different angles (Corbin & Strauss, 2015), the researcher considers grounded theory best suited for this study. The benefit of this approach is developing a deeper understanding of the phenomena and discovering previously unknown constructs to fill the gap in the

literature. The complexity leadership theory literature has a gap in presenting a process for practitioners to use experiential learning in complex environments and therefore needs further exploration. Grounded theory is the right approach to further study complexity leadership theory as extended by experiential learning theory and provides a basis for theory development and ultimately practical application. The limitation of the other four methods described in table 5 is the lack of theory development that could provide an operational model for practitioners.

Grounded theory focuses on the shared experiences of a group of individuals and endeavors to discover a theory that explains the phenomenon (Creswell & Poth, 2018). Corbin and Strauss (2015) state that grounded theory "enable[s] researchers to examine a topic and related behaviors from many different angles-thus developing comprehensive explanations" (p. 11) and providing new understandings of areas not previously investigated. Limited research has been done on how experiential learning theory can extend complexity leadership theory. Grounded theory can provide a framework for more rigorously structured empirical research by gathering data on a problem to see it differently (Knafl & Howard, 1984). According to Kennedy and Lingard (2006), grounded theory is the appropriate choice of methodology when the goal is to explain a process while building on existing theory.

Grounded theory was first codified by Glaser and Strauss (1967) to use data to create new theories, and it centered on the constant comparison of data using

analytical induction. This approach marked a shift in qualitative research from describing a social interaction or process to creating a structured approach to develop a deeper understanding of the phenomena participants are experiencing (Boadu & Sorour, 2015). In Glaser's and Strauss's book *The Discovery of Grounded Theory (1967),* the authors outlined a method that described how to collect data in a structured way and create theory (Glaser, 2010).

As proposed and updated over time, the grounded theory methodology provides a pragmatic set of guidelines to develop theory from qualitative data (Kushner & Morrow, 2003) without *testing a priori* hypothesis. According to Kennedy and Lingard (2006), "Glaser's and Strauss' approaches to grounded theory methodology eventually became divergent" (p. 40). Glaser's emphasis on grounded theory centered on empiricism and rigorous methods resonated with his quantitative background. At the same time, Strauss emphasized a pragmatist philosophical tradition and a more open-ended study of interactions (Charmaz, 2014). Glaser and Strauss continued to refine further and update their grounded theory approaches (Glaser, 1992, 2009, 2012; Strauss, 1987, 2014; Strauss & Corbin, 1997). This method has become more common in qualitative research (Annells, 2006).

The branching of grounded theory between Glaserian and Straussian views on grounded theory has led to academic evolutions over time. The continual refinement of grounded theory has contributed to the literature and provided more

guidance on advances in this qualitative process (Aldiabat & Le Navenec, 2011). The Glaserian and Straussian versions of grounded theory use "coding, constant comparison, questions, theoretical sampling, and memos to generate theory" (Walker & Myrick, 2006, p. 548). The main differences between Glaserian and Straussian versions of grounded theory center on the research and interview questions, coding process, and researcher interaction (Charmaz, 2014; Creswell & Poth, 2018; Saldana, 2021).

Table 6 outlines how the research and interview questions become less structured as the method progresses from Glaser to Strauss. The coding process in the Glaserian model is less structured and is sensitive to letting the categories emerge rather than be forced during coding (Boychuk-Duchscher & Morgan, 2004; Glaser, 1992). Researcher interaction in both Glaserian and Straussian approaches is restricted. Table 6 also describes Glaser, Strauss, and Charmaz's worldview or theoretical perspective that influences their research approach.

Table 6

Grounded Theory Comparisons

Grounded Theory of:	Glaser	Strauss	Charmaz
Worldview or Theoretical Perspective	Objectivism	Pragmatism	Constructivism
Research Questions	Broad Inquiry	Open or specific	Open or specific
Interview Questions	Unstructured	Open or Semi-structured	Open or Semi-structured
Coding Process	Open Theoretical	Open Axial Selective	Initial Phase Focused Phase
Researcher interaction	None	Limited	Co-Construction

Adapted from: (Charmaz, 2014; Creswell & Poth, 2018; Saldana, 2021)

Creswell and Poth (2018) describe the constructivist grounded theory method as one that builds on the foundations of Glaserian and Straussian approaches and develops the theory as a co-construction process with interactions between the researcher and the participants. This co-construction approach allows the researcher to tap into their knowledge and involve the participants, adding more creativity and depth to the grounded theory development. Charmaz's (2014) constructivist model offers a more interpretive analytical approach to the data collected (Boychuk-Duchscher & Morgan, 2004). The constructivist method provides specific steps or phases to coding the qualitative data while simultaneously comparing it with emerging categories and is influenced by the researcher's interactions with the participants (Charmaz, 2014).

Patton (1999) offers that "at the core, qualitative analysis is a creative process" (p. 1190). The constructivist grounded theory uses a conceptual framework to guide the data collection and analysis (Yu & Smith, 2021). Qualitative research relies on pattern recognition by the researcher (Patton, 1999), and the constructivist method provides an avenue for creativity by the researcher.

The grounded theory format for this study was the constructivist approach, which advocates interaction between the researcher and the participant and allows the researcher to have more flexible guidelines and an interpretive view on theory development (Charmaz, 2014). Although rigor is used in the method, increased value is placed on the views and lived experiences of the participants. Charmaz (2014) advocates using the creativity of the investigator, realizing that could alter the research direction (Gray, 2018). The participants are studied to create a theoretical explanation of a process or experience (Creswell & Poth, 2018).

Research Design

Grounded theory begins with questions on contextual ideas of interest and builds underlying explanations to develop a theory of the forces that create the outcome (Hunt & Ropo, 1995). This effort uses an iterative cycle where data is collected and compared to other data or theory and further refined until categories and theory are aligned (Sekaran & Bougie, 2016). The study looked for common or shared experiences among participants in a specified process area and was conducted as a cross-sectional study (Sekaran & Bougie, 2016). Cross-sectional

studies refer to the study time horizon when the data is collected at one time across the research period and permits comparisons between individuals and their shared experiences. A cross-sectional study is recommended for grounded theory (Gray, 2018).

This study used open and semi-structured interview questions and accept general comments at the end of the session (Milena et al., 2008). Open-ended and semi-structured questions allow the researcher to probe into a chosen area while the participant can direct their answers to cover their experiences (Corbin & Strauss, 2015). The researcher followed Rocco and Plakhotnik's (2009) guidance on incorporating theory from the literature review relevant to the study and separating areas that do not relate to the phenomena under investigation.

In the design of this study, avoiding bias was accomplished by centering the researcher's thoughts on concepts and continuous reference to the research questions during the interview process (Miles et al., 2020). Additional steps to reduce researcher bias was the use of active listening during the interviews, asking clarifying questions, and paraphrasing their answers for confirmation. Further, a pilot study was conducted to refine the design and discover potential barriers in recruiting participants, modify interview questions and improve the study (Kim, 2011). Pilot studies can also reveal any preconceptions the researcher has and take steps to mitigate them (Krathwohl & Smith, 2005). The pilot used the interview protocol from the study to further refine the questions.

Kim (2011) points out that the interview questions should be broad enough to allow the interviewees to tell or narrate their stories. If the questions are too narrow, they may not be able to capture the whole experience of the participants. The interview protocol used a series of semi-structured interviews with strategically selected employees. The critical incident technique was considered when a participant discussed a key topic of the research, and it can be expanded by asking what helps and what hinders the activity or phenomena (Viergever, 2019). In semi-structured interviews, a few topics are chosen before the session based on literature and provide consistency in areas covered in each interview (Corbin & Strauss, 2015). Field notes were written during the interview process, and memos were created following the session to clarify and improve the sense-making of the research (Howard & Barton, 1986).

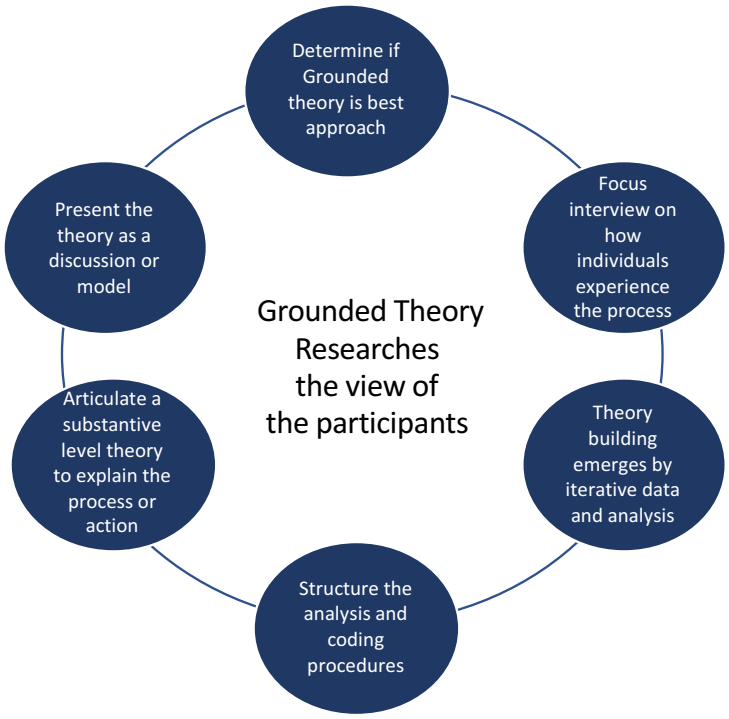
Writing can aid in preserving first thoughts and crystalizing understanding of the subject matter (Howard & Barton, 1986). During this portion of the study, detailed memo-writing was used to preserve the integrity of the information and categorization. Boychuk-Duchscher and Morgan (2004) contend that "memos are aimed at conceptualizing that, which to this point may have been purely descriptive" (p. 610). Memos were used consistently and systematically throughout the research process and completed after interview sessions. This information identified relationships and potential causation (Maxwell, 2013). Notes were also taken during the interview and aid in memo writing and further developing ideas.

These notes were reviewed as the memos are written and used as part of the concurrent process of data collection and analysis.

Figure 7 outlines the significant steps for conducting grounded theory research. After the first step, selecting grounded theory, the researcher constructs interview questions that focus on the core phenomenon, causal conditions, and consequences (Creswell & Poth, 2018). In the next step, the researcher records memos and seeks to discover patterns. Simultaneously the coding by the researcher is conducted and provides insight on where to gather additional data. This effort culminates in developing a substantive-level theory that explains the participants' experiences with the phenomenon and can be further refined into a model (Creswell & Poth, 2018). The researcher used Appendix I to review the study's adherence to grounded theory quality during the development of the dissertation.

Figure 7

Procedures for Conducting Grounded Theory Research



Adapted from (Creswell & Poth, 2018, p. 89)

Delimitations

The study area is confined to complex environments and focused on the use of enabling leadership and experiential learning theory to influence emergent outcomes and create organizational knowhow. The pre-interview screening questions aided in determining the background of the participants in the use of experiential learning in a complex environment. The interview solidified a participant's depth of understanding of complex environments and experiential learning.

Limitations

The participants' background may or may not include an academic understanding of complex environments and identifying the nature of emergence. This limit was mitigated by using alternate phrases to describe the relevant academic concepts. The selection of participants would likely mirror only experiences in military aviation and may not be translatable to other domains. A narrow selection of participants could lead to groupthink where leaders view their experiences similarly and can impact the results or offer a skewed view of the role of leaders. The study sought to represent the aviation domains in the Department of Defense (DOD) across the aviation acquisition process. However, it was a challenge to recruit candidates in the appropriation and allocation areas which are the domain of congress and high-ranking flag officers. This will create an over emphasis on the technical and programmatic side of the enterprise.

Population and Sample

Sample sizes for grounded theory studies include a group of participants as determined by the investigator's experience and confirmed by the pre-interview screening document. Aldiabat and Le Navenec (2018) advise selecting participants carefully, and the researcher screened potential candidates for the experiences directly related to the study. The number of participants and their attributes evolved as the study progresses (McCrae & Purssell, 2016). Hennink et al. (2017) reported that code saturation likely occurs at 16 to 24 interviewees. Galvin (2015) examines

the probability of a theme being captured in an interview and posits the probability that a specific theme will emerge is 93 percent if a concept is present in 20 percent of the population and 12 interviews are completed. Galvin (2015) uses the equation $P=1-(1-R)^n$, where P is the probability that a concept will emerge in the interviews given that the concept is present in R proportion of the population and n interviews are conducted. The author further provides a reference table in Appendix B (Galvin, 2015, p.11) for planning interview based qualitative research. This table shows at the 16-interview point specified by Hennink et al. (2017) and where a concept exists in 20 percent and 10 percent of the population, the probability that the concept will be discovered is 97 and 81 percent respectively. The probability of concept discovery is increased with more interviews and can be validated by constant comparison technique used by grounded theory.

Corbin and Strauss (2015) describe grounded theory sampling as seeking data collection to a saturation point whereby a theory is developed to explain the action or interaction. Aldiabat and Le Navenec (2018) point out that data saturation is a gradual process that requires the researcher to use their subjectivity and intuition. A saturation point has been noted to occur when the same themes repeat or no new ideas emerge (Creswell & Poth, 2018) and has also been described as *theoretical sufficiency* (Charmaz, 2014). If the researcher needs more data to either verify or develop codes, categories, and their relationships, then *theoretical* (after

initial coding) or *discriminate* (during focused coding) sampling are used to select more participants (Strauss & Corbin, 1997).

Selection of Participants

Ideal candidates targeted for this study are experienced leaders and team members who have experience working in complex environments. The research was conducted with select employees from the Research Development, Testing, and Evaluation domains in U.S. Navy, U.S. Air Force, and U.S. Marine Corps aviation acquisition systems personnel (government as well as Aerospace and Defense contractor). The sampling was a cross-section of individuals who work in complex environments, as confirmed by the pre-interview questions to provide heterogeneity.

This study initially offered approximately 30 people the opportunity to participate and reserved the right to invite more or complete the interview process based on data saturation or theoretical sufficiency. Access to team members was granted in a previous study for the Acquisition Research Program (ARP) at the Naval Post Graduate School. The NAVAIR leadership is interested in pursuing further research in this area. Table 7 outlines the five key areas that this study used to recruit for representative sampling and to increase generalizability of findings. These areas include; agency, education, roles, years of service, and gender.

Table 7

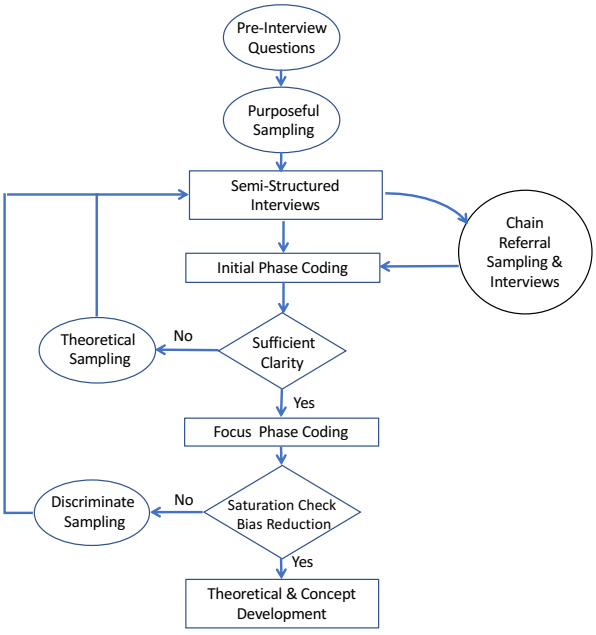
Representative demographics for participant sampling

Agency	Education	Roles	Years of Service	Gender
Navy	Doctoral	Executive	>20	Male
Marines	Masters	Manager	>10-20	Female
Air Force	Bachelors	Team Leader	<10	
Aerospace & Defense Contractor	Associates	Team Member		

Figure 8 shows the integration of sampling in the constructivist grounded theory process.

Figure 8

Integration of sampling into grounded theory process



Adapted from: (Charmaz, 2014; Walker & Myrick, 2006; Yu & Smith, 2021)

The key elements that sampling supports in the process include pre-interview screening, semi-structured interviews, initial coding, researcher decision points, focused coding, saturation, and finally, concept and theory development. Figure 8 further describes how each sampling method is connected to a coding phase.

The initial participants were selected *purposefully* (Gray, 2018; Naderifar et al., 2017; Palinkas et al., 2015).Their selection was based on experience working in a complex environment and learning how to deal with emergence. Purposive sampling is a common strategy to identify participants knowledgeable about the research question and who can assist the researcher achieve a deep understanding of the phenomenon under study (Palinkas et al., 2015). McCrae and Purssell (2016) state, "participants are chosen not to represent others but for their likelihood of having information on the phenomenon of interest" (p. 2285). The grounded theory study selected participants based on how well they can help the researcher form the theory.

Grounded theory's discovery occurs as the researcher collects, analyzes, and codes the qualitative data; more insight is gained and provides a view into how much and what further data should be collected (Glaser & Strauss, 1967). The sampling of participants is an iterative process that focuses on concept development instead of representing the population (McCrae & Purssell, 2016). Glaser and Strauss (1967) emphasized that sampling is "the process of data collection for

generating theory where the analyst jointly collects, codes, and analyzes the data and decides what data to collect next and where to find them in order to develop his theory as it emerges" (p. 45). Corbin and Strauss (2015) emphasized that the researcher collects data on concepts to be studied in grounded theory sampling, not the people themselves.

The selection of participants for this study included people and areas that directly relate to the research questions being investigated (Long & Godfrey, 2004). Figure 8 shows that theoretical sampling occurs after the initial purposeful sampling when preliminary codes and categories have been developed (Cho & Lee, 2014). The theoretical sampling technique is helpful in selecting participants who can help clarify the properties of the data as is coded (Charmaz, 2014). Theoretical sampling allows the researcher to gather and analyze data while simultaneously deciding what to collect next (Aldiabat & Le Navenec, 2018; Corbin & Strauss, 2015; Glaser & Strauss, 1967).

The final phase of sampling used a discriminate approach where participants were selected to reduce bias and check theoretical saturation (Creswell & Poth, 2018). The team members in the RDT&E domain research new technology, develop new platforms, create improvements to existing platforms, as well as test and evaluate military aircraft. The workforce frequently deals with emerging complex and challenging new problems that are not encountered in

common engineering areas and makes them an excellent population from which to select participants.

Pre-interview screening questions were asked to ensure the participants have the desired background to calibrate the selection of interviewees. A series of one-on-one sessions were used to collect the data taking advantage of an adaptive interview method that allows the questions to be modified and seeks interrelated questions for exploration. This study used open questions that do not require direct causal answers, which allowed for deeper dialogue and confirming questions (King et al., 2019). The use of alternate phrases for textbook terms aided in altering mental models through dialogue (Jacobs & Heracleous, 2005).

The interviews were recorded and transcribed. The transcription was outsourced to an organization that assures security and provides non-disclosure agreements for the transcribers. Each interviewee was provided the transcript for member checking and respondent validation. At the end of each interview, the researcher asked each participant whom they would recommend being added to the interview list. This type of sampling is called snowballing or chain referral and is used to find participants not readily known to the researcher. Participants were reminded that they may withdraw throughout the study. Confidentiality was maintained by using pseudonyms for the participants in the study, and the information was secured and stored in a separate location where the investigator has exclusive access.

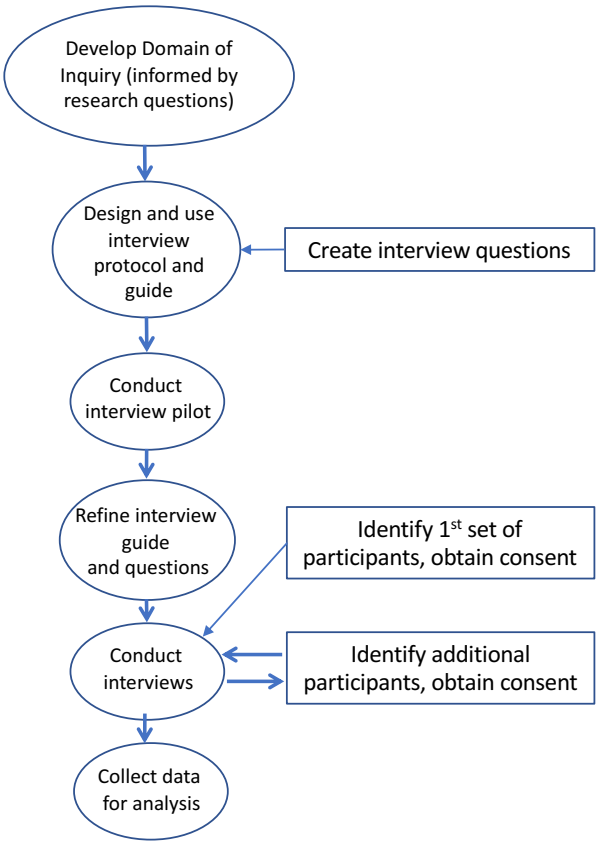
Instrumentation

The study used the interview methods outlined in Appendices D, E, and F. After the pilot study, modifications were made to the interview methods to improve the conduct of the sessions. The researcher informed the participants that follow-up sessions may be needed. The researcher also canvased more participants based on the emerging information from the earlier interviews. In-depth interviews have generated the most ideas compared to focus groups (Carter et al., 2014). Fontana and Frey (1994) state, "interviewing is one of the most common and most powerful ways we use to try to understand our fellow human beings" (p. 361). The interview process was conducted in a professional setting where the participants are comfortable speaking. Local protocol for COVID was observed if the interviews are conducted in person. Member checking was conducted by providing each interviewee the transcripts to review for accuracy.

Figure 9 shows the development of the Domain of Inquiry (Charmaz, 2014), beginning with the creation of the interview guide, interview questions, and interview protocol to finally conducting a pilot study to refine the process. Identifying and obtaining consent from participants begins the interview process.

Figure 9

Developing the domain of inquiry



Adapted from: Charmaz (2014)

The investigator used memos after interviewing to record analytical thought and sense-making during the study (Corbin & Strauss, 2015). Field notes were taken during the interviews to record the researcher's initial thoughts and information to aid in the development of the study's memos (Given, 2008). Patton (2002) declared that the researcher is an instrument in qualitative research and can have a bias in their findings. Stewart (2010) indicates that transparency through reflexivity can be achieved when researchers know how their prior experience and

beliefs influence qualitative research. Creswell and Poth (2018) suggest the researcher declare their positions in their writings and use reflexive comments in the memo as the research is conducted. These efforts were used to remain aware of the researcher's experiences, biases, worldview, and positionality.

Procedures

Internal Review Board (IRB) approval was obtained before interviews were conducted. Informed consent (Appendix A) was provided to each participant and collected before each interview. Each interview was recorded, and transcripts produced. The researcher took notes during the interview to facilitate memo writing at the end of the interview. A pilot study was conducted to refine the interview questions and discover areas for improvement (Kim, 2011).

Grounded theory methodology was used to gather information on complexity challenges facing the RDT&E and Program domains in the U.S. Navy, U.S. Air Force, and U.S. Marine Corps acquisition community. The individuals selected were consulted throughout the investigation as needed. The investigator personally interviewed each participant. The conduct of the interview is an essential factor and was handled consistently and respectfully (King et al., 2019).

An essential aid in qualitative research is using a software application that provides the necessary tools to organize, analyze, and integrate research data efficiently (Silver & Lewins, 2014). The researcher used the software application NVivo to store the research data in a single location. NVivo is an industry-leading

qualitative research software program that provides functionality for coding data, recording notes and memos, linking data clusters, searching and retrieving data, and mapping data to support theories.

The coding features of the NVivo application assisted the researcher in developing categories and themes. The software was valuable in exploring comparisons, filtering results, and creating visual concept maps and charts. The NVivo software was chosen as it offers additional features such as memo storage, coding analysis, and sophisticated queries (Saldana, 2021). NVivo contains tools such as the framework matrix feature, which can assist the researcher in discovering category properties and actor interactions, and auto coding functions such as using the frequency of word usage in interviews (Center for Innovation in Research and Teaching, 2022b). The research outputs developed using NVivo are used in chapters 4 and 5 of this study.

Data Collection and Analysis

The data collection method chosen is based on grounded theory's research method (Gray, 2018). Interviews were recorded to facilitate the coding and development of themes or categories derived from the data. The interviews were transcribed by an outside professional service. These transcriptions were made available to the participant for review. Tukey's (1977) approach compares and contrasts the data gleaned from the interviews. The data was coded, categories were created, and themes were generated for analysis (Saldana, 2021).

According to Sekaran and Bougie (2016), data analysis consists of data reduction, display, and conclusions. The first step, data reduction, entails selecting and categorizing the information collected in the study. Secondly, data display involves charts or a selection of quotes that help understand the information. Finally, the researcher derived the data set based on the patterns observed. "Qualitative data analysis is not a step-by-step, linear process but rather a continuous and iterative process" (Miles & Huberman, 1994, p. 333). Coding is used in qualitative research to break down the data, compare common categories and themes, and then organize it to construct a theory (Walker & Myrick, 2006).

Table 8 outlines the coding phases and the accompanying methods, objectives, and potential sampling approaches that were used in this study.

Table 8

Constructivist Grounded Theory Coding

Coding Phase	Methods	Phase Objectives	Sampling Method
Initial Phase -or- First cycle	Open In Vivo	Codes Sub-Codes	Purposeful
Transition	Diagramming	Reassemble Organize	Theoretical
Focused Phase -or- Second cycle	Focused Axial	Categories Themes	Discriminant

Adapted from: (Charmaz, 2014; Saldana, 2016; Walker & Myrick, 2006)

A two-phase coding approach was used to categorize the data (Charmaz, 2014). Glaser and Strauss (1967) stress in their original work that it is important to

analyze qualitative data by combining a coding technique with concurrent analysis. Musto and Schreiber (2012) describe that the coding process begins with reviewing the data line by line and then breaking down the data into concepts or in vivo codes. In vivo coding is using the participant's language or data to create a short phrase that condenses and captures the essence of the relevant quote from the transcript (Saldana, 2021).

These codes were combined into higher-level concepts or categories. This approach is referred to as open coding, the initial phase, or the first cycle method, and requires the categories to be constantly compared to each other and relevant to the study (Boadu & Sorour, 2015). In vivo coding was employed to split the data into coded segments. The codes expressed an idea, a phrase, a sentence, or a whole paragraph (Minichiello et al., 1990). Sekaran and Bougie (2016) prescribe standardizing the selection of a specific coding unit to establish the level of data analysis. This study used themes or "a single assertation about a subject" (Kassarjian, 1977, p. 12) which can vary in length.

Saldana (2016) emphasizes the need for a transition phase between the first and second coding cycles. After the initial phase, he advocates for the researcher to return to the original coding, examine memos for insight, and start preliminary mapping to see if more data is needed to complete the first phase. Theoretical sampling, if needed, is used at this time to find more participants to refine the codes thoroughly.

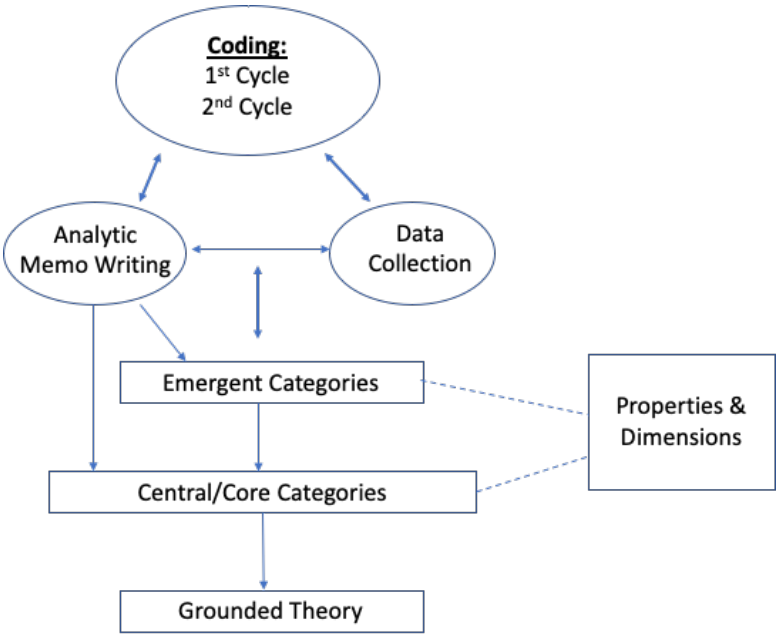
The second or focused phase of data coding reassembled the data and explored the relationships between the categories (Boadu & Sorour, 2015). First cycle codes are combined into a smaller number of broader categories during this coding phase (Saldana, 2021). The codes and sub-codes are converted into categories (Saldana, 2021) and are further developed to identify the categories by properties and the interactions among categories or actors (Corbin & Strauss, 2015).

The researcher further integrates, classifies, prioritizes, and refines the significant categories (Boadu & Sorour, 2015). The theory begins to emerge at this step by explaining the relationship between the core category and the other major categories (Corbin & Strauss, 2015). A first draft of the emerging theory should provide a new perspective and integrate existing theory from the literature review (Boadu & Sorour, 2015). The researcher was diligent in writing field notes, journal entries, and memos to aid in reflexivity and record how the researcher's theory evolves.

Figure 10 shows the interrelationship between the coding process, memo writing, data collection, and the creation of categories into grounded theory. Saldana (2016) displays this visual as *a classic* ground theory. The key elements include coding, the interaction with data collection and memo writing, the synthesis of categories, and the inclusion of properties and dimensions to develop substantive or grounded theory.

Figure 10

Developing grounded theory: coding, memos, and data analysis



Adapted from: Backman & Kyngäs (1999)

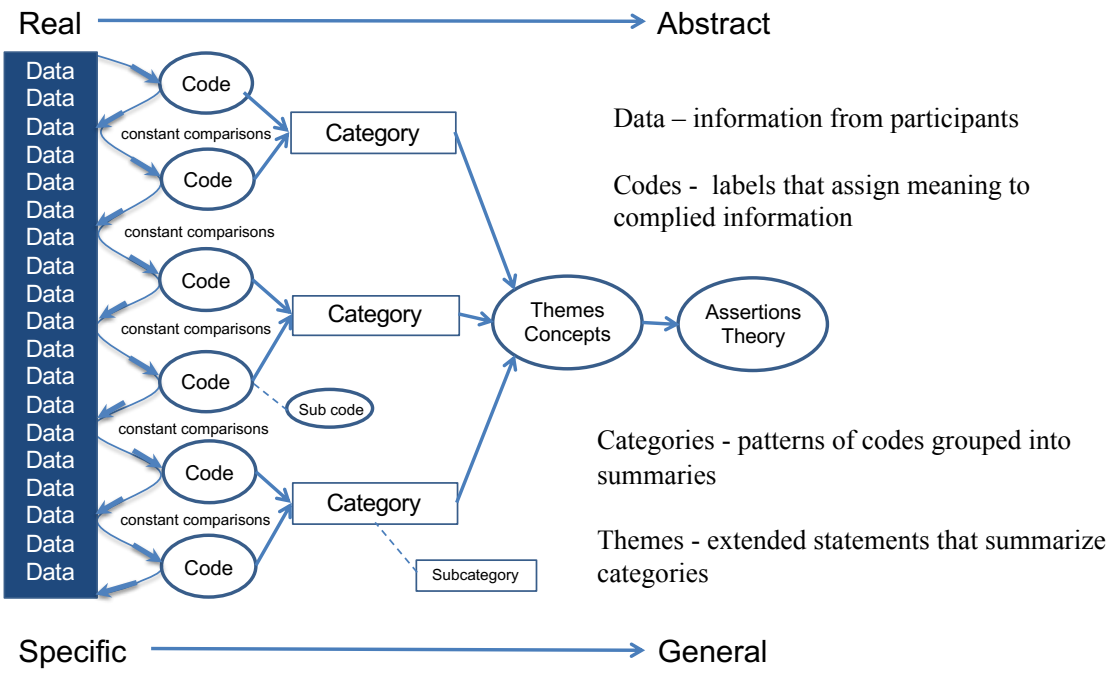
Farquhar et al. (2020) suggest that divergent research modes should be included with convergent modes to provide more insight into the study. Divergent and convergent findings exhibit a degree of interdependence or patterns and explain phenomena under study. In contrast, divergent findings do not appear to fit into the study and should be further investigated (Farquhar et al., 2020). Without using a divergent analysis, important information in the study could be lost (Xu & Storr, 2012) as it can be viewed as less critical. Frequency can be a key factor for analysis in both divergent and convergent approaches. Negative case analysis frames questions that center on what experiences or explanations the researcher expected

but did not appear in the interviews (Patton, 2002). Both divergent and negative case analyses were used in an iterative process to capture the full richness of the study.

Figure 11 represents a streamlined or more simplified view of the coding process and how the data is coded, then categorized, and finally developed into themes and concepts for further synthesis into theory.

Figure 11

Streamlined view of the coding process



Adapted from (Saldana, 2016)

Ethical Considerations

Internal Review Boards (IRBs) were conducted by the University and the Naval Air Systems Command. Creswell and Poth (2018) emphasize respecting the participants' privacy, communicating the process, and ensuring welfare through fair treatment in the study. The researcher has completed ethics training through the Collaborative Institutional Training Initiative (CITI) program. The curriculum groups completed were humanities responsible conduct of research, conflicts of interest, human research, social-behavioral research, and social-behavioral responsible conduct of research.

Informed consent forms were given to and signed by each participant, confirming the assurance of confidentiality. The IRB committee examined the interview questions and research design for final approval before the research was conducted. As described in Appendix A, confidentially was maintained in this study, and the participants could withdraw at any time. The anonymity of the participants was maintained by assigning a pseudonym to each interviewee, and the research documents were secured in a locked location with exclusive access by the researcher.

Researcher Positionality

I have been a Naval Air Systems Command employee for over nine years, yet I have not worked directly in the RDT&E community. However, I have worked across boundaries as a Program Manager, Six Sigma Master Black Belt, and Lean

Leader, giving me insight into each community's processes. My most recent work entailed co-leading major organizational design changes in the RDT&E community, where I learned the challenges this team faced with complexity. This knowledge of the phenomenon encouraged me to discover new information and insights to seek new pragmatic approaches. In order to find new points of view, Backman and Kyngäs (1999) suggest using a bracketing method where the researcher suspends knowledge about the experience being studied and conducts the data analysis without preconceived ideas. Working outside of the participants' community allowed me to leverage my technical background in understanding complexity leadership and experiential learning theory but not have day-to-day operational knowledge of the organization that could have impacted the design of the methodology or the analysis of the data.

Validity and Reliability

Sekaran and Bougie (2016) describe two types of validity: internal and external. Internal validity indicates how well the research results represent the actual data collected. External validity denotes how well the research can be generalized or transferred to another context (Sekaran & Bougie, 2016). The selection of participants could provide challenges to validity if there is a homogeneous viewpoint to thinking about leadership and the problem-solving process. This groupthink may impact the results or offer a skewed view of how the group views the role of leaders.

Generalizability can be an issue since this study is only in one highly technical field, and the results may not translate to lower technology industries. Kassarjian (1977) suggests that the researcher must find a balance between the reliability of the categories and the relevance of categories. Reliability of the categories generated in the data analysis refers to how often different judges would select the same items in a category for coding. The relevance of the categories ensures that the category is not too broad and can provide insight into the study (Sekaran & Bougie, 2016).

Table 9 lists the mitigation approaches for this research study. To improve reliability, the researcher defined the categories, provided descriptions, and documented how the data were analyzed (Corbin & Strauss, 2015). Additionally, the study ensured that the definition of the codes does not change in meaning during the coding process (Creswell, 2014) unless a lookback in the data requires a recoding.

Table 9 also lists methods to improve validity. Triangulation methods were used to interpret and substantiate key findings between the coded interview data and the interview results (Hopf et al., 2016). Golafshani (2003) states, "to achieve validity and reliability of a research get the researcher's truthfulness of a proposition about some social phenomenon using triangulation" (p. 604). A trained researcher can improve validity by gathering high-quality data using thorough

methods (Patton, 1999). These methods can provide more insight and enhance the credibility of the study.

Table 9

Validity and Reliability Mitigation Approaches

Issue	Mitigation Approach
Validity: The accuracy of research findings	• Member checking • Selection of participants • Divergent or Negative case analysis
Reliability: The repeatability of research findings	• Triangulation by data source method, sharing memo's and coding doc's • Clearly defined: codes and categories • Transparent research approach: memo's, transcribing interviews, journal

Adapted from: Creswell & Poth, (2018), Gray (2018)

Four types of triangulation contribute to the verification and validation of qualitative analysis: methods, investigator, theory, and data source (Carter et al., 2014). The methods type of triangulation checks the consistency of findings by different collection approaches. The investigator category uses two or more investigators in the study to compare observations. The theory method uses different perspectives to interpret the data. Data source triangulation uses data from different participants utilizing the same collection method (Carter et al., 2014; Patton, 1999).

Patton (1999) encourages combined triangulation methods to reduce any negative impact on validity and reliability. This study used the data source method by selecting unique types of people to gain multiple perspectives. For comparison,

a modified version of the theory method was achieved by sharing coding and memo documents with another researcher who is not participating in this study. Triangulation provided a view into consistency, but was also illuminative in finding inconsistencies for "deeper insight into the relationship" and a "degree of convergence" (Patton 1999, p. 1193).

The traditional approach to triangulation emphasizes convergence and complementary data where the reflections are similar and provide the researcher with a method to crystalize the phenomenon under study (Farquhar et al., 2020). This study explored the divergence mode or negative case analysis. A divergent analysis provides the researcher a view into expected data but does not appear. The negative case data can be obtained by a theoretical sampling of participants with knowledge in the area and a second literature review centered on the divergent case. This method can uncover unseen factors or clarify considerations.

A technique known as "member check" (Maxwell, 2013) gathers feedback from the participants about the data collected and inferences drawn from the coding as a validation method. Fielding and Fielding (1986) point out the need to target validity issues as threats discovered by examining sources of error and then looking for ways to mitigate these issues.

Summary

Chapter three provides an overview of the qualitative research approaches and the accompanying elements. Grounded theory was chosen as the method that

best fit the study's goal and the researcher's worldview. More specifically, the constructivist grounded theory advocated by Charmaz (2014) is appropriate as it has an ontological approach where the participants can have multiple viewpoints for the same experience. The constructivist grounded theory also allows the participants to interact with the researcher in a co-constructive approach.

This study seeks to explore the problem that complex issues do not follow a cause-and-effect relationship. Therefore, the emergent outcomes have not been what the organization expected (Clarke, 2013). Because of this, organizations need new or evolved approaches that can prepare leaders and team members to operate successfully in a complex environment. The research questions explored the experiences of leaders and team members who employ enabling leadership and experiential learning in complex environments, create new knowledge, and explore how to develop emergent outcomes that the business seeks.

The study's methods, design, and procedures are described in detail in their respective sections. The collection and examination of the recorded information emphasize using the constant-comparison method of data analysis and theory development. The interview questions are semi-structured, where the researcher can solicit experiences directly related to the research questions and provide an open forum for the interviewee to provide general information.

The participants were selected based on their experience working in complex environments and provide recommendations on other interviewees that the

study should consider soliciting. Ethical considerations appropriate for this research were described, and controls were implemented. Techniques for mitigating issues with validity and reliability are outlined in table 8 and were used in this study.

Chapter four provides the data and its analysis. Chapter five includes the study's conclusion, recommendations, and implications for future practice. The final section outlines suggestions for future research based on the findings of this study.

Chapter 4

Findings and Data Analysis Results

Overview

This study explored enabling leadership and experiential learning, the influence on emergent outcomes, and creating organizational knowhow in a complex environment. Naval Air Systems Command (NAVAIR) is a significant organization in the Aviation and Defense Industry that is routinely challenged with operating in a complex environment and is the subject population of this study. As described in Chapter One, operating more effectively in complex environments can contribute to improved national defense. This study provides insight for practitioners to improve organizational knowhow and influence emergent outcomes by enabling leadership and experiential learning.

Chapter Three outlined the major qualitative research approaches and provided the rationale for selecting grounded theory. This grounded theory qualitative research study proposed to discover and categorize key themes to help practitioners influence emergent outcomes and the creation of organizational knowhow in complex environments by effectively using enabling leadership and experiential learning. This study's essential outcome is the findings and conclusions developed to build the proposed uncertainty breakthrough model.

Chapter Four presents an overview of the approach, the selection of participants, the data collected, how it was analyzed, and the research results.

Detailed descriptions of the participants' demographics are outlined in this chapter, and the development of the codes, categories, and themes are presented as well. Interpretations of the results are discussed in Chapter Five.

Organization of the Remainder of the Chapter

The remainder of this Chapter is laid out in the following manner. The descriptive findings section provides details on the participants characteristics and demographics. The data analysis section describes the process used to develop codes, categories, and themes. The findings are presented by research question with quotes relevant to the research questions followed by the emergent themes supported by a series of narrative quotes. These findings served as the groundwork for developing the conceptual thematic framework. The next section details the conceptual thematic framework and its definitions. The last section summarizes and synthesizes the data with a description of the study's limitations.

Questions that Guide the Research

This research focused on leaders' and team members' experiences working in a complex environment. Enabling leadership supports adaptive space, which is fluid or transitory and is initiated by organizational pressures and tensions between the exploratory and exploitation sides of the business (Uhl-Bien & Arena, 2017). Enabling Leadership attributes leverages adaptive space to create new ideas or adaptive responses to complexity.

Furthermore, the study examined the extension or superimposition of experiential learning theory on enabling leadership to influence emergent outcomes. Experiential learning posits that learning is more than knowledge delivery; it is knowledge creation through grasping and assimilating cognitive work effort (Kolb, 1984). Together, enabling leadership and experiential learning were investigated and sought to explore how they can support the influencing of emergent outcomes and the creation of organizational knowhow. The research questions are stated below:

RQ1. In complex environments, what are the experiences of leaders and team members who employ enabling leadership to influence emergent outcomes?

RQ2. In complex environments, what are the experiences of leaders and team members who employ experiential learning to influence emergent outcomes?

RQ3. In complex environments, how does enabling leadership influence the ability to create knowhow in the organization?

RQ4. In complex environments, how does experiential learning influence the ability to create knowhow in the organization?

Research Approach

As outlined in Chapter Three and Appendix F (interview guide and questions), this study followed the protocol and began with questions on contextual

ideas of interest and built underlying explanations to develop a theory of the forces influencing emergent outcomes (Hunt & Ropo, 1995). This effort uses an iterative cycle where data is collected, compared to other data or theories, and further refined until categories and theories are aligned (Sekaran & Bougie, 2016). This study looked for common or shared experiences among participants in the specified areas and was conducted as a cross-sectional study (Sekaran & Bougie, 2016). A cross-sectional approach was selected for this grounded theory study (Gray, 2018). Cross-sectional studies refer to the time horizon when the data is collected simultaneously across the research period and permits comparisons between individuals and their shared experiences.

Open and semi-structured interview questions were used in this study. General comments were encouraged at the end of the session and provided rich dialogue (Milena et al., 2008). The interview questions provided in-depth information on the interviewee's experiences. Open-ended and semi-structured questions allow the researcher to probe into a chosen area while the participant can direct their answers to cover their experiences (Corbin & Strauss, 2015). The researcher followed Rocco's and Plakhotnik's (2009) guidance on incorporating theory from the literature review relevant to the study and separating areas that do not relate to the phenomena under investigation.

Descriptive Findings

Participants

According to the protocol described in Chapter Three, the participants recruited for the interviews met the research participation criteria outlined in Chapter Three, which was a strong science and technical background in the Department of Defense (DOD) Aviation Acquisition domain or the Aerospace and Defense Industry workforce. Potential interviewees were invited to participate by e-mail as shown in Appendix B. Participants were screened and selected according to the following participant requirements: education, role or level in the organization, and years of experience in the DOD Aviation Acquisition or Aerospace and Defense industry field. They were also questioned for familiarity and experience working in complex environments, as exemplified by emergent organizational outcomes that do not exhibit predictability or a linear cause and effect.

The selection included a spread of expertise from approximately seven years to over 35 years. The people interviewed included senior executives in major organizations in the science and technology sectors of the U. S. Defense Department and mid-level managers and team members responsible for executing the design, development, and production of programs in these technology sectors. Participants included team members and leaders currently and formerly holding positions such as:

- Deputy Assistant Secretary of the Navy for Research, Development, Testing, and Evaluation (RDT&E) office.

- Naval Air Warfare Centers; Aircraft and Weapons Divisions, Executive and Senior Leadership.
- U.S. House of Representatives Professional Staff and Senior Research Fellows at American Enterprise Institute (AEI) think tank.
- Wing and Squadron Commanders of the Navy's Atlantic test aircraft assets.
- Deputy Program Executive Officers, Deputy Program Managers, Integrated Product Team leaders/members, and Design and Sustainment Engineers in Naval Air Systems Command (NAVAIR).
- Aerospace and Defense industry Executives, Managers, and Team leaders/members.

Figures 12 and 13 are designed to provide a contextual understanding of the participants' organizational dynamics and the setting or domain in which they operate to better understand and interpret the findings from the interview discussions. Figure 12 outlines on a macro scale the end-to-end process of developing and sustaining aviation assets in the Naval Air Systems Command (NAVAIR). The lifecycle begins at the Congressional level, where funds are appropriated and distributed to NAVAIR. The program's technical authority is the system command, providing training and allocating personnel. These resources are distributed to the various levels of teams to execute the programs.

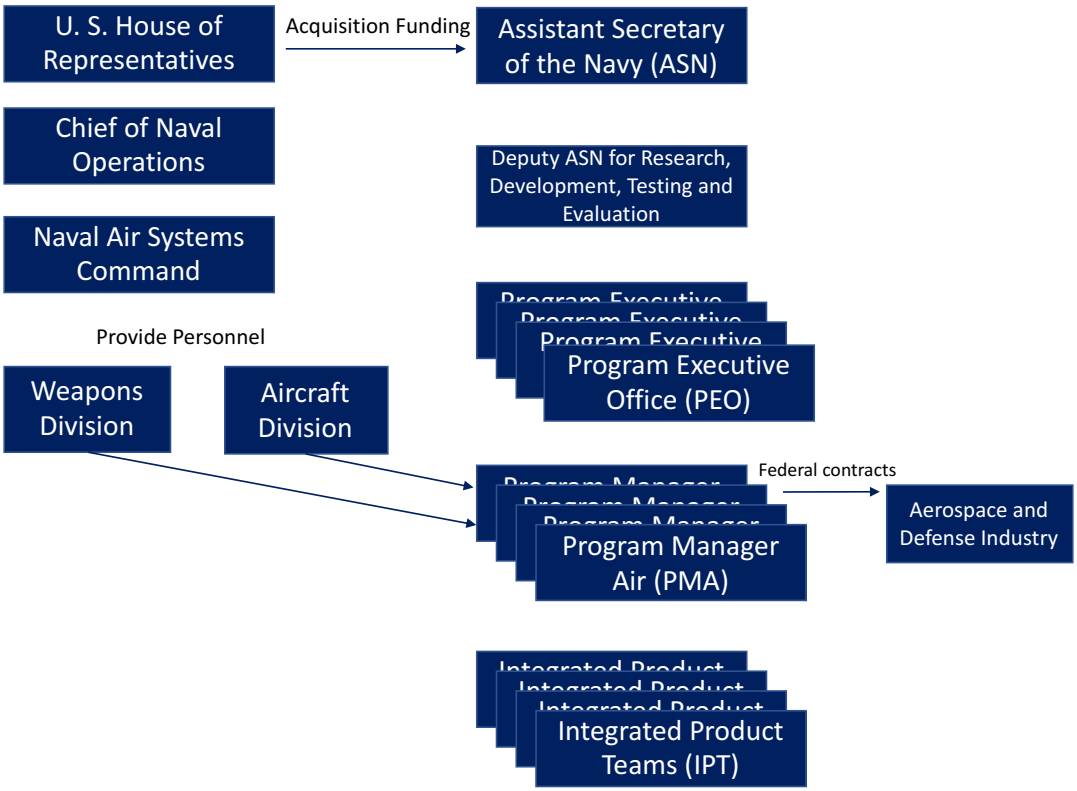
Figure 12

Aviation Acquisition Process

Figure 13 shows the organizational relationships across the significant elements of the acquisition process. The left side of the diagram identifies the headquarters that provide the funding, policy, and technical authority. The figures on the right side represents the execution of the system command's aviation programs. The research included interviews with participants from both the headquarters and execution sides of the enterprise.

Figure 13

Organizational Elements of Naval Aviation Acquisition



Interview Process

A pilot study phase was conducted with four participants who had personal exposure to the subject and the study's purpose but not to the detailed mechanics of the research approach. The pilot study phase delivered Appendices A (informed consent), B (Invitation to interview), C (Confirmation to interview), and D (Pre-Interview questionnaire) to replicate the interview process. In addition to the documents that were delivered to the pilot participants, an interview using the protocol and interview guide (Appendix E and F) was conducted, and the interviewees received their transcripts to review. The pilot replicated the exact sequence that the remaining participants experienced.

A review was conducted with the pilot team members to discover improvements to help run the study. The pilot allowed the researcher to check the questions' phrasing, flow, and sequencing. The participants in the pilot study phase expressed that the questions encouraged deep reflection on the research questions under investigation and were thought-provoking. The pilot study members recommended that the pre-interview questionnaire add the academic words used in the study with common or alternate phrases. `Increased effectiveness of the discussion was attained during the interview by summarizing the interviewees' statements for clarity. Additional comments from the pilot stated that amplifying questions effectively drew out more information. The pilot study phase output included the recommendation to read the academic definitions aloud using common

terms that the participants were familiar with. The feedback from the pilot was implemented.

The recruitment process provided the opportunity to complete 27 interviews. All interviews were one on one and conducted by phone. Each interview was recorded (with permission) and subsequently transcribed and delivered to the participants to review for accuracy. The interviews were conducted over three months and began formally by reading the protocol, script, and key definitions (Appendix E) while empathizing the confidentiality of their answers. At the end of the session, the participants were asked to name an individual they would recommend for an interview in this study (chain referral).

The initial question helped set a relaxed tone and was to query their role in the organization and their experiences with complex environments. As the session progressed, both the interviewer and participant had the opportunity to guide the direction of the interview. The sessions allowed the researcher to unpack or explore key concepts discussed by the participant. The final period of the interview was open-ended and permitted the interviewee to offer additional insight into the areas of complexity, enabling leadership and experiential learning. The final question asked them to share personal discoveries during the interview process. The researcher took notes during the interview to draft field memos of key concepts discovered in the dialogue.

Table 10 summarizes the statistics of the interviews. Twenty-seven people were interviewed, with an average duration of 56 minutes. The result was 512 pages of transcripts that were uploaded into the application NVivo and coded. Table 10 also indicates a participation rate of 87%. Of the 31 interviewees approached for this study, 27 were able to participate in the interview session. Chain referral or snowball sampling (Naderifar et al., 2017) helped achieve a successful participation rate.

Table 10

Range, Mean, and Median of interview duration

Interview Number	Range	Mean Duration	Median Duration	Transcript Number	Participation Rate
27	45-68 min.	56 min.	57 min.	512 pages	87%

Unique codes were assigned to each interviewee according to level in the organization and gender. The descriptor for each interviewee consists of two letters and one number. The first letter denotes the role, executive, manager, or team member/leader. The second letter describes a male or female participant, and the third letter is a randomly assigned number. For example, MM2 would represent Manager, Male, #2, and EF3 would represent Executive, Female, #3.

Demographics of Participants

Table 11 outlines the interviewees' experience as Range, Mean, and Median years in their domain and role. As stated earlier, the participants were selected

based on their experience in complex environments and their range of experience in the aviation domain. The population from which the interviewees were selected constituted at least seven years of experience. The years of experience used are partly due to the aging workforce available. In the first few years, an employee in this domain undergoes rigorous training to become a fully qualified team member and therefore needs more experience in a complex environment.

Table 11

Range, Mean, and Median of years in domain and role

Range in Domain	Mean in Domain	Median in Domain	Range in Role	Mean in Role	Median in Role
7-40 yrs.	28 yrs.	27 yrs.	2-19 yrs.	8 yrs.	7 yrs.

Table 12 stratifies the roles or levels in the organization that the researcher targeted; executive, manager, and team leader/member. The Range, Mean, and Median of years the participant served in their domain and role are listed in the table. Based on Table 12, the participants demonstrate significant professional experience and exhibit an older workforce in this domain.

Table 12

Range, Mean, and Median of years by domain and role

Roles	Range in domain	Mean in domain	Median in domain		Range in role	Mean in role	Median in role
Executive	32-42 yrs.	36 yrs.	35 yrs.		2-13 yrs.	8 yrs.	8 yrs.
Manager	10-38 yrs.	25 yrs.	27 yrs.		2-22 yrs.	8 yrs.	7 yrs.
Team Member	7-40 yrs.	22 yrs.	24 yrs.		3-13 yrs.	6 yrs.	4 yrs.

Table 13 shows the depth of experience in the pool of interviewees by years of service in both their domain and role. Participants had significant experience in the aviation domain and could easily discuss complex environments.

Table 13

Work experience percentage by domain and role

Work Experience	In Domain	In Role
>20 yrs.	77%	4%
>10-20 yrs.	15%	30%
<10 yrs.	8%	66%

Table 14 provides an overview of the domains represented by the interviewees in this study. There were ten domains where data was gathered and analyzed. The domains listed in Table 14 are broad to reflect a balance between anonymity by not using job titles and describing the areas in the study.

Table 14

Participants by domain

Domain	# Participants
Legislative Affairs	1
Research and Development	3
Program Executive office	2
Design and Sustainment Engineering	2
Flight Engineering and Testing	3

Domain	# Participants
Business Finance	3
Integrated Product Team	3
Process Improvement	2
Professional Education	4
Strategy and Operations	4

Figure 14 shows the distribution of roles and education levels of the participants. The study sought to interview participants at all three levels of the

workforce. Selected study participants had varied roles and education in the organization. Figure 14 also shows a significant number of graduate-level degrees of the participants.

Figure 14

Role and educational levels of the participants

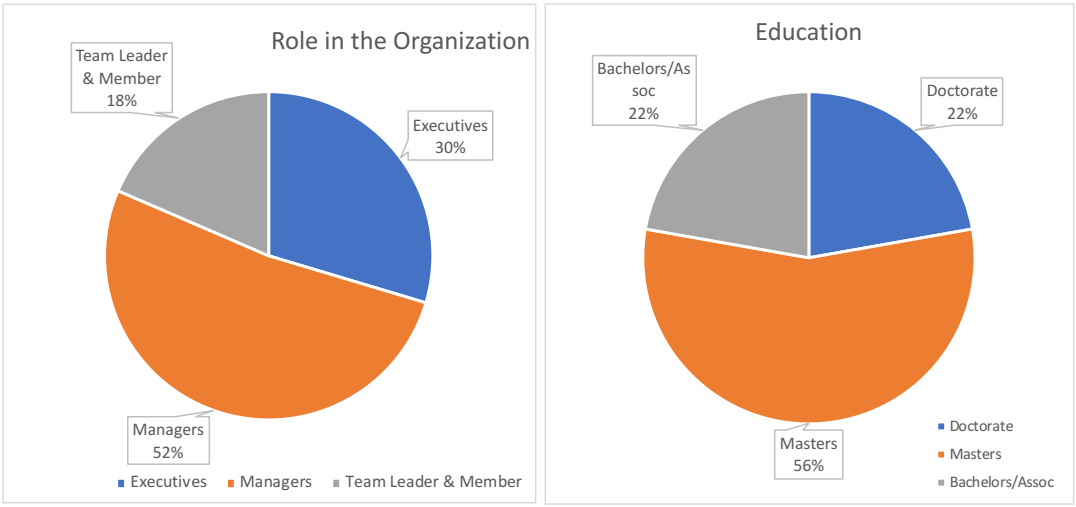
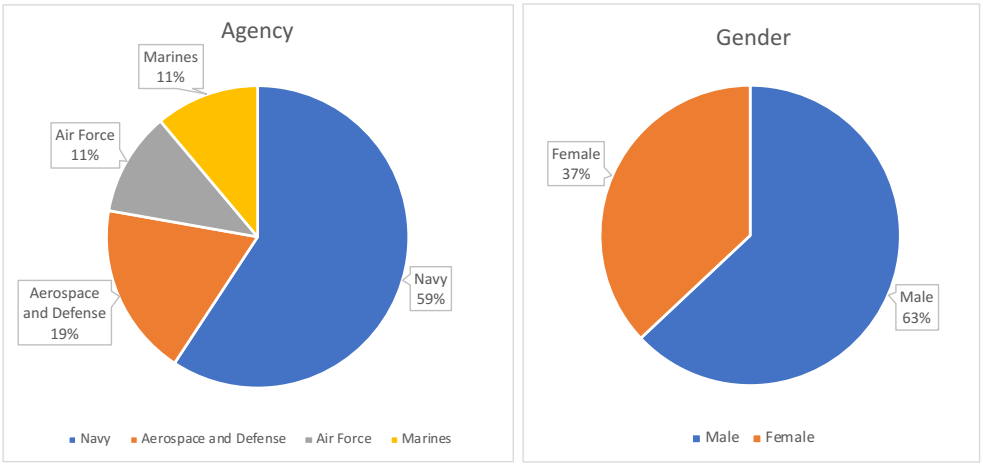


Figure 15 displays the distribution of agency represented. The study sought to interview participants in the four agencies represented in the aviation acquisition process, as shown in Figures 12 and 13. The genders of the research participants are also listed in Figure 15.

Figure 15

Agency and Gender distribution in the study



Data Analysis

Codes

According to the coding protocol described in Chapter Three, the codes were developed by reviewing the transcripts line by line and creating a code that condenses the essence of the relevant quote. Saldana (2021) describes coding as the first stage of analysis and is the art of assigning meaning to key ideas representing a portion of the data for pattern identification. Coding is the fundamental building block for grounded theory data analysis (Bryant & Charmaz, 2007). Based on participants' keywords or statements, new codes were created, or the quote was assigned to an existing code. This approach is called *in vivo* coding and allows the researcher to stay connected or grounded during the analysis by using codes containing the participants' data (Saldana, 2016).

For example, this is a represented excerpt for the code *self-correcting processes* where MM6 (35 years experience in domain, 12 in current role, Doctoral Degree) stated, "Henry Mintzberg, a researcher in Canada, told me once that mid-level managers have the potential to destroy organizations by interfering with self-correcting processes. Let things sort themselves out, but they intervene and jump in ahead of time." The coding approach was iterative, as described by Charmaz (2014), and allowed new codes to be developed as the interviews progressed, which provided more data for analysis. The coding process was structured and sought to compare in vivo statements and discover relationships to create categories. A comparison pairwise process was used throughout the process. Six hundred sixty quotes or in vivo references were analyzed and categorized into 105 codes. The was an average of approximately 7 in vivo references per code. Appendix J is the code book which lists the codes, number of sources, in vivo references, and descriptions. It should be noted that an in vivo reference or quote can be associated with more than one code during the coding process.

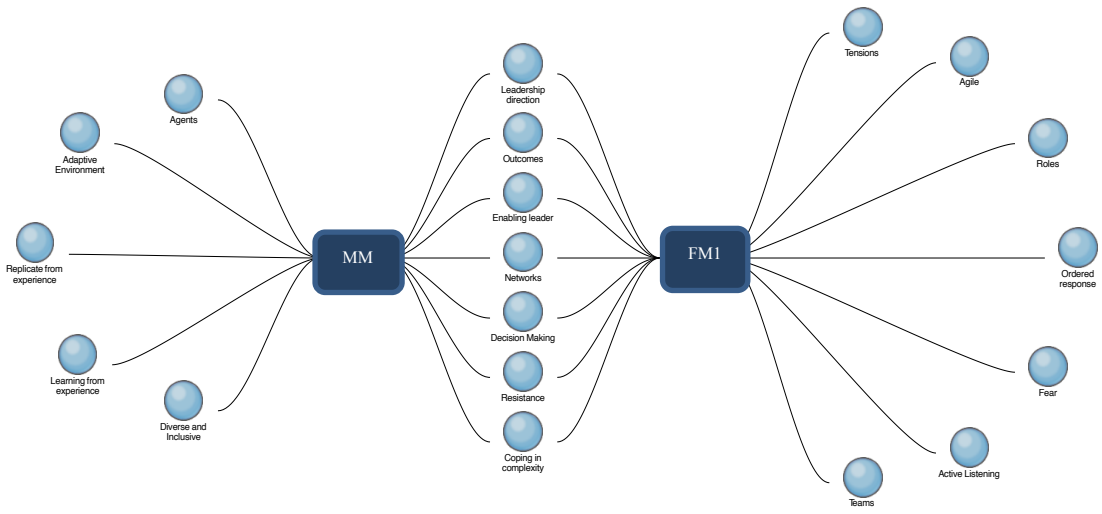
Figure 16 is an illustrative example of a pairwise comparison showing common and shared codes between two interviewees. The application NVivo 12 allows one to visualize the unique and shared codes between two participants. This pairwise approach aided the grounded theory constant comparison technique by providing a tool to examine alternative interview codes. The middle section shows

the shared codes; the outer sections are the unique codes for those two interviewees.

Methodologically, the pairwise comparison approach is more iterative and complex than can be shown visually in this dissertation. After the researcher conducted interviews, this type of diagram was used to compare codes and help identify similarities and differences in the qualitative properties of the codes. The constant comparison technique utilizing the pairwise comparison tool in NVivo 12 aided in identifying theoretical saturation as the study progressed. This tool in NVivo 12 provided the researcher with a comparison method to look for outliers or negative case data between interviews.

Figure 16

Comparison of codes between two participants

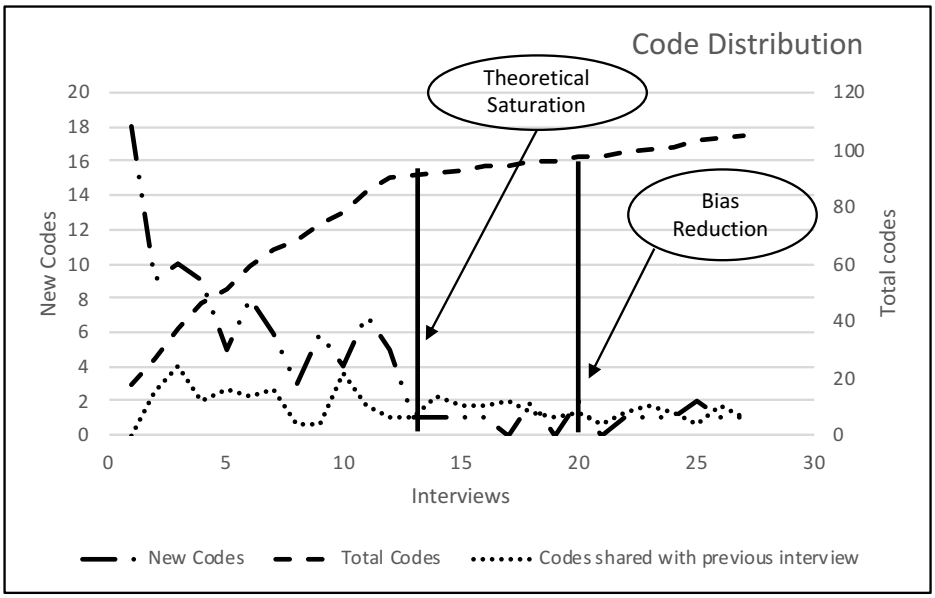


Theoretical Saturation. Figure 17 shows the chronological effect of the coding process as new codes are created and added to the total number of codes. The large dotted line represents the number of codes created as the study progressed. The intermittent dotted and solid line represents the number of new codes created in each interview, denoting the use of previous codes as the study progressed. The dotted line shows the number of codes shared between two consecutive interviews. This graph displays the extensive reuse of previous codes.

Twenty-seven interviews were conducted, and according to Galvin's (2015) calculations described in Chapter Three, there is a 94 percent probability that a concept was captured in the interview if that concept is present in ten percent of the group of interest. At approximately the 14th interview, theoretical saturation or sufficiency (Charmaz, 2014) was demonstrated and is shown graphically in Figure 17 as an inflection point where concepts in the interview were repeated.

Figure 17

Code Distribution



The vertical lines between the saturation and bias reduction areas show where the interview aimed to check saturation and negative case questioning. Furthermore, it allowed the researcher to probe with more profound questions on concepts discovered in the first set of interviews. Follow-up discussions with key participants used member checking to improve the study's validity (Creswell, 2014). In addition, as referenced in Chapter Two, a doctoral-level researcher reviewed the study's approach and coding techniques for reliability and validity confirmation. No significant issues were noted.

Coding Phases. Figure 18 displays the three phases of the interview process. Charmaz states, "coding is the pivotal link between collecting data and developing an emergent theory to explain these data" (p. 113). To methodically

collect the data and code, the interview process was divided into three parts. The initial batch of interviewees comprised a group of fourteen individuals and represented most of the codes created. This group of interviews utilized purposeful sampling, as detailed in Chapter Three and Table 8. The participants are selected based on their understanding of a complex environment and how they can inform the research (Creswell & Poth, 2018). The analysis was conducted using constant comparison and helped identify emerging gaps in the first set of interviews.

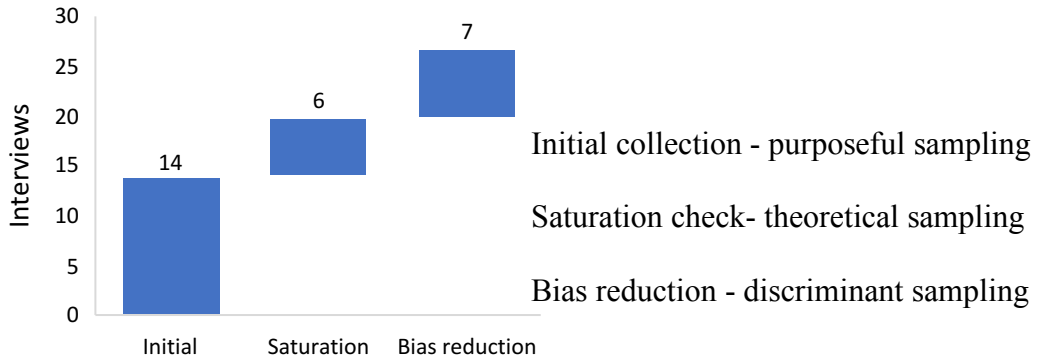
The following interview phase allowed the interviewer to ask more penetrating questions and help unpack answers based on the first set of codes. This phase took advantage of the theoretical sampling described in Chapter Three and, according to Charmaz (2014), allows for "collecting pertinent data to elaborate and refine categories in your emerging theory" (p. 192). The continued alignment to the original semi-structured interview questions helped to ensure that any essential data was captured. This second phase also allowed increasing the negative case questioning or the development of deviant or outlier views to earlier concepts. Contradictory data was reviewed to find new patterns and validate existing ones. As illustrated by Sale (2022), "outliers are not forced into categories or ignored but used instead to aid understanding or theory development" (p. 3). Furthermore, this phase helped check theoretical saturation and examine what was expected as a concept but did not appear.

The last interview phase was intended to decrease bias by discriminant sampling (Cho & Lee, 2014; Creswell, 2014) and ensure the participants were represented across the horizontal and vertical levels of the organization and varying levels of experience in the aviation acquisition process. Creswell (2014) posits that triangulation or collecting data from participants of varying experiences and levels in the organization can improve qualitative validity and reduce bias. Any gaps in the representation of the aviation acquisition process were identified, and individuals were recruited to represent concepts in those areas.

The researcher understood the importance of being the instrument for the study and took precautions to keep personal bias out of the interviews and interpretations of the findings. Similarly, throughout the process, the researcher conducted member checking during each interview and at various times during the coding process to validate findings (P. Coleman, 2021). The researcher used peer debriefing to clarify or confirm interpretations of the findings (Creswell, 2014).

Figure 18

Interview phases and sampling approach



Adapted from Cho & Lee (2014), Naderifar et al. (2017), Palinkas et al. (2015)

Categories

According to the protocol described in Chapter Three, the categories were developed by combining similar codes into a category. Saldana (2021) describes categories as labels assigned to a grouped pattern of codes and captures the essence of the data's attributes. A series of iterative efforts to group codes into categories was conducted using NVivo 12 software, where many versions of codes/categories were created for analysis and comparison. The researcher used this constant comparison approach to identify codes with similar properties and identify potential interrelationships.

The researcher's memos provided background and helped group the codes into categories. Birks et al. (2008) describe how memos are used to make conceptual leaps to "record the decision-making trail that establishes and guides the research through its many phases" (p. 70). Memos helped capture the researcher's

thoughts following the interview and aided in crafting the categories from the codes. Charmaz (2014) describes memo writing as "developing your ideas in narrative form and fullness early in the analytic process" (p. 171). The researcher took field notes during the interview and soon afterward created memos to record impressions and observations created during the session. The researcher conducted concurrent coding, categorizing, and memo writing as part of the analytic process (Saldana, 2021).

Category Development. In general, frequency or how many participants are represented in a category is a consideration but not a sole or deciding factor in creating a category. Qualitative depth and meaning were the deciding factors. Saldana (2016) states that salience, ubiquity, and centrality are salient considerations in developing categories. The researcher developed eleven categories from the codes representing a condensed version of the data set. The last nine interviews (one-third of total sessions) produced only nine new codes (8.6% of total codes) and did not create any new categories. A major concept that was not expected was the significance and universal idea of uncertainty barriers to operating in a complex environment.

A less frequently appearing code can be structurally important in category creation. The minimum threshold to be considered a category is not the percentage of participants but a representation of the level of importance of the area under consideration. For example, the lower end of the categories is critical thinking and

structure and planning, with 22 and 30 percent of the participants representing these categories, respectively. The participants stated the importance and significance of these two categories and the long-term impact of their creation.

The participants commenting in the higher frequency areas of the study showed emerging patterns and relationships that occurred early in the data collection process and remained relatively consistent throughout the interview sessions. The high percentage of the participant and the associated number of references in the stated categories, as shown in Figure 19, provided the researcher with deep insight into interrelationships within that category. This high percentage ultimately resulted in the detailed development of that category. The range of responses in these areas provided extra depth to elevate the level of analysis and assist in developing higher-level concepts.

Figure 19 shows the percentage of interviewees' responses in each category on the bar chart. The number of references attributed to each category is displayed on the line. The figure provides a visual exhibit of the input density for each category. This descriptive output aided in the analysis of the findings and was used as a check-in in creating the categories. The complete list of categories, number of sources and references, and representative excerpts are listed in Appendix K.

Figure 19

Percent of Participants by Category and Number of References

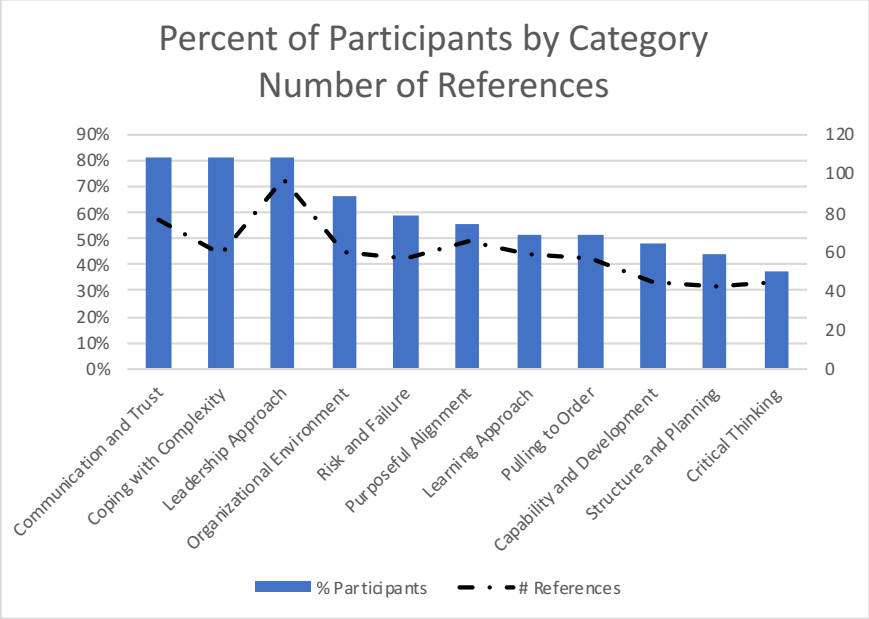
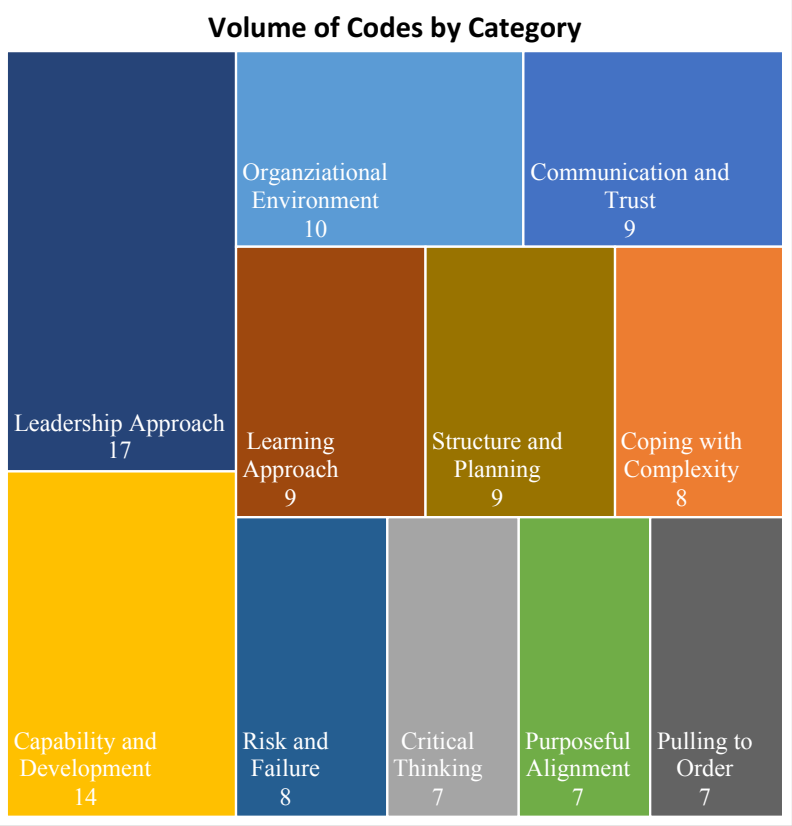


Figure 20 presents the categories in the block diagram below. The figure illustrates the number of codes to create the eleven categories, with each block representing the size or density of each category that contains the 105 total codes. Each block shows the category and the number of codes used to develop that category. The blocks' size graphically displays the codes' volume that established the category.

Figure 20

Volume of codes by category



Themes

According to the protocol described in Chapter Three, the themes were developed by grouping the categories of common ideas into an extended-phrase describing their tacit meaning. Saldana (2021) states, "Themes are researcher interpretations and constructions about the ideas inherent in patterns" (p. 369). The themes provided meaning to grouped categories and are outcomes of the researcher's analytical reflection. Similar or interrelated data sets of information groups were aggregated to form a unified construction. The development of themes

organizes repeating ideas and their meaning, furthering the development of grounded theory. The eleven categories were grouped into three major themes.

Table 15 shows the number of sources or participants, in vivo references, and categories used to create each theme. The figure is a descriptive output of the final analysis the researcher used as a check in the creation of the themes.

Table 15

Themes, Sources, In Vivo references, and Categories

Themes	Sources	In Vivo References	Categories
Breaking Through Uncertainty Barriers	27	249	Pulling to Order Coping in Complexity Risk and Failure Communication and Trust
Exploiting Capability & Organizational Structure	22	146	Organizational Environment Structure and Planning Capability and Development
Empowering Leadership Approach	24	265	Purposeful Alignment Critical Thinking Learning Approach Leadership Approach

Grounded research uses the respondent's narrative as the primary data source (Saldana, 2021) and is foundational for the findings. The following sections provide the quotations for the research questions and emerging themes that illuminate and amplify the research process (Coleman, 2021).

Research Findings

The interviews were conducted uniformly using the protocol described in Chapter Three and the interview protocol and questions from Appendix F. The interviewer read aloud the script, research questions, definitions, and alternate phrases for the academic definitions (Appendices E and F) to ensure each participant understood the concepts under investigation. Appendix F also provided the researcher with amplifying questions and specific areas to probe for under the research questions as the interview progressed. The interviewer restated key concepts conveyed by the participant for clarity and understanding.

Broadly framed, the inquiry sought to uncover key concepts from each participant during the interview with as much consistency as possible. This consistency was achieved in an ordered flow with a conversational style to explore and probe for the following concepts during each participant's interview. The research results section is divided into research questions and emerging themes.

The research question outcomes provide an overview of the answers from the participants, and the emerging themes provide a more detailed analysis of the findings from the interviews. During the interview, the participants were also asked to provide examples of successful and unsuccessful instances in their research question answers. This approach gave the researcher more insight into potential alternative viewpoints which were examined as the study progressed.

Research Question Results

This Chapter's section uses interview statements to represent the qualitative data from the research questions. This approach describes the participant's observation of events and understanding of what transpired in complex environments. These data were used to develop categories and themes to "make patterns visible and understandable" (Charmaz, 2014, p.89).

Opening Questions. At the beginning of the interview, the participants were asked open-ended questions on their understanding of a complex environment and their experiences working in that domain. Their responses included the more significant number of simultaneously moving parts to consider and the non-linear or lack of cause-and-effect nature of events. The outcomes are unpredictable early on, and the environment can border on chaos. Furthermore, the responses included many inputs such as organizational tensions and pressures that need to develop into clear and simple goals to be achieved.

- *The organization I'm a part of now is very flat. [When] presented with complex problems... there is no real structure... many inputs, many influences, and no real, clear answer. (MM8)*
- *[In a] complex environment there [are] lots of moving parts, lots of interdependencies. It's not linear, there is a lot going on simultaneously at the same time. (MF5)*

The participants also conveyed the differences between complex and complicated environments. One manager articulated how something complicated can be taken apart or examined by a reductionist approach and reassembled to retain its function. However, the manager further explained that a complex system cannot be reassembled and still function. The participants suggested that some leaders and team members can confuse the difference between complex and complicated. Sometimes we confuse and think complicated means complex. (MF5)

- *Manmade things are complicated...like a jet engine, you can take it apart, you can analyze all the individual pieces, springs, parts. You can study it in that capacity, then you can put it back together again, and you can start up that engine again... Something that's complex, like an organism, a living organism, you can take apart a living organism, but you won't put it back together again, you won't be able to switch it back on. (MM6)*

As outlined in Chapter Two, it is important to note that how a leader approaches problem-solving is dependent on the environment in which they are working (complex or complicated).

RQ 1 Enabling Leadership. In complex environments, what are the experiences of leaders and team members who employ enabling leadership to influence emergent outcomes?

The study participants described their enabling leadership experiences and were asked to provide examples of successful and unsuccessful experiences. The

data suggested that enabling leaders are rare, and organizations do not actively recruit or train for the traits needed to develop a successful enabling leader. One senior leader (EF1, 35 years of experience with seven as a senior executive) described “enabling leaders give their power away” as difficult for many people to do. Another manager (MM1, 22 years in their domain, with eight in the current role) expressed, “It’s pretty rare to have an enabling leader, I don’t think we have very many of them and usually the ones I’ve come across, they are very successful." The prevailing view was that having enabling leaders in the organization is essential, but there needs to be more of them.

The interview dialogue emphasized that relationship-building is essential for leadership success. Enabling leaders must remove roadblocks that the team experiences as problems are being solved. The participants further explain that enabling leaders should have a clear strategy and focus on how they would like to influence outcomes and must constantly communicate this to the teams. Participants understood the dichotomy or opposing operation and entrepreneurial sides of the business and the importance of coordinating and synchronizing their efforts.

- *Provide opportunities to keep them from experiencing a roadblock. (MM2)*
- *When you have an enabling leader, who has a clear strategy for where they want to go, it encourages both operational and entrepreneurial growth. (MF2)*

- *One end of an organization or one demand signal in an organization to innovate, and another demand signal in the organization to operate. And those two signals quite oftentimes are at odds. So, enabling leadership is about how to sync and bring those things together. (MM3)*

Participants discussed shared leadership, where the leader and team members own the problem together. Learning and experiencing together as a leader and team creates opportunities for essential and critical conversations that may not occur in other circumstances.

- *That idea of shared leadership, where, you know, everybody owns the problem together, and everybody solves it together. (EF2)*
- *Enabling leadership is working as a team and before you hand something off you talk through it and you explain everything. (MF3)*
- *When the leadership is truly enabling, it provides a magnification of the outcome because you then start seeing followers learning and experiencing with each other to build their knowhow. (EF3)*
- *Understand what's going on in the system, trying to help create a space where people can actually have those important conversations. (MM3)*

The following quotes are where the participants described that when a non-directive or team-centric approach is used in the organization, deeper relationships are created and foster the development of the team members:

- *Your approach as a leader in a complex organization must be shifted from that directive, positional authority. The approach taken must be more collaboration, teamwork, and building to be effective in a complex environment. (MM5)*
- *Enabling leadership provides the emotional backdrop that is needed for people to take chances on trying out what they've learned, and figuring out how it actually can apply to what they're trying to do. (EF3)*
- *As an enabling leader I have to understand the other organizations and the other stakeholders. How does that impact you as a stakeholder? (MF3)*
- *If you have an enabling leader, and they understand how you learn, you're generating a relationship, you have open two-way communication. The employee then feels empowered to learn [and] to have that knowhow, because they're confident, it's a confidence builder as well. (TF2)*

Therefore, these quotes delineate why the team-centric approach builds confidence and fosters risk taking that may not have been done otherwise. Furthermore, the participants thought involving the right stakeholders at the right time was important for success.

Successful Enabling Leadership. Participants were queried about the successful experiences of enabling leadership that they have observed. A key component for successful enabling leadership was the understanding amongst the team members that the leader was visibly showing support for their work and

removing barriers as they arose. Furthermore, it was stated the importance of leaders not to demonstrate upfront decisions, choices, or bias when providing challenges to the team. Synchronizing both sides of the business for better coordination and providing resources were significant to success.

- *In an enabling leadership situation where the boss has got your back and is willing to give you the time to work through best decisions, they won't force you to have an answer upfront, which in an emergent outcome situation you can't have. (EF3)*
- *in many cases, it was a leader in the organization who didn't have a bias one way or the other, and was very effective in the art of facilitating (EF2)*
- *Our most successful experiences involve bringing members from the operations side together with those entrepreneurial side and having a synergist who can translate between one side and the other. (TF1)*
- *Enabling leadership [is] about breaking down barriers and allowing expansion and growth of people and creativity. [it] is really important to provide the resources, the tools, and the environment. (MF5)*
- *The approach that you take as a leader in a complex organization must be shifted from that directive, positional authority, your approach must be more of collaboration, and teamwork in order to be effective in a complex environment. (MF5)*

The participants' lived experiences emphasized that a teaching and learning environment was most successful in developing critical thinking as outlined in the following quotes:

- *A teaching leadership model, which has a great effect on the teams because they can take in the most positive outcome. This type of experience imparts critical thinking. (TM1)*
- *The enabling leadership through their relationship building established in environments where there is a willingness and a desire of the followers to also help each other...and that magnifies the increase in knowhow in the organization. (EF3)*
- *The most success came from the fact that the leadership reinforced the notion that the rank and file members had the space to experiment and fail as long as they were learning from their failures, to succeed toward the goal (MM8)*
- *I want to be consistent in how I react to things. I want people to know that when they come in the office, regardless of what happened, the first thing I'm going to do is listen to them and engage them in a discussion. (EM3)*

This learning approach allowed the team members to believe that they could fail and then succeed in the way they work. Building relationships and a listening leadership approach supported collaboration and encouraged open communications.

Unsuccessful Enabling Leadership. Participants were queried about the experiences of enabling leadership that were unsuccessful. A key finding was that hiring and developing enabling leaders was not a priority of the business. Leaders who exhibit some but not all necessary attributes for enabling leadership may not be successful, which sends a negative message to the workforce on the efficacy of using these skills in the organization. This negative environment can erode the leader's confidence in their enabling leadership skills and, thereby, lack their team's confidence. Team members were hampered by the organization not placing importance on developing enabling leadership attributes in the workforce.

- *We don't spend enough time trying to figure out if someone's going to be an enabling leader. What are those traits to interview for them? We don't recruit very well and can make what is called a 40-year mistake. (MF1)*
- *And then when they're not successful, that then actually creates an environment that takes away from enabling. Someone else sees that and they go, "see you enabled that person and it was not successful." (MF3)*
- *I feel that leader did not have confidence in their own ability and thereby lacked confidence in the ability of their team members and was very much micromanaging. There was a culture of fear associated with that leader. There was no active learning. (TF1)*

The participants emphasized the importance of stakeholder involvement but cautioned that involving the appropriate choice of people and the impacted domains

are salient for success. More stakeholder involvement was needed to speed up efforts. Other limiting factors mentioned were the lack of resources and poor communication or sharing of information. Lack of thoughtful decision-making was considered a contribution to the lack of success. Leaders often react too soon to events and create poor outcomes.

- *We always ran across someone who hadn't been engaged or someone who hadn't been involved. Anytime you're looking to do something that's got a broad application, the challenge is always the tradeoff between too few and too many people involved. (MM9)*
- *If you don't have the resources, and you don't have the tools in place, and tangible things that people can use, I think enabling leadership is going to fall short, because they're not going to be able to get to the capacity that is optimal or desirable. (MF5)*
- *Holding and compartmentalizing information, not being able to frankly address issues with transparency created a lack of communication across the organization was really a fundamental hindrance to success. (MM8)*
- *The least effective leadership attribute is the leader who is unwilling to slow things down sufficiently to get to the right balanced, conscientious and thoughtful decision, or set of courses of action. (TM1)*

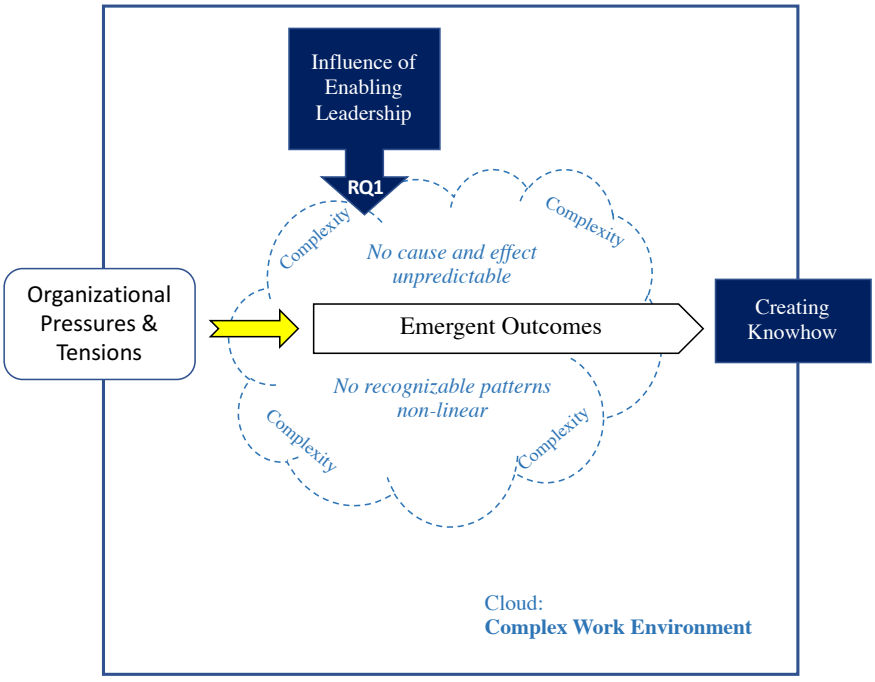
Therefore, building relationships and creating a learning environment is important to successful enabling leadership. Unfortunately, these participants stated

that enterprise does not prioritize developing enabling leaders, creating a gap in needed skills. Leaders may need to help understanding complex environments and the support required to influence emergent outcomes successfully.

Figure 21 displays the study's paradigm on navigating complexity where enabling leadership enters the cloud containing a complex environment. This diagram depicts the location of the research question concerning the study. The influence of enabling leadership on emergent outcomes is shown as RQ1. The next section discloses the findings of the influence of experiential learning on emergent outcomes.

Figure 21

Navigating Complexity: Research Question 1



RQ 2 Experiential Learning. In complex environments, what are the experiences of leaders and team members who employ experiential learning in order to influence emergent outcomes?

The participants describe the early step for experiential learning as providing the time and focus necessary to conduct learning while doing. Instead of commanding a group to 'go do,' the extra time spent on dialogue around opportunities and a measured approach to resolve issues is helpful. Many interviewees suggest that upon further reflection, the transformation of knowledge takes time and often requires deeper thought and analysis. Here is your target, go execute. You need to generate the learning and adaptive nature that you want. But if you start turning it into, "I noticed that you're doing this and somebody else is doing that. Do you think there's opportunities?" (EM5)

- *Leaders are too fast to want to resolve situations or issues to take the time to spend on people. (TF2)*
- *But I would I look back on now and realize is that, while I might have been learning things and experience, I wasn't necessarily transforming that and it wasn't until later on. It's realizing that the cycle is something that you continue to do, and you're doing all the time, but yet, the full transformation might not happen until later on, as long as you continue to iterate. (MM3)*

- *I think there's a lesson there, not in the theory of how you learn, but the theory of how you then put that learning into action. (EF3)*
- *In my organization is having people experience something not on their own but watching us do it. It's one thing to read a recipe, but it is another to watch a professional baker do it. (EM2)*

A common premise among the participants was the need for team members to actively practice learning to transform experiences into knowledge and knowhow.

Successful Experiential Learning. Participants were queried for examples of successful experiential learning experiences. A common input from the participants emphasized the critical hands-on approach to learning. The most successful was the importance of having explicit knowledge (books, manuals) and practice and application. The more people can actually be hands on, and learn their tradecraft by doing the work as opposed to reading a book or following a process manual. Those are valuable because it gives repeatability and discipline but it is insufficient. (EF2)

- *One of the most successful ways of looking at experiential learning is seeing how these cycles combine of practice and application of different thinking and operating environments and where it layers on itself (MM3)*
- *When you really do lessons learned after an evolution. You don't just do lessons observed. You actually dig into why things came out the way they did and you carry that forward for future experiences. (EF3)*

- *They had the space to contemplate and think and work through the issue, the challenges that they were presented. (MM8)*

In summary, the participants stated that a rigorous group reflection on what was learned and not just observed was an important factor in successful experiential learning.

Unsuccessful Experiential Learning. Participants were queried for the experiences of unsuccessful learning experiences. Many suggested that team members do not have a mental model of how to apply knowledge and cement their learnings. There was a consistent view that the organization did not provide the time or effort for reflection. No reflection efforts diminished the ability to create a deep understanding of what was learned and how it should be applied in other areas. Not completing the full experiential learning cycle frequently ends in unsuccessful efforts. The most often missing element is the lack of reflecting and transforming knowledge into knowhow.

- *What might be beneficial is to have that upfront conversation or somehow transfer of knowledge of this is how I learn and understand what that really means because we don't. (TF2)*
- *Do they have the right framing of how they can apply that experience, or what it would mean to do it differently? Have they thought deep, deeply enough about it? (EM5)*

- *I think all the time, we forget about reflecting. I would probably say that one was the least used. (MF4)*
- *It can be a failure if that entire cycle is not completed, so that people can understand when just because it's been successful this time, doesn't mean it's going to be successful the same way the next time. (EF3)*
- *You have to take time and say, "I want people to understand what we did, what was successful, what wasn't. (MF1)*
- *Another least successful experiences I've seen when using experiential learning is when people think that because they have learned how to do a particular task.... They don't kick into that transforming piece. They leave that part out. (EF3)*

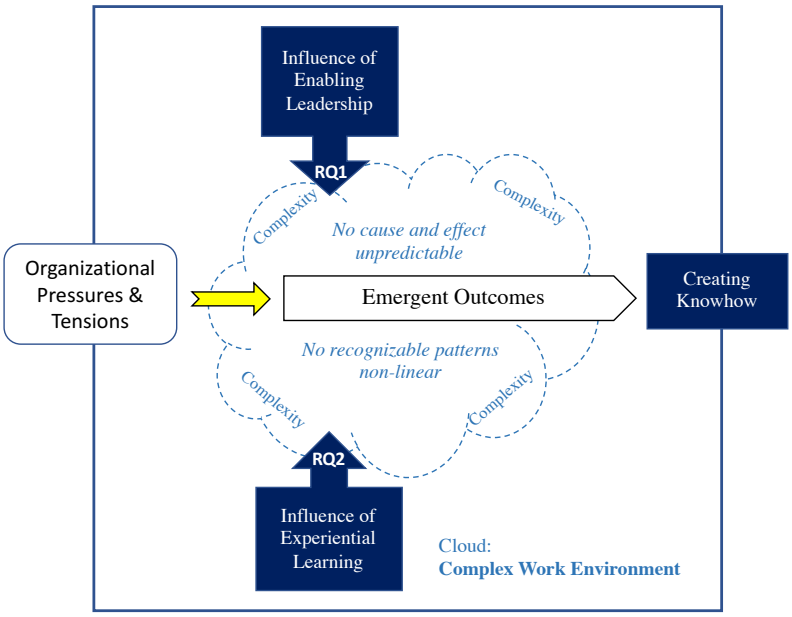
Therefore, the organization needs to focus on learning and make it an integral part of the way they work. The concept of learning by doing is prevalent, but the reflection needed to transform that task into knowhow is often lacking or not completed. The participants advise that the full cycle of experiential learning is necessary for full effectiveness.

Figure 22 displays the study's paradigm on navigating complexity where experiential learning enters the cloud containing a complex environment. This diagram displays the location of the research question in relation to the study. The influence of enabling leadership on emergent outcomes is shown as RQ2. The next

section discloses the findings on the influence of enabling leadership to create knowhow.

Figure 22

Navigating Complexity: Research Question 2



RQ 3 Enabling Leadership Influence on Knowhow. In complex environments, how does enabling leadership influence the ability to create knowhow in the organization?

Participants describe enabling leadership as essential to creating knowhow in the organization. Enabling leadership helps teach people critical thinking and how to develop a learning organization. It creates an environment where team members can see the challenge with a common view.

- *Enabling leadership is essential to creating knowhow (MM3)*

- *Enabling leadership is also about teaching people how to critically think. With that critical thinking, they're now learning and they're creating a learning organization and the knowhow organically passes around (MF3)*
- *This idea of enabling leadership is more, it's much more and much more challenging, it's about helping to bring people in a space where they can have at least some common view of what they're trying to do. (MM3)*

Participants describe relationship building that leads to knowledge sharing and passing information at the team level where it is needed in real time. The feedback loop that is encouraged through enabling leadership is a key success factor in knowhow development.

- *Enabling leadership through their relationship building in environments where there is a willingness and a desire of the followers to help each other and that magnifies knowhow in the organization (EF3)*
- *Enabling leadership is what leads to experiential learning. People are actively empowered to make this feedback loop. That's how you get the knowhow because you have a team of people thinking and actively passing information. (MF3)*
- *Knowhow is enabled through enabling leadership in the knowledge sharing and knowledge management side of things... I now have the ability to reach out and get information and lessons learned from whole parts of the organization I never had a relationship with. (EF2)*

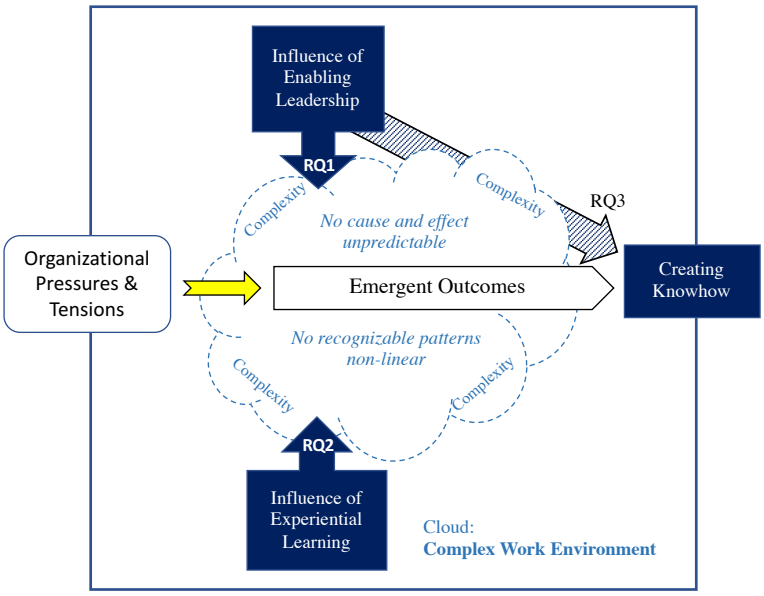
- *The most successful experiences involved different ways that knowledge was being shared, and there could be more minds in the space to think and know about what was going on. We could come up with more options and alternatives to solve the problems. (MF3)*

Therefore, developing a learning organization and having a robust feedback loop for ideas and translating experiences creates knowhow. Enabling leaders that teach thinking skills that help fosters reflection and grow knowhow. As noted in the *World Economic Forum: Future of Jobs Report* (Schwab & Zahidi, 2020), the top two core proficiencies needed in future jobs are analytical and creative thinking (p. 38). This report emphasizes the critical role in developing thinking skills in the workforce.

Figure 23 displays the study's paradigm on navigating complexity where enabling leadership enters the cloud containing a complex environment. This diagram displays the location of the research question in relation to the study. The influence of enabling leadership on creating knowhow is shown as RQ3. The next section discloses the findings on the influence of experiential learning to create knowhow.

Figure 23

Navigating Complexity: Research Question 3



RQ 4 Experiential Learning influence on knowhow. In complex environments, how does experiential learning influence the ability to create knowhow in the organization?

The participants asserted a strong correlation between experiential learning and the creation of knowhow in the organization. The interviewees further emphasized that experiential learning ramps up the learning effort in the organization in general by uncovering more ways to solve challenges and boosting confidence through experimentation.

- *I think that there's a high degree of correlation there between experiential learning and knowhow in an organization (MF2)*

- *It certainly ramps up the development of knowhow in the organization because all members are involved in growing knowhow, in finding more knowledge, in finding ways to experiment, in finding which ways that worked out, they have the confidence that they can experiment (EF3)*
- *My sense of knowhow is that it's much more relevant in a complex world, because conditions are constantly changing. Knowhow is more active. It's adaptive expertise. (MM3)*

A common output from the interview sessions contended that experiential learning helps create a collaborative work environment and should be embedded in the way the team works. Furthermore, it is important that the organization rewards the teams using experiential learning efforts.

- *Experiential learning is a practice that allows us to create knowhow. The organizations that continue to stay ahead are those that the practice of learning is embedded in the DNA (MM3)*
- *The only way to increase knowhow is through a collaborative learning environment that adapts to the situations and rewards those who are diligent about improving (MM2)*

As a result of sharing knowhow, it has a positive impact on building next generation of mentors and mentees. The effort to create knowhow in the enterprise requires a significant engagement and commitment to learning.

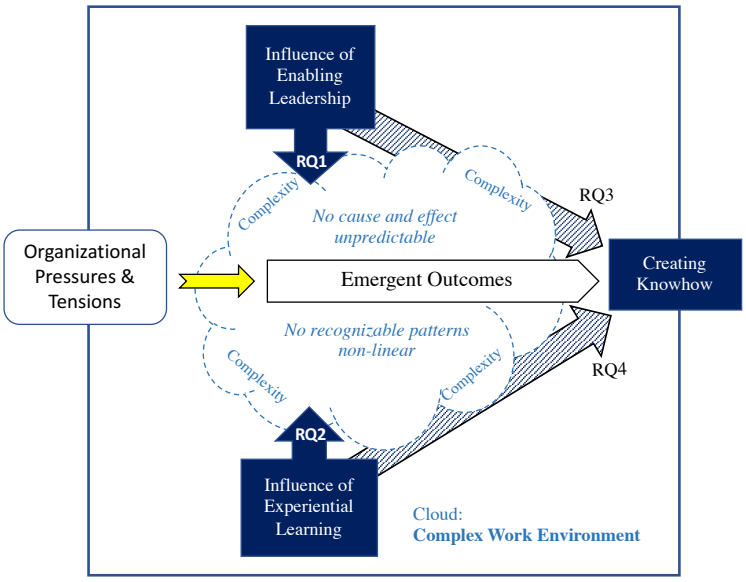
- *but in any organization, a team especially in complexity, that knowhow is a shared resource (MM3)*
- *And that builds know how because they become the next generation of mentors (EF2)*
- *Experiential learning has a heavy degree of engagement and trust as part of its aspect because you have to be able to engage with people often and give them your time. So that's the component, the tacit knowledge to create knowhow in the end, it's a commitment to the value of learning. (MF1)*

Therefore, the participants strongly believe that both enabling leadership and experiential learning are key to influencing the creation of knowhow in the organization. During the interview sessions, three major themes emerged; removing uncertainty barriers, exploiting capability and organizational structure, and empowering leadership. The next section examines the findings of the emerging themes from the study.

Figure 24 displays the study's paradigm on navigating complexity where experiential learning enters the cloud containing a complex environment. This diagram displays the location of the research question in relation to the study. The influence of experiential learning on creating knowhow is shown as RQ4.

Figure 24

Navigating Complexity: Research Question 4



During the interview sessions, three major themes emerged: removing uncertainty barriers, exploiting capability and organization structure, and empowering leadership. The relationship between all three themes provide insight into why successful operations in complexity was lagging. The next section examines the findings of the emerging themes from the study.

Emerging Themes

The emerging themes address the fundamental concepts that apply to management practices. The most significant theme discovered was the uncertainty barrier and impacted the success of the other two themes. If the uncertainty barrier is not successfully navigated, then the ability of the enterprise to influence

emergent outcomes and create organizational knowhow is reduced. The following sections provide the detailed findings for each theme.

Theme I: Breaking Through Uncertainty Barriers. The participants define this theme as explaining the impact of the uncertainty barriers in an organization and the need to remove them. Breaking through the barrier includes dealing with the cultural aversion to taking risks and fear of failure in the organization. The ability to cope with complexity and resist the pull to order when the situation does not necessitate it is an important factor in breaking through uncertainty. Clear communications and building trust are important factors in building knowhow.

A key output from the interviews was a common belief that operating environments could create certainty and, therefore, can predict outcomes. The participants offer that there is more uncertainty than most leaders and team members realize. This uncertainty creates a risk factor for the employees and raises concerns about how the organization views failure. The participants discussed that uncertainty wasn't managed and stemmed from a lack of knowledge.

- *The way that we've created our beliefs about the world is that we can create certainty, we can solve problems and create outcomes. There are plenty of examples throughout history…but what those stories don't fully explain, it's all the complexity that was a part of that, that created learning tensions, that created uncertainties, and then resulted in an outcome. (MM3)*

- *It's all about managing the uncertainty. What you want to do is create the best tradeoff using models to understand the uncertainty that you can deal with upfront. (TM3).*
- *If we have a lack of knowing, it creates uncertainty. We have to approach what we do different than other circumstances. And so that's very different in contrast to say that the predictable complicated world that we've come to believe the world is. (MM3)*

An upfront conversation about uncertainty and the tradeoffs needed to deal with unknowns that were understood early in influencing emergent outcomes could reduce uncertainty.

Pulling to Order. The concept of 'pulling to order' was described by many participants as a major resistance or barrier to influencing emergent outcomes while working in a complex environment. A common default of leaders is to use an ordered or standard process to problem solve. It was further stated that mid-level managers did not allow the feedback loop to create stability or reach a new equilibrium and could cause the organization harm. Furthermore, the participants understood that the use of traditional roles and ordered processes were not as successful in a complex environment as using a more agile approach.

- *There was resistance by senior leaders who crave order, and then there was resistance by the people in the organization. (EF1)*

- *Ordered responses are when there really isn't a complex problem, or something that you're trying to solve. Those are things that, you know, there's work processes, those are your traditional roles (MF1)*
- *Mid-level managers have the potential to destroy organizations by interfering with self-correcting processes...things sort themselves out. They intervene and jump in ahead of time (MM6)*
- *You are always going to struggle with an ordered process, rather than an agile process. You are just fighting the culture and the order the whole entire time, because people are fearful to go outside of what box they perceive they're supposed to stay in. (MF1)*

Participants described resistance to new approaches and change as avoiding leadership direction or not working in a more agile or entrepreneurial way. Thinking differently on approaching problem solving was an area not easily overcome.

- *There was resistance to the direction that was given in how to get things done in a more entrepreneurial way. (EF1)*
- *Bureaucracies by their very nature are pretty averse to change. I was working in an environment where I was really pushing for disruptive change, and it was not welcome in many cases. (EF2)*

- *You are frustrated that the organization resists you pulling leverage or pulling levers and then you have a very frustrated leader, instead of a collaborative leader. (EM4)*
- *If you have a person that is only going to think how they've always thought and they just can't wrap their head around anything different, it doesn't matter how much trust they have in you (MF2)*

Overcoming bureaucratic resistance and helping team members think and approach influencing emergent outcomes differently are important factors in a complex environment.

Coping in Complexity. The participants provided insight into their approach on how to cope with complexity. Recognizing the tensions that are present in a complex environment and understanding how your team makes sense of the unknown is an important step. Try to understand how people see the world and how team members make sense of events. Leaders described that the sheer number of interactions needed to operate in a complex environment exceeds how work is beyond the ability to accomplish in a normal process. Work product also was a concern of individuals. Employees are tasked with working differently in a complex environment. This new approach to their work is not the standard method they are historically accustomed to and therefore creates anxiety on how well an employee is performing their job.

- *In a complex environment, you have tensions. Those tensions are going to be from the traditional roles that people take on. (MF1)*
- *If you don't look for ways to meet people where they are, or address a problem in a different way, then you're going to ultimately fail (MM2)*
- *It wasn't about the conditions that I was creating or only the acceptability of them being wrong, It was dealing with their own idea of what good work represents, that was the real challenge (EM5)*
- *The complexity was that if you could put down on a network diagram, all of the organizations that I felt that I needed to build a relationship with and have some productive communication with, far exceeded my ability. (EF2)*

A common approach described by the interviewees in a complex environment was to slow down the decision-making process or compress time to open one's aperture and to better understand potential patterns. There is realization that complicated and complex environments are different but not realized at an enterprise level. Furthermore, it was stated that the emergent outcomes are not predictable ahead of time due to limited understanding or knowing what the next steps will bring.

- *I think there's a big difference between complicated and complex, and when you start to talk about complex systems, there's an element of the unknown that I think a lot of leaders, especially in DOD, don't realize or they don't want to acknowledge (MM6)*

- *In a complex environment, I try to delay decisions as long as I possibly can. I try to open my aperture and recognize patterns...and that's incredibly important in an emergent outcome experience. (EF3)*
- *I will default and circle the wagons on the way that I handle complexity and allow myself time compression to get an idea of what's really going on. I might suspend judgment and suspend decisions to the last possible moment. (MM6)*
- *You end up with results that you didn't even know you were going to end up with, you can't know an outcome of something you don't understand. (MF1)*
- *The biggest factor in complexity is the lack of knowing and then the challenges around doing, because this idea of knowing and doing is central to who we are as human beings. (MM3)*

Overcoming the lack of knowing and then deciding what to do next is a challenge to a person's core sense-making.

Risk and Failure. Many comments dealt with participants' concerns over executing in a complex environment and the risk of failure. The participants' strong emotions centered on how the enterprise would perceive a failure and whether leadership would support a person who took a risk but failed. Interviewees suggested it takes confidence in yourself and in the organization's processes to be willing to take risks. A perceived outcome of taking risks in a complex environment is the fear of negatively impacting one's career or job loss.

- *What it's like working in a complex environment? I think that the first word that came to mind is risky. It's risky working in a complex environment... risk aversion and fear of loss of control (MM6)*
- *Working in a complex environment can actually be almost terrifying...even if you're working in a totally safe office environment. Because there are complexities that could drive outcomes that you can't predict. (EF3)*
- *Nobody likes risk. The fear of failure is very great in a complex organization (TF2)*
- *Confident people are more willing to take more risk. They're more willing to go out looking for new more entrepreneurial things. (TF1)*
- *If you don't have confidence that you have leadership that will support you through the process, you can worry about the future of your career. You can worry about the outcome of the initiative and the success, that it might have impact have on others... It can make you start making your decisions based on fear of what might happen, instead of making decisions that might optimize the outcome...You start giving things away in order to stay safe, instead of having a willingness to take calculated risk into your decision-making process. (EF3)*

If the perception is that the organization isn't supportive of mistakes, then this can impact the quality of decision-making in influencing or optimizing the emergent outcome.

Communication and Trust. Communication and the development of trust or the loss of trust is an important factor in an empowering leadership approach. If the workforce does not have sufficient level of confidence and trust in the leadership then operating in complexity is difficult. Open and two-way flow of communication can develop positive relationships.

- *The most successful experiences for me have occurred when the communication within teams and the communication of leaders is different. I mean by different is a communication that's flowing back and forth in the moment. (MM3)*
- *Shared experiential learning has to be administered with candor...in an open communicative way. (MM6)*
- *The failure to achieve the desired outcome almost always comes down to communication. (MF4)*
- *What you see is people just don't have or don't make the time to properly communicate in a complex environment and that leads to uncertainty...and that can lead to frustration. (EM3)*
- *You have to trust and you trust because you know, you've got the right people in the right place. I think the communication piece of it, if you cannot clearly articulate definitions, goals, responsibilities, roles, all of that in the way that people need to hear it. (EM3)*

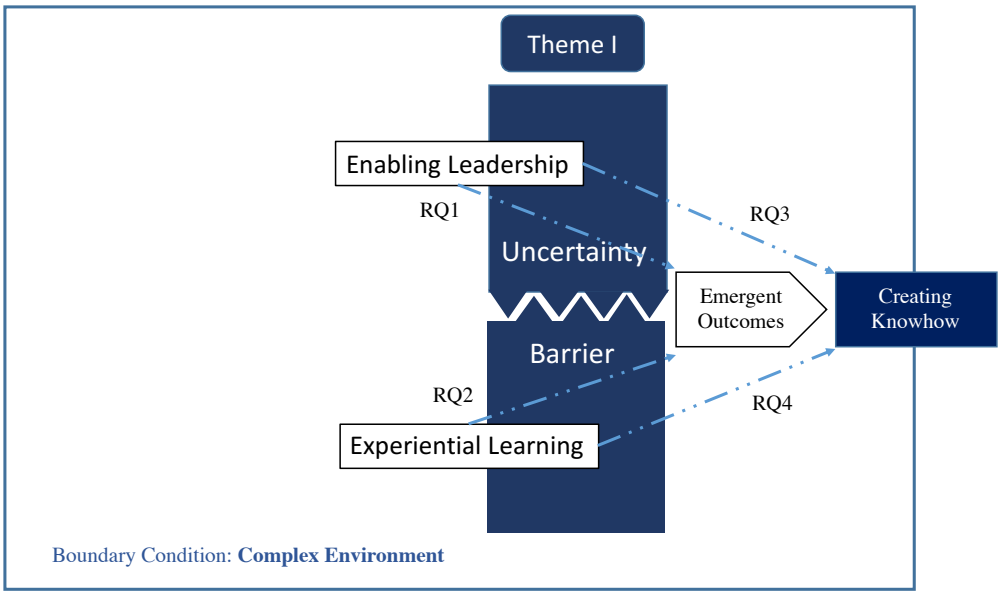
- *It's the relationships that you built...that kind of trust you have when there are some issues they're going to be there for you, whether you are the leader or a follower. (MF4)*
- *You have to build trust and relationships with those that are stakeholders in the complex environment that you are operating in. (MM5)*
- *The currency with which we operate with our people is trust (TF2)*

Furthermore, developing positive relationships can build trust both with teams and stakeholders. Leaders and team members realize that trust is an important currency and is difficult to reestablish once it is lost.

Figure 25 is the thematic framework that displays a complex environment with the Theme I, the uncertainty barrier, blocking the progress of enabling leadership, experiential learning, and the resulting empowered leadership from influencing emergent outcomes or creating knowhow. This diagram displays the location of the theme from the findings in relation to the study. The next theme describes the foundation or launch point necessary for success in a complex environment.

Figure 25

Thematic Framework-Theme I: The Uncertainty Barrier



Theme II: Exploiting Capability and Organizational Structure. The participants describe this theme as an important part of the success by sustaining and improving capability both as an individual and an organization. Furthermore, the participants describe the importance of understanding the organizational environment and how to use the systems and structure of the enterprise to influence emergent outcomes and achieve objectives.

A major contribution to capability development is creating an environment that supports team members making recommendations and then comparing them to standard approaches for new ideas. This active approach can help find the best solutions. The participants described having the leaders proactively look for collaborative people, assign them to teams, and develop their complexity skills.

This proactive approach allows the organization to influence emergent outcomes and create organizational knowhow.

- *Our leader at the time created the environment in which it was very safe to go ahead, and make recommendations, which then got vetted amongst some of the more standard approaches...and we found that there were better ways to do things. (MM1)*
- *You have to have an environment where you're not afraid to work on things in an untraditional approach and try things...and then eventually find the right solution. (MF1)*
- *Identify the skills and the strengths of people quickly and put these people that are really strong on teams. (MM2)*

The interviewees expressed that there are not only unknowns in complex environments but also significant interactions that need consideration. In addition to different interactions, the rate at which they occur creates difficulty and impacts the ability to influence emergent outcomes.

- *Complexity is less predictable than in a merely complicated space. The nature of the interactions, the array of variables, known and unknown, that are affecting the context creates a space where a lot of things just aren't known. (MM3)*
- *You have to make sure that you're looking at the interaction of everything. And when things interact, they change. How something performs on its own,*

or how a person or department in an organization works on their own. It's different than how they work when they are interacting (MF2)

- *We have different levels of people in the organization...Things are simultaneously happening and occurring but that doesn't mean they're happening at the same rate, or the same quality or the same levels. (MF5)*
- *There is a tremendous amount of interaction and interdependencies between different parts of the system. And there's very little control or even a way to influence the interaction of a lot of that (MM4)*

Organizational interactions and interdependencies are important factors in working in a complex environment.

Organizational Environment. The awareness of the organizational environment was a key attribute for success. The experiences of participants emphasized that most organizations are geared to rewarding performance in complicated environments not complex environments. The interviewees described that understanding that one is operating in a complex environment is important and consequently creates unique challenges.

- *We've created these organizations for a very predictable, complicated world in that the rewards, the values, the career paths, all these other kinds of things are designed for a world of expertise. (MM3)*
- *We have a lot of process in place and way of looking at the problems that presupposes it's just a complicated problem. (EM5)*

- *It's not because of the lack of ability or intellect but it's the lack of knowledge of how those organizations really operate. If somebody has never operated in a particular environment, what always worked for him in the environment they were used to should work now, but it doesn't because of the difference in the environment (MM4)*

In summary, the processes of organizations require review and modification to create successful emergent outcomes.

Structure and Planning. The reality of the enterprise's structure and organizational layers are either a supportive or hindering force. Lines of authority do not replace the need for influencing people who are not in your chain of command. The simpler the organizational structure and the fewer layers to navigate can help people work through complex environments. Traditional roles, as defined by the culture, present a hurdle to overcome as many see their role as following policy and relevant instructions guiding to a waypoint or milestone, but they are not sufficient to influence the outcome.

- *Lines of authority are interesting and useful but the role of leaders at my level, and the complexity requires significant influence over people who don't work for you (EM1)*
- *if you're in a position where you can affect the structure of the organization, keep the structure of the organization as clean and simple as you can. Because the work is complex, the organization shouldn't be complex, and it*

shouldn't be hard for people to try to figure out how to navigate through an organization (EF2)

- *Traditional roles that are not only defined by HR, but are defined daily culturally (MF1)*
- *Everybody is deriving satisfaction from executing busyness or activity without any real understanding of how their actions affect the outcome, or the goal or the objective... You have just absolute layers of policy, that if we laid them all out and tried to connect the dots, while everybody is busy following the instructions that they believe are relevant, they are not actually designed as a total system...The waypoints are necessary but they're never sufficient. (EM1)*

The contribution of organizational planning and its development was described as an important factor in an enterprise, but how to employ it differs in a complex environment. Creating clear end goals and a singular measure of success created clarity. The planning process in a complex environment is a continuous effort. New elements or emerging issues impact the plan and should be addressed and modified as they occur.

- *I tried to make sure that the end goal of whatever situation comes up is really clear...so we can figure out a way to get there the best way possible...[with] a singular measurement of the outcome of what we were trying to do. (MF2)*

- *Working in a complex environment is a constant planning process. (EM2)*
- *Planning is great, right and it's necessary, but no matter how much you plan, your plan will probably be challenged, and if not, even fail. (MM8)*
- *The plan is there purely for you to work through potential outcomes, to work through an understanding of what you might see as different kinds of outcomes are starting to emerge, so that you can recognize them as they develop. And to give you a framework against which you can make new decisions about how you should proceed. (EF3)*
- *We would recognize the fact that complexity that has different elements that were never considered before. (TM3)*
- *People who think that the plan must be followed step by step, as laid out, are absolutely limiting their success (EF3)*

The findings illustrate the need for the planning process to consider potential and emergent outcomes as a framework instead of concrete and defined milestones that need to be achieved at every step.

Capability and Development. The participants felt that it is important to prepare the workforce to operate in a complex environment. In order to build capability, leaders should budget time to focus on the development of their teams. Furthermore, developing emotional intelligence is a key factor in developing capability in individuals and success on teams. Conflict is a natural part of complex

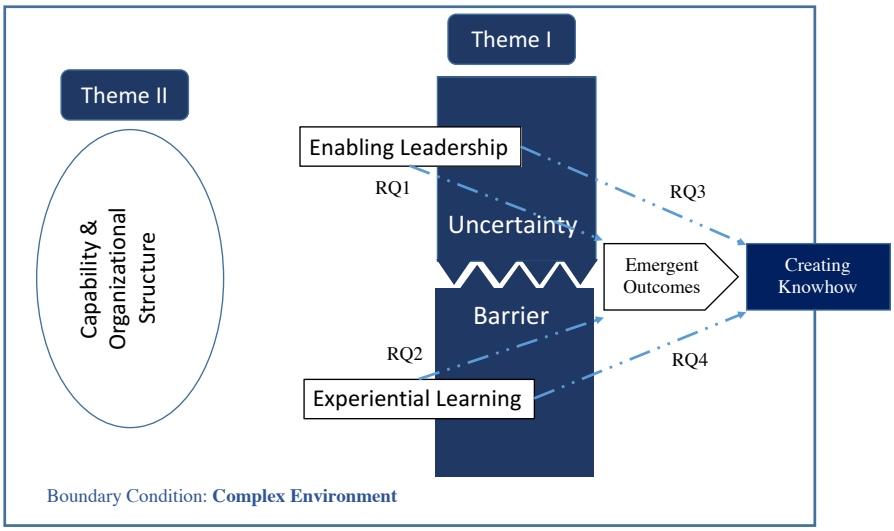
environments and teaching team members conflict resolution skills is an important part of capability development.

- *All of the success I've ever been affiliated with, has been 100% enabled by learning about and building capability in the teams...It's intuitively not easy for people to grasp, but nobody seems to budget time to focus on the attraction and the nurturing of their teams. (EM1)*
- *Develop emotional intelligence and it will probably instill wisdom. (MM6)*
- *Know the limitations and the talents of your people, because if they're not willing to take a risk, learn, and experiment in that experiential kind of way, they may not have the emotional intelligence necessary. (MM8)*
- *You have to be a great adjudicator and a resolver of conflict and you need to teach your team how to resolve conflict in acceptable and professional ways. (EM1)*

Figure 26 is the thematic framework that displays a complex environment with Theme II, capability, and organizational structure, as the launching point or the base infrastructure needed to support the progress of enabling leadership, experiential learning, and empowered leadership to influence emergent outcomes and create knowhow. This diagram displays the location of the theme from the findings concerning the study. The next theme is the empowering leadership approach that promotes the embracing of complexity and the unknown by using critical thinking skills in a learning culture.

Figure 26

Thematic Framework-Theme II: Capability and Organizational Structure



Theme III: Empowering Leadership Approach. The participants describe this theme as using a leadership approach that includes understanding complexity, embracing the unknown, using critical thinking, and encouraging a learning culture. The concept of empowered leaders is iterative and continues to develop leaders and their skills. There is an expectation that the leaders and team members continue to increase their knowledge and organizational knowhow.

- *Empower those individuals at the appropriate level to handle emergent outcomes. If you empower those folks correctly and instill in them confidence that you've got their back, 'as long as you're doing the right thing for the right reasons.' (EM3)*

- *While enabling leadership allows and empowers experiential learning, I think is an outcome of enabling leadership in that it becomes that iterative process (MM5)*
- *Knowing from your leadership and your organization that there is a culture and a desire for you to continue to increase your knowledge and your knowhow. That not only is it encouraged, it's expected. (TF1)*

Purposeful Alignment. The participants described that acknowledging complexity and unpredictability is integral to understanding emergence. Realizing that many outcomes are unknown or unknowable is essential for working in a complex environment. Decision points are different when influencing emergent outcomes and are characterized by limited data for decision-making. This limited amount of data also compels evolving goals. The traditional method of creating goals and objectives at the beginning of an initiative is a less effective planning approach in a complex environment. Aligning the efforts around a central purpose will help create success in influencing emergent outcomes.

- *There's always an element of the unknown and maybe the unknowable. I haven't heard many leaders say, to embrace complexity, or acknowledged complexity is to embrace the unknown and possibly the unknowable. (MM6)*
- *If I don't have all the information I need to decide on something at this moment, I can wait and see if something does emerge to tell me what*

direction the situation is going. Then I can make a much more appropriate decision. (EF3)

- *There is no perfect answer...there's only the most logical answer based on the data that's available to you. That data has holes and you fill in those holes with assumptions based on your personal values and beliefs, your past experience. (EM2)*
- *Emergent outcomes start off with something that is to be delivered in the plan but once we begin it becomes something that we end up having to adjust. It's never something that when we start it's predictable at the end. (MM5)*
- *Filling that gap between book learning and actual applied knowledge to solve problems is a gap that folks face every day. It's absolutely vital that we fill that gap with not only saying here's the knowledge that you need, but here's how to apply it. (TM1)*
- *We're turning that experience, the academic experience and my logistics experience into actually new knowledge, a new knowledge of the way to employ ships, which still exists today, (MM1)*

Tin summary, the participants felt that providing education and experience of the mental models were needed to help individuals understand how to operate in a complex environment.

Critical Thinking. Participants stated that working in a complex environment requires an emphasis on critical and creative thinking. The participants describe that on many occasions, there is not time allotted to spend on critical thinking. Furthermore, the enterprise needs more teaching or training to execute critical thinking.

- *You have to allow for critical thinking to occur within an environment that is complex. (TF1)*
- *Critical thinking, even though it takes a little time, it's too easy to react to something without thinking through...just take a little bit of time to sort of analyze with what you know, synthesize what you got to do (EF2)*
- *Basic critical thinking training is not pervasive across the lower the middle and the upper level leadership. (TM1)*
- *Things are more complex because people are thinking less. They just want to take comfort in doing what they're told...and our business is really an outcome business. (EM1)*
- *In a complex environment, if you understand or mastered the art of critical thinking, and planning, then you can navigate a complex environment much quicker. (EM2)*

The interviewees emphasized that the organization should require purposeful and critical thinking as a fundamental component of how teams work.

Learning approach. The interviews revealed that creating a learning environment and how learning is conducted is important to the success of an empowering leadership approach. The participants emphasize that everyone is a learner and that employees must be active in the learning cycle with constant engagement. The commitment to learning is a day-to-day challenge. Furthermore, dedicated time should be set aside for reflection.

- *Allow people in the experiential domain to actually try, it's the learning, and it's that learning cycle...a lot of our knowhow comes from the fact that we learn through trial and error. (EF2)*
- *Experiential learning has a heavy degree of engagement and trust...you have to be able to engage with people often and give them your time...it's a commitment to the value of learning. (MF1)*
- *Engender a learning organization through good leadership and stewardship in the day to day trench work of getting the job done. (TM1)*
- *Constantly reflect and I think that that leads to better knowhow in an organization because as you try to perpetrate that new information. (MF2)*
- *You actually have to take time and say, "I want people to understand what we did, what was successful, what wasn't." All of that takes time to write up and we're not given the time. (MF1)*
- *I think we experience and act more than we reflect and think. We act without thinking. (EF1)*

The participants further describe that the organizational commitment to learning from work efforts is often missing and should be considered a key attribute.

Leadership Approach. The participants described the leadership approach as an important part of creating the desired environment. The accomplishment of a successful leadership approach is an active, not passive, attribute. This attribute is best achieved by being less directive and providing more empowerment deeper into the organization. One participant also remarked that organizations rely more on heroic leadership and seek to reward that approach. Leaders must frame their goals and provide guidance differently when operating in complexity.

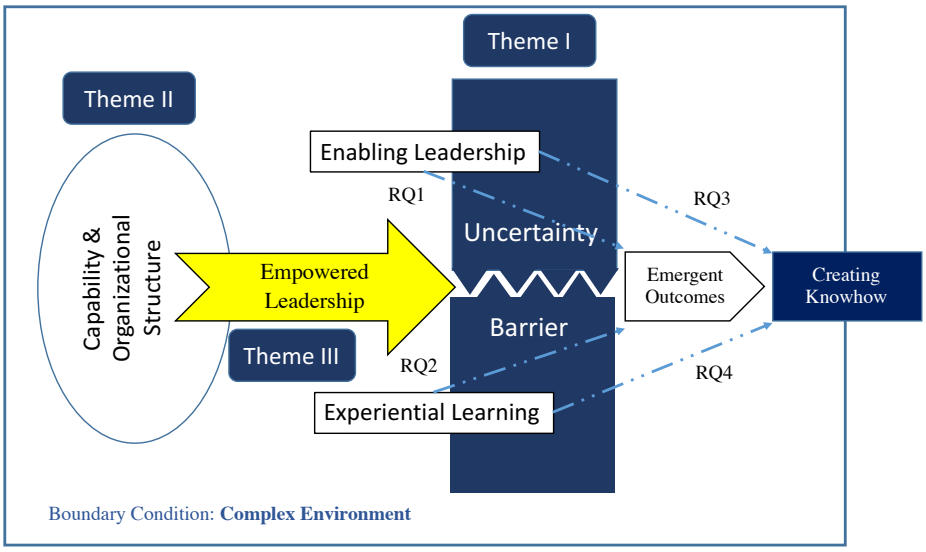
- *Unfortunately, what we value and reward in organizations is heroic leadership. We have a hard time accepting the fact that this practice [enabling leadership and experiential learning]is going to make us successful in the long run. (MM3)*
- *You don't get to the knowhow without having leadership that is willing and able to guide the workforce in order to understand how to deliver on an outcome (MM9)*
- *You have to acknowledge the fact that it is a complex environment and you also have to frame the goals a little bit differently. (EM5)*
- *A leader in a complex environment lets the reins go slack. I absolutely rely on my team to have learned what they need to know to be able to cope with the situation. (EF3)*

- *I tend to be less directive as the issue becomes more complex. (MM9)*
- *To empower you have to let go. You can't control all the time. (EM3)*
- *My working definition of empowerment is knowing that you can decide. You can complete a task. You can move forward with the information that you have, and get things done. (TF1)*

Figure 27 is the thematic framework that displays a complex environment with the final Theme III, empowered leadership, as a driver with the support of enabling leadership and experiential learning to influence emergent outcomes and organizational create knowhow. This diagram displays the location of the theme from the findings in relation to the study. All three themes from the study are shown in the thematic framework. Based on the findings of the study, the next section presents a practical model of how breaking through the uncertainty barrier can be achieved.

Figure 27

Thematic Framework-Theme III: Empowered Leadership



The findings in this chapter illustrate that enabling leadership and experiential learning influence emergent outcomes by creaking through the uncertainty barrier on the complexity journey to increase organizational knowhow.

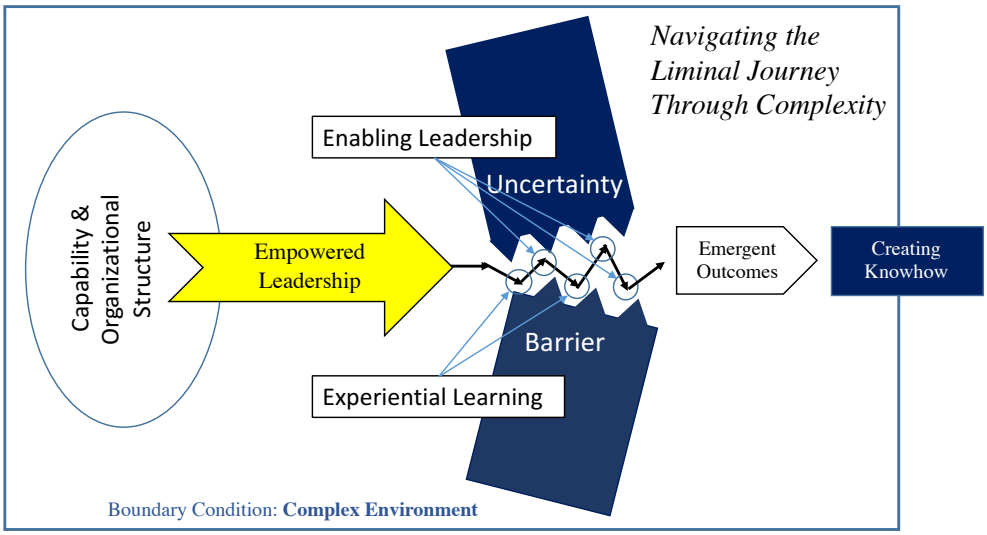
Conceptual Thematic Model

Figure 28 is the conceptually themed Rideout-Walton (RW) Uncertainty Breakthrough Model (UBM), which displays the influence of enabling leadership and experiential learning on the complexity journey. This model was thematically designed from concepts derived from grounded theory qualitative research demonstrating how the themes and forces are interrelated. It illustrates the themes uncovered by the research and shows how enabling leadership and experiential learning influence emergent outcomes and create organizational knowhow. It is summarized by FE3 (36 years in domain, eight years in last leadership role), who

states, "enabling leadership provides you the environment, and experiential learning provides the vehicle to gain knowhow."

Figure 28

RW-Uncertainty Breakthrough Model



The arrows in Figure 28 represent actions or direction changes supported by enabling leadership and experiential learning on the liminal journey through complexity to influence emergent outcomes and create organizational knowhow. The model displays that when the workforce proceeds in a direction and reaches a sharp corner or tooth in the barrier, a course correction from enabling leadership or experiential learning allows continued travel along the path breaking through uncertainty.

The model suggests supportive and hindering forces at play, similar to a force field analysis (Lewin, 1948). Supportive forces represent attributes or factors that influence or assist in influencing emergent outcomes and creating

organizational knowhow. Empowered leadership and the influence of enabling leadership and experiential learning are examples of supportive forces. Hindering forces represent attributes or factors that block the influencing of emergent outcomes and creating organizational knowhow. The uncertainty barrier and pulling to order are examples of hindering forces. Other components, such as capability and organizational systems and structures, can either be supportive or hindering forces depending on their effectiveness in a complex environment.

Model Delimitation. The thematic framework components of enabling leadership and experiential learning are not meant as an interpretation or representation of mediation or moderation specifically. The diagram in the model does not imply a mediating or moderating relationship as described in Hayes (2018) and Zhao et al. (2010). Rather, the findings suggest the relationship occurs and are influencing factors but does not describe specifically how or to what extent this occurs. Further research can ascertain more detail on the direct and indirect relationships.

Framework definitions. The following are the definitions of the thematic framework. The model includes the three themes, removing uncertainty barriers, exploiting capability and organizational structure, and empowering leadership discovered during the grounded theory research.

Capability and Organizational Structure. These represent the status of the workforce and organization and represent an organization's initial conditions. This

theme encompasses both individual and team capability. The economics of information and the accompanying communication challenge requires new approaches to organizational design (Alberts, 2007). No single organizational structure works in all environments (Alberts & Nissen, 2009). Consequently, organizations operating in complexity should create in their organizational design the ability to creatively adapt the structure to the environment.

Empowered Leadership. Empowered leadership represents the approach leaders take in the organization, including critical thinking, decision-making, leadership, and learning approach. According to the findings, it depends on how well these areas are fostered and encouraged in the organization that demonstrates how strong the supportive forces can become.

Uncertainty Barrier. *The* participants' most highly charged response focused on uncertainty in taking risks and the fear of failure in the organization. Traditionally, the most common approach for reducing uncertainty has been to focus on increasing information gathering van Crevald (1985). However, when less data is available, especially under time constraints, the organization should be designed to operate in a reduced information environment.

Enabling Leadership. Enabling leadership consists of individuals or teams that foster the conditions that influence or mediate the dynamic relationships between the operational and entrepreneurial structures of the business (Curral et al.,

2016). The attributes of enabling leadership allow for healthy adaptive functions or spaces where new ideas can be developed and refined (Campbell, 2014).

Experiential Learning. Experiential learning theory offers a view of learning's social dimension (Gherardi et al., 1998) instead of knowledge delivery. The theory posits that individuals and groups create and assimilate knowledge through cognitive and work effort (Klimoski, 2005).

Emergent outcomes. Emergent outcomes or emergence are a disruption that produces a novel or radical shift in a system's behavior or performance. Lichtenstein (2014) describes emergent outcomes as new creations and development of order as opposed to resultant outcomes characterized by adding or subtracting elements (Lichtenstein & Plowman, 2009).

Knowhow. In practical terms, knowhow is the organization's knowledge of accomplishing a task or activity. In contrast, knowledge is familiarity with certain functions, whereas knowhow is the understanding of how to perform that function. The creation and use of knowledge (hence knowhow) are significant business activities for the organization (Augier & Teece, 2006).

Boundary Conditions. The boundary conditions define the work zone and the environment that the workforce is immersed in. For this study's purpose, the participants are describing their experiences in a complex environment.

Liminal Journey Through Complexity. The top right corner of Figure 28 shows a header that states Liminal Journey Through Complexity and refers to the

twist and turns taken as the team breaks through the uncertainty barrier. It is meant to capture the dynamic action necessary to make real-time changes in direction and action with the influence of enabling leadership and experiential learning. Liminality is described as crossing the threshold marked by uncertainty and ambiguity during the transition to a new emergent state (Hawkins & Edwards, 2015).

Summary and Synthesis of Data

This chapter's research findings and results section presented a series of pertinent quotations from the interviews that provide narrative answers to the research questions. The sections are divided into the research questions narratives and further detailed narratives on the emerging themes. The purpose of reporting the findings with this grouping was to analyze the data in an ordered fashion and to emphasize the emerging themes. The researcher frequently referred to Appendix I (quality considerations for grounded theory) during the design and execution of this study. The six elements of the quality evaluation proposed by Creswell and Poth (2018) were satisfied.

The grounded theory research approach provided an avenue to open the interviewee's mental aperture and discover deeper connections between experiential learning, enabling leadership, and the creation of organizational knowhow through influencing emergent outcomes. Leveraging the elements of complexity leadership

theory afforded the background to gain further insight into how the participants dealt with complexity in creating organizational knowhow.

Research question 1 focused on participants' experiences with Enabling Leadership to influence emergent outcomes. The participants described the organization as having a limited number of people with the unique attributes of enabling leaders. The findings demonstrated the importance of enabling leaders to synchronize the operational and entrepreneurial sides of the business. Owning a challenge together was a key aspect, and selecting outside stakeholders strategically to participate in the development of solutions. Team members were aided by enabling leaders who removed barriers and showed visible support for their efforts. Enabling leadership, when coupled with experiential learning, builds capacity and fuels learning.

- *I think true enabling leadership is linked tightly with experiential learning of the followers. That really gets down to the core output of enabling leadership...building capacity in the followers to learn in the most profound ways. (EF3).*

Research question 2 focused on participants' experiences with Experiential Learning to influence emergent outcomes. Uniformly the participants describe the necessity to practice the learning cycle actively. Team members were aided by having enough time to reflect on learnings and transform the knowledge. Team members were also hampered by not completing the full experiential learning

cycle. Many times, during lessons learned discussions, the interviewees described it more as a lesson observed without knowhow gained. The organization does not always signal the importance of learning in the workplace.

- *Generally learning takes a backseat to performance, but if you're doing it right, you should be doing both. (MM6)*

Research question 3 focused on enabling leadership influencing the creation of organizational knowhow. The participants describe enabling leadership as facilitating the relationship building and feedback loop needed to create knowhow. The enabling leaders' role in teaching critical thinking facilitates reflection and grows knowhow, which further emphasizes the importance of a learning organization.

- *The most important responsibility of business leaders is to translate new knowledge and information into knowhow. (MM3)*

Research question 4 focused on experiential learning influencing the creation of organizational knowhow. The interviewees asserted a strong correlation between experiential learning and the creation of knowhow in the organization. Experiential learning helps create a collaborative work environment, ramps up the learning effort, and boosts confidence through experimentation.

- *You have a team of people thinking, reflecting, and actively passing information that allows them to accomplish their goal...that's experiential*

learning, and then through that [experiential learning] is how you get the knowhow. (MF3)

The findings from the study revealed elements through the coding process that impact the ability to influence emergent outcomes and create organizational knowhow. These elements were distilled into three themes, breaking through uncertainty barriers, exploiting capability and organizational structure, and empowering leadership approach. All three themes are interrelated and need to pull in the same direction. FE3 (36 years in domain, eight years in last leadership role) states, "these different methods [enabling leadership and experiential learning] are very important and interdependent for the success of creating knowhow." If one of the themes that support enabling leadership and experiential learning needs to be added or developed to the necessary level of maturity, the success of influencing emergent outcomes and creating knowhow could be reduced.

The findings provide insight into relationships within and between themes. Trust communications and coping with complexity show a relationship in the theme of removing uncertainty barriers. Open communications and trust are necessary for the ability to cope with complexity. In the same theme, the findings noted that the risk of failure accelerates pull to order. The workforce significantly fears failure and how it affects their career. Therefore, this can cause the workforce pull their efforts back into a more familiar and safe process not conducive to a complex environment.

Across the themes of exploiting capability and empowering leadership, developing individual and organizational capability is an important step in providing a background for critical thinking in a complex environment. The interviews revealed that an empowered learning and leadership approach could influence emergent outcomes. EF2 (39 years in domain, two years in last leadership role) summarizes by saying, "When you have enabling leadership and experiential learning, you have mechanisms to be effective in a complex environment."

Employees' experiences in a complex environment are markedly similar at the various levels in the study. The reasons why experience is described similarly at different organizational levels may vary, but most recognize that complexity is seen as confusion. Not all leaders understand the difference between complicated and complex environments and therefore pull to order. As noted in Uhl-Bien & Arena (2017), the pull-to-order impulse to overcome the perceived confusion can create more issues than it solves. The findings further emphasize that the nature of a complex environment includes significant frustration levels and a dose of risk aversion throughout the workforce.

A significant unexpected discovery was that engineers did not want to solve problems in a different way and were seen as risk averse, because their view of a different approach in a complex environment contradicted what they perceived as a necessary and adequate body of work for their domain. The uncertainty barrier is the focal point and creates an unpredictable navigation journey. Although the

uncertainty barrier appears to be impenetrable, the uncertainty breakthrough model intends to show how to navigate complexity by employing enabling leadership and experiential learning to make the journey more successful. Therefore, educating and training the workforce on navigating the uncertainty barrier in a complex environment is an important outcome. The findings and the Uncertainty Breakthrough Model are used as foundations for discussion, implications, conclusions, and recommendations for future research in Chapter Five.

Chapter 5

Conclusions, Recommendations, Implications

Overview

Chapter Two notes that to remain competitive in increasingly complex environments, organizations need improved approaches to help the workforce cope with the unpredictable nature and unrecognizable patterns that characterize complexity. The purpose of this research was to explore the experiences of leaders and team members operating in a complex environment and using enabling leadership and experiential learning to influence emergent outcomes and create organizational knowhow.

The study sought to develop a deeper understanding of the efficacy of enabling leadership and experiential learning and followed the grounded theory protocol outlined in Chapter Three. The protocol resulted in substantive interview results that were analyzed and condensed into codes, categories, and themes, as outlined in Chapter Four. The findings from Chapter Four provided themes that align with the research questions and contribute to the understanding and the body of knowledge of successful operations in a complex environment.

Problem Statement

Chapter One notes that firms commit significant resources to leadership and competency training for their workforce (Hrivnak et al., 2009). For firms to continue to be competitive and advance in complex environments, greater use of

leading practices and knowledge resources is required. The evidence in this study corroborates with the published research that complex issues do not follow a cause-and-effect relationship; therefore, the emergent outcomes have not been what organizations expect (Clarke, 2013). Despite significant resources committed, most federal agencies are not prepared to adequately cope with emergent outcomes (Trainor, 2017). The DoD organizations studied need new or evolved approaches that can prepare leaders and team members to operate successfully in an increasingly complex environment. This study's findings challenge traditional leadership development assumptions (Alvesson & Sandberg, 2011) through an in-depth inquiry of experiences, efforts, and patterns of behavior of select DoD leaders and team members who have dealt with emergent outcomes within their organizations.

This research focused on the concepts of enabling leadership and experiential learning in a complex DoD environment. Enabling leadership attributes leverage adaptive space to create new ideas or adaptive responses to complexity. Experiential learning is learning that is more than knowledge delivery; it is knowledge creation through grasping and assimilating cognitive work effort (Kolb, 1984), or simply, *learning by doing*. The study examined the two variables together, and their influence on emergent outcomes and creation of organizational knowhow.

Contribution of the Study

This study explored the complexity leadership model by overlaying the experiential learning theory to understand how the workforce can utilize enabling leadership and experiential learning to improve emergent outcomes and create organizational knowhow. The findings can provide guidance to practitioners in implementing the critical tenants of complexity leadership.

An integrated approach that provides practical guidance on employing complexity leadership was absent from the literature. The complexity leadership theory offers principles but does not establish an explicit approach to using complexity leadership successfully. This study seeks to add to the body of literature and research to provide guidance to practitioners on successfully implementing enabling leadership and experiential learning in their organizations. As noted in earlier chapters, the research and managerial objectives are restated below.

Research Objective

This grounded theory qualitative study's *research objective* was to address the literature's void on the details to employ complexity leadership theory effectively. The research discovered and categorized vital themes to build a model to aid the workforce in successfully navigating the luminal journey through complexity.

Managerial Objective

The *managerial objective* of this study was to utilize the findings and conclusions developed to help practitioner's with a better understanding of how to

influence emergent outcomes and create organizational knowhow in complex environments by effectively using enabling leadership and experiential learning. This study offers the practitioner guidance in the recommendations section to navigate through complexity.

Organization of the Remainder of the Chapter

The remainder of the chapter begins with evidence-based discussions of the study's findings, conclusions, and recommendations segmented by research questions and emergent themes. The following sections summarize the recommendations with theoretical and practical implications. The next sections describe the strength and weaknesses of the study and recommendations for future research and practice. The final sections summarize research questions from the study and the researcher's reflections.

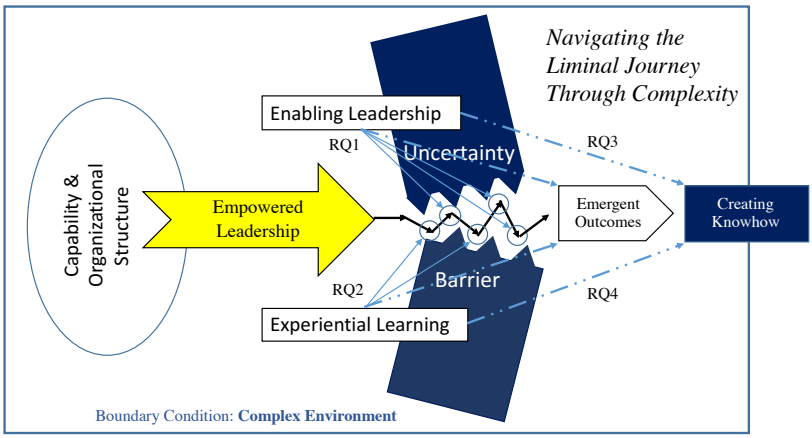
Summary of Findings and Conclusions

The uncertainty barrier inhibits progress in the complexity cloud. It was the core dilemma discovered in the research and is shown as the wall that must be breached in the model. Without leadership and learning approaches designed to operate in complexity, the workforce will experience reduced effectiveness in operations. The findings determined that lack of ability to navigate complexity can be misinterpreted as workforce resistance or confusion.

Figure 29 was the final model derived from the thematic analysis enumerated in Chapter Four, as is reshown here.

Figure 29

RW-Uncertainty Breakthrough Model (UBM)



The UBM model shows how the themes overlay and connect to each research question. The model displays how practitioners would navigate the liminal journey and break through the uncertainty barrier. The boundary condition is shown as operating in the complexity cloud characterized by unpredictable patterns without recognizable cause and effect.

Conclusions

There are four predominate or overarching conclusions from the findings in Chapter Four. The first one is the importance of the workforce correctly identifying their operating environment as complex. The research revealed that leaders and team members could not routinely identify their operating environment as complex. The data revealed that it is imperative that the workforce correctly identify the domain they are operating in, as noted in Snowden's (1999) Cynefin framework. The leaders and team members' responses are different in the different domains.

Secondly, enabling leadership was vital in building the environment to create purposeful alignment and a learning approach. Without this leadership approach, the workforce's ability to cope with complexity is reduced, and many efforts resorted to pulling the team to processes designed for an ordered environment and not suited for a complex environment (Arena & Uhl-Bien, 2016; Uhl-Bien & Arena, 2017).

The third predominant conclusion is that experiential learning must utilize the full cycle of grasping and transforming knowledge (Kolb & Kolb, 2005). The participants noted that lessons were more likely observed than learned. The interviewees further expressed that a sense-making mental model such as experiential learning can help the workforce to use cognitive work effort to grasp and transform knowledge into knowhow.

The fourth overarching conclusion from the findings was that the intensity and the extent that an uncertainty barrier becomes an obstacle in the complexity cloud. The uncertainty barrier impedes the successful influencing of emergent outcomes and therefore reduces the creation of organizational knowhow. As evidenced by the findings, overcoming the uncertainty barrier is a primary concern for the practitioner. The remainder of this chapter details the study's answers to the research questions under the narrative themes and explicates the intricacies of the contribution to practice derived from the themes.

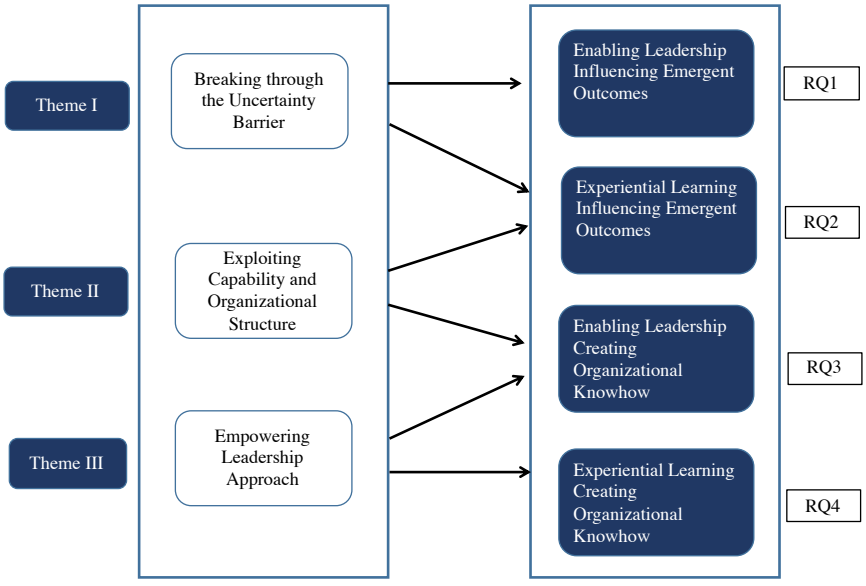
Themes and Recommendations

This emergent theme section reviews the relevant findings contextually developed in Chapter Four from the narratives and answers the research questions. The three themes developed from the findings are: 1) breaking through the uncertainty barrier, 2) exploiting capability and organizational structure, and 3) adopting empowering leadership approach. Each of these themes is discussed in detail in the following sections. The four research questions in this study are interrelated.

Figure 30 displays the strongest direct mapping or relationships of the themes to the research questions probed in the study.

Figure 30

Research Question and Theme Mapping



There are also fainter indirect relationships that connect most of the themes and research questions that are not shown in the figure for simplicity. Figure 31 illustrates:

- Theme I, Breaking Through the Uncertainty Barrier, provides detailed insight from RQ1 and RQ2.
- Theme II, Exploiting Capability and Organizational Structure, provides detailed insight from RQ2 and RQ3.
- Theme III, Empowering Leaderships Approach, provides detailed insight from RQ3 and RQ4.

The core theme discovered in the research was that the *uncertainty barrier* regulates progress in the cloud or arena of complexity. The barrier must be successfully navigated for the enterprise to influence emergent outcomes and create organizational knowhow. The rest of the chapter is the interpretative conclusions, discussion, and implications of the evidence in Chapter Four. The following section provides a detailed discussion of the three major themes.

Theme I: Breaking Through Uncertainty Barriers. The participants defined Theme I in Chapter Four as explaining the impact of the uncertainty barriers in an organization and the need to remove them. Breaking through the barrier includes dealing with the cultural aversion to taking risks and fear of failure in the organization. The ability to cope with complexity and resist the pull to order when the situation does not necessitate it is essential in breaking through

uncertainty. Clear communications and building trust are important factors influencing emergent outcomes and creating organizational knowhow. The four categories developed from the findings are 1) pulling to order, 2) coping in complexity, 3) risk and failure, and 4) communication and trust. These categories are discussed in detail in the following sections and linked to the four recommendations.

The first category in this theme is *pulling to order*, where the reaction to not understanding the unpredictable nature of complexity was to force a solution or process and thereby creating more issues. The next category, *coping in complexity*, describes how the workforce views operating in complexity and what tools they use to help them manage the pressures and tensions. The third category, *risk and failure,* disclose the high emotions the workforce feels if they fail in an effort and the resultant organizational reaction. The final category, *communication and trust,* reveal the importance of developing trust aided by effective communication.

Pulling to Order. The data gathered from the interviews emphasized the need to broach the *uncertainty barrier* and was considered the central finding. If the workforce becomes immobile or frozen in the uncertainty barrier, the data suggests that a common reaction will be to default to processes better suited for complicated environments. The barrier in the complexity cloud might be interpreted as organizational conflict or confusion, but instead is the result of exercising processes designed for a simple or complicated domain and are not

effective in complexity. This confusion creates frustration which can further block progress in the complexity cloud. Incorrectly identifying the operating domain results in applying solutions or providing guidance that hinders the organization's ability to influence desired emergent outcomes and therefore reduce the creation of organizational knowhow.

The participants revealed the preponderance of cultural resistance to change, a component of the uncertainty barrier. However, the findings suggest that the lack of progress in the uncertainty barrier cannot be assumed to be cultural resistance alone. However, the details of what is occurring are important. Two main factors need to be considered when paused in the barrier. First, knowing the details of where and what is blocking the progress is essential. Researching, thinking, and reflecting will aid in the exploring the roadblock. Secondly, the findings clearly state that an enabling leader's primary role is removing obstacles. However, many leaders still need to adequately identify these obstacles, which makes overcoming them more difficult.

Therefore, it is reasonable to conclude that leaders and team members must initially identify the environment they are working in as complex. The details surrounding that obstacle must be analyzed if the workforce encounters barriers. Predictably, without correctly identifying the environment and type of obstacle encountered, the workforce would default to working with processes designed for other Cynefin environments, as defined in Chapter Two. The "pull to order" effect

will negatively impact the ability to influence emergent outcomes and the creation of organizational knowhow.

Recommendation #1: Provide training on Complexity 101. How to identify the environment in which the workforce is operating and the appropriate responses. Ensure the leaders and team members have available different processes developed for the different operating environments.

Coping in Complexity. How individuals cope with complexity is important to consider in an enterprise. Is the organization or the employees comfortable with the unknown or unknowable? Although the unknown has an element of risk, the complex environment requires embracing the unknown, as emergent outcomes are inherently different than initially anticipated. The internal tensions and external pressures in a complex environment can create chaos, but the team's reaction is important. Working on the edge of chaos requires influencing skills instead of a command and control approach.

The participants describe a successful coping mechanism in complexity as slowing down the decision-making process. Once the leaders and team members accept that there are unknowns, they should plan to uncover critical information. The next step is to set a goal on much discovery of information is realistically possible. Once the search for the unknowns is complete, the workgroup can make sense of alternative decisions that can be executed.

Based on these findings, the conclusion is that coping with complexity requires more influencing skills than traditional approaches. Available data constrain the decision-making process. A balance of enough data to make good decisions but not all data for perfection is the goal. Limited available data requires leaders and team members to bypass their bias, push out decisions until necessary, and become more comfortable with the unknown.

Recommendation #2 Develop concepts and sense-making models to assist the workforce in the timing of decision-making. Further, develop and upgrade influencing skills in the workforce instead of defaulting to a command and control approach.

Risk and Failure. Accepting risk and how the enterprise will respond is a key concern for leaders and team members. If a decision is made to accept a risk outside of the normal working processes and fails, the workforce is concerned that the organization will react to this failure punitively. When working in a complex environment, the organization must view risk-taking in a new paradigm. The notion or belief that taking a risk and failing will negatively impact one's career will cause the workforce to reduce quality decisions that would benefit the enterprise.

The researcher concludes that the workforce needs direct assurance from the enterprise on how they will handle failure in complex environments. Predictably, without a detailed and communicated risk versus failure or results model to guide

the workforce in complexity, influencing emergent outcomes will become secondary, and the organization will not get the expected results.

Recommendation #3 Develop a risk acceptance sense-making model for the workforce. Codify the degrees of freedom available for decision-making and the boundaries for failure.

Trust and Communication. As demonstrated in the findings and noted in Covey's (2006) *Speed of Trust: the one thing that changes everything,* trust becomes the currency of enabling leaders. The concept of trust is interwoven with the workforce's fear of failure in the organization. Teams can be asked to take risks to achieve goals, but if the team is unsuccessful, will the organization react negatively to the employees and, in the worst case, threaten their employment? The team must believe that the enterprise supports its prescribed risk-taking to create a high trust condition. Lack of trust and high risk associated with failure can accelerate the pull to order or use processes unsuited to the complex domain. Effective communication is an integral and underlying component of building and maintaining trust in the organization.

Effective communications are a capability multiplier. Although communications generally flow in organizations, the type and quality of communication determine effectiveness. Open and two-way communication is necessary to create a trusting atmosphere in the organization. The workforce must believe they can be candid, bring up information, and have a dialogue outside the

regular passing of information. The findings show that there is a lack of a comprehensive approach or roadmap to effective communications. It is logical to conclude and predict that if an organization encourages delicate or critical conversations to occur in a two-way flow, then effective communication and trust can be achieved.

Recommendation #4 Provide a detailed roadmap to the organization on achieving effective communications to develop high trust in the enterprise.

Theme II: Exploiting Capability and Organizational Structure. Theme II was described in Chapter Four by the participants as an important part of the success by sustaining and improving capability both as an individual and as an organization. Furthermore, the participants described the importance of understanding the organizational environment and how to use the systems and structure of the enterprise to influence emergent outcomes and achieve desired results. The three categories developed from the findings were 1) organizational environment, 2) structure and planning, and 3) capability and development. These categories are discussed in detail in the following sections and linked to the three recommendations.

The first category in this theme is *the organizational environment*, where awareness of how well the organization's processes are geared toward working in complexity is important. The challenge in the organizational environment is navigating complexity in an organization designed for complicated endeavors. The

next category, *structure and planning,* describes an organization's supporting or hindering forces that need to be reconfigured, such as using influencing skills versus lines of authority and reducing the number of decision layers. The third category, *capability and development,* provide insight into the need to prepare the workforce to operate in complexity. This category advances the notion that training and mentoring should be focused on the team versus the individual.

Organizational Environment. A common thread throughout the findings was how difficult operating in a complex environment appeared. Traditional organizational systems and structures are designed to be effective with a predictable cause-and-effect approach. The ability to operate in a complex environment raises more organizational structure and workforce skills challenges than the simple and complicated domains. The workforce skills and organizational structure needed to operate in a complex environment require a new approach to establish this capability. Designing the working practices around the complex environment is necessary for the workforce to operate successfully in complexity. The key leaders in the organization need to validate to the workforce the unique challenge in complexity and reward performance that can break through the uncertainty barrier.

Recommendation #5: Review existing work practices and upgrade the key areas used in complex environments to reflect the unique challenges. Develop

performance metrics and evaluation methods as a key performance goal of the workforce navigating through complexity.

Structure and Planning. The organization's structure is an important foundation for the workforce to leverage. How an enterprise is organized dictates patterns of interaction and interdependencies between key elements. An important concept of complexity is to organize for success by keeping the lines of authority and decision-making as simple as possible. The findings revealed that having too many decision-makers and less essential stakeholders in the workflow could not only slow down progress but may stop it altogether. Reduce the less important complicated touch points. Conducting a review of the current roles in the workforce to reveal the overlapping responsibilities, simplify communication connections, and provide flexibility in decision-making.

Complex environments will create unique challenges for the enterprise to conduct strategy and goal-setting sessions. Strategy development's planning and budgeting components will require more flexibility than constructed in everyday operations. An amount of agility must be embedded in the plan and budget to respond to emergent outcomes. Strategy development allows the enterprise to create incentives for success in a complex environment. Currently, as mentioned in the uncertainty barrier theme, there are underlying disincentives for the workforce to take risks and make critical decisions while operating in a complex environment.

It is straightforward to conclude that if the lines of authority and excessive permission points are too many and cumbersome, the effectiveness of operating in a complex environment will be negatively affected. If the planning and budgeting approach in the enterprise is cumbersome or designed for a simple or complicated domain, then successfully operating in a complex environment will be reduced.

Recommendation #6 Examine existing lines of authority and permission points. Simplify the organizational structure. This examination will require an analysis of existing roles and responsibilities to ensure they are prepared and structured to operate in complexity.

Recommendation #7 Build a unique planning and budgeting process for those areas that routinely work in a complex environment. More flexibility would need to be built into this process as information and unpredictable outcomes are known later.

Capability and Development. The findings reveal that a focus on team development needs to be included. Teams are formed with specific resident skills. However, more effort is needed to develop further necessary skills needed in complexity. A few of the essential skills mentioned in the data are; conflict resolution, critical thinking, team building, emotional intelligence, and sense-making models. The findings suggest that some of these skills may be represented on a team by happenstance, not by design. The data reflected the need for organizations to increase their understanding of emotional intelligence's importance

and how-to development. Participants pointed out that emotional intelligence facilitates reflection and abstract conceptualization, which are necessary for experiential learning.

Focus on providing these skills is necessary to give the enterprise the capability to operate successfully in a complex environment. A first step to accomplish this would be to assess the workforce's capability to operate in a complex environment. Once the gaps in knowledge and skills are identified, the workforce could be better prepared by training on those topics as the team is formed and begins to coalesce. Concentration on these skills can give the workforce the confidence and emotional reserve to perform in a complex environment.

A clear conclusion can be drawn between preparing the workforce to operate in a complex environment and their success. The participants describe that most of the work is conducted in teams, but the development of teams is not a priority for the organization.

Recommendation #8 A focused initiative to increase the ability of the workforce to operate in a complex environment should be conducted. It should start with baselining current capabilities and a concentrated series of training events to close the gap.

Theme III: Empowering Leadership Approach. The participants described Theme III in Chapter Four as using a leadership approach that includes

understanding complexity, embracing the unknown, using an agile leadership approach, and encouraging a learning culture. Empowering leadership is continuous and iterative to foster leaders' development and skills. There is an expectation that the leaders and team members continue to increase their knowledge and organizational knowhow. The four categories developed from the findings are: 1) purposeful alignment, 2) critical thinking, 3) learning approach, and 4) leadership approach. These categories are discussed in detail in the following sections and linked to the four recommendations.

The first category in this theme is *purposeful alignment,* which outlines the need to examine how goals and objectives are distributed and wherein the execution of work and decision points have the best effect. The next category, *critical thinking*, is described by the data as an important component of working in complexity but needs to be given priority for training. The findings further emphasize that the workforce needs more time to utilize critical thinking. The third category, *learning approach,* stresses the importance of creating a learning environment and using the complete experiential learning cycle. The final category, *leadership approach,* provides insight from the data on the importance of guiding the workforce differently using teams and encouraging empowerment to deeper levels in the organization through enabling leadership.

Purposeful Alignment. Creating alignment is an integral part of the successful use of resources. This alignment can produce a level of productivity and

harmony among competing domains. Achieving a satisfactory amount of alignment requires the use of facilitation and collaborative teams. The data revealed that facilitating teams to solve problems or discover new ways of working more effectively exploits existing resources and drives success in a complex environment.

A key factor in teaming concept is the use of influencing skills to gain buy-in from stakeholders. Since a complex environment is characterized by emergent outcomes that are not known early on, the workforce must be comfortable embracing the unknown. If a team does not have these skills to the degree required, special training should be conducted to give the workforce the tools they need to succeed, as mentioned in the capability theme. Constant team development becomes a leadership foundation.

Creating effective alignment of resources is important in all environments; however, in a complex domain, the alignment is done through the facilitation of teams and collaborating effectively with stakeholders. The workforce needs mental models available for them to understand complex environments.

Recommendation #9 Make facilitative leadership and facilitation of teams the focal point of how the enterprise works. Provide mental models to help teams understand the nature of complexity.

Critical Thinking. For empowerment to be effective, leaders and team members will require a more in-depth analysis of how they are executing critical

thinking and decision-making with adjustments according to the operating environment. In complex environments, decisions made too early can be harmful, or too late will miss an opportunity to influence the emergent outcomes. The traditional lines of authority will be stressed in a complex environment, and many low-risk decisions can be delegated to a lower level. Decision-making and delegation of authority will need a particular focus while operating in a complex environment. The workforce will likely have limited data and no examples of similar scenarios.

A consistently important component of businesses is how well critical thinking is employed. Unfortunately, this area does not receive emphasis deep into the workforce. Without an understanding of the critical thinking process, it is predicted that the teams will be less effective in a complex environment.

Recommendation #10 Provide specific and detailed training on critical and creative thinking. Ensure the workforce uses the training in the execution of their teamwork.

Learning Approach. An integrated learning approach ingrained in the organization's work is a necessary success factor. Learning needs to be intentional and takes place during work efforts to grasp the knowledge successfully. Creating a collaborative learning mindset in the organization's culture will require time and effort to reflect and transform knowledge into knowhow. Another vital factor is actively sharing knowledge across organizational boundaries. There are many

potential approaches. However, a robust coaching and mentoring program can improve individual team members' skills and serve as a conduit to share knowledge across domains. A key component of a coaching program should be helping the workforce understand and utilize understand experiential learning and enabling mental leadership models by direct coaching that trains as one works.

The interview proved that creating a learning environment is essential to long-term success. With an active learning cycle, the workforce will retain its ability to keep up with changes in the business.

Recommendation #11 Create and codify a learning approach (experiential learning) in the organization that fully uses the learning cycle, emphasizing the missing reflection component. Consider create learning coaches to be employed across the firm.

Leadership Approach. Successfully influencing emergent outcomes in a complex environment requires an upgraded approach to leaders' guidance and direction. The objective is to create a paradigm of empowering leadership. This requires team members to suspend their biases and experiences and look for novel ways to frame assumptions. The traditional method of setting objectives and measurements is replaced by a central purpose that provides a broad aiming point to achieve. Modifying how success is defined will require leadership agility, embracing failure, and perseverance as the workforce navigates through complexity.

The researcher concludes that leadership in complex environments requires a unique approach. Leadership becomes less of an individual effort and more of a process. This process approach is less directive and focuses on aiming points versus specific goals. An output of a less directive approach is more empowerment at deeper organizational levels.

Recommendation #12 Develop and deploy a leadership model for the enterprise that focuses on enabling leadership, considers how desired results are identified, and provides empowerment deeper in the organization.

Summary of Recommendations and Implications

As discussed in Chapter Two, Snowden and Boone (2007) describe the challenges in a complex environment where leadership approaches fail if the domain is unknown and the leader uses the wrong responses or organizational mechanisms. Furthermore, Uhl-Bien and Arena (2017) illustrated the concept of an enabling leader who can recognize their operating environment and apply complexity thinking to influence emergent outcomes.

The data in the study revealed that leaders or team members must adequately recognize a complex environment, yet the majority do not and therefore operate at a disadvantage. The participants reported that the majority of people they have observed demonstrate a lack of ability to *recognize complexity*. Since the ability to recognize a complex environment was a significant theme in the minds of

the participants and among those they work with, it stands to reason that this is a generalizable and significant issue.

An unexpected finding in the data was the magnitude and importance of the fear emotions experienced by the workforce. The data and findings revealed that powerful emotions were experienced by individuals taking a risk and, consequently, the uncertainty of the organization's reaction to a failure. The nature of complexity presents unknowns and requires a certain amount of risk-taking. The organization must reduce or mitigate the perceived risk and fear of failure. These workforce concerns about risk and fear of failure affected work products and created reduced effectiveness in complex environment operations.

A significant insight from the study is the importance of leaders focusing on developing teams to instill the needed skills to operate in a complex environment. The competency training approach currently focuses on individual knowledge, skills and abilities and does not cover team building and dynamics. The data revealed that the organization does not place team development as a key training or development activity. The work in a complex environment will customarily require a team approach. When the organization provides this team development approach, it will improve the workforce’s capacity to operate in complexity. Therefore, the ongoing development of teams needs to be a priority in the enterprise.

The literature shows a deficiency in extending complexity leadership theory to the logical goal of creating knowhow. When an enterprise develops knowhow,

they improve an enterprise's competitive advantage. Therefore, knowhow as an aiming point or north star is foundational for guiding successful operations in a complex environment. Using knowhow as the end goal will improve strategic approach and planning process to increase focus on desired outcomes.

The complexity leadership theory literature provides principles and guidance for enabling leadership (Uhl-Bien & Arena, 2017) but needs specific details on how to accomplish these principles. The goal of influencing emergent outcomes is to create organizational knowhow. This study provides a model and guidance for workforce capacity building, leadership/learning, and organizational structure approaches necessary for breaking through the uncertainty barrier. The data revealed that enabling leadership and experiential learning to synchronize and operate together in the organization provided the best approach for success in a complex environment.

Recommendations

The dominant conclusions of this study are the necessity of recognizing that the operating environment is complex and navigating or breaking through the uncertainty barrier successfully. The leader's challenges are recognizing these barriers, and the thematic findings reinforce this conclusion. The three themes developed in the study are: 1) breaking through the uncertainty barrier, 2) exploiting capability and organizational structure, and 3) empowering leadership approach. The three themes were derived from the analysis and enumerated in

Chapter Four. The final model, RW- Uncertainty Breakthrough Model, was shown in this chapter as Figure 29. This model visualizes how the workforce can navigate the liminal journey through complexity using enabling leadership and experiential learning. Each theme and category were fully developed in the themes section and accompanied by recommendations.

Current leaders are challenged with operating in complexity, and this issue was echoed in several findings. The data exemplified the lack of ability of leaders and team members to identify complex environments and therefore operate with approaches and processes not suited for complexity. As previously mentioned, this study sought to add to the body of literature and provide recommendations and guidance for practitioners to navigate through complexity successfully. Therefore, this study concluded that these are the most essential issues in each category for which these recommendations were developed. The following bullets summarize the 12 recommendations derived from the thematic section's interpretations of the findings and conclusions.

- Recommendation 1- *Provide training on Complexity 101. How to identify the environment in which the workforce is operating and the appropriate responses. Ensure the leaders and team members have available different processes developed for the different operating environments.*
- Recommendation 2 – *Develop concepts and sense-making models to assist the workforce in the timing of decision-making. Further, develop and*

upgrade influencing skills in the workforce instead of defaulting to a command and control approach.

- Recommendation 3- *Develop a risk acceptance sense-making model for the workforce. Codify the degrees of freedom available for decision-making and the boundaries for failure.*
- Recommendation 4 – *Provide a detailed roadmap to the organization on achieving effective communications to develop high trust in the enterprise.*
- Recommendation 5- *Review existing work practices and upgrade the key areas used in complex environments to reflect the unique challenges. Make navigating through complexity a key performance goal of the workforce.*
- Recommendation 6 – *Examine existing lines of authority and permission points. Drive simplicity in the organizational structure. This drive to simplicity will require an analysis of existing roles and responsibilities to ensure they are structured for complexity.*
- Recommendation 7- *Build a unique planning and budgeting process for those areas that routinely work in a complex environment. More flexibility would need to be built into this process as information and predictable outcomes must be clarified early on.*
- Recommendation 8 – *A focused initiative to increase the ability of the workforce to operate in a complex environment should be conducted. It*

should start with baselining current capabilities and a concentrated series of training events to close the gap.

- Recommendation 9- *Make facilitative leadership and facilitation of teams the focal point of how the enterprise works. Provide mental models to help teams understand the nature of complexity.*
- Recommendation 10 – *Provide specific and detailed training on critical and creative thinking. Ensure the workforce uses the training in the execution of their work.*
- Recommendation 11 – *Create and codify a learning approach (experiential learning) in the organization that fully uses the learning cycle, emphasizing the missing reflection component.*
- Recommendation 12 – *Develop and deploy a leadership model for the enterprise that focuses on enabling leadership, considers how desired results are identified, and provides deeper organizational empowerment.*

In aggregate, organizations should focus on developing and deploying the 12 recommendations to provide the capability to navigate through the uncertainty barrier. If all 12 recommendations are completed, it will provide the enterprise's capability to influence emergent outcomes and create organizational knowhow successfully. As noted in the next section, taking a milestone and systems approach will provide a roadmap for success. The recommendations can be deployed in phases, but skipping one or more will cause a less-than-successful experience.

Successful Implementation

As stated earlier in this chapter, this section offers a practitioner's approach or guidance on how to apply experiential learning and enabling leadership to guide an organization's navigation through complexity. For successful implementation, consideration should be given to the execution of milestones and a systems integration approach. The milestone approach groups and sequences the deployment of recommendations in a time-phased method. At the same time, the system approach integrates the interdependencies of the recommendations.

Milestone Approach. The researcher advocates a phased approach to implementing the recommendation to develop a progressive improvement for operating in complexity. The 12 recommendations are cogently divided into three milestone planning groups. The first milestone planning group centers on developing the workforce's capacity to operate in a complex environment and consists of recommendations 1, 8, 9, and 10 listed in the above section. This group of recommendations is launched first and ensures the leaders and team members can correctly identify the operating environment as complex (recommendation 1). Failing to do so will cost the enterprise the ability to work effectively in a complex environment. Next in this group is to increase individual skills using facilitative leadership/teaming (recommendations 9 and 10) and critical thinking. These areas provide team members with fundamental tools to work effectively in complexity. Increasing individual skills to work effectively in complexity is a career

development component. The last recommendation in this group (recommendation 8) is launching a baseline assessment of the workforce's knowledge and abilities working in complexity. With the assessment results, the organization can identify areas for improvement and focus resources on improving specific capability shortfalls.

The next milestone planning group (II) focuses on leadership alignment and consists of recommendations 2, 3, 4, and 6. Depending on the available resources, these recommendations can be deployed during or after milestone planning group I. The four recommendations in the leadership alignment group can be deployed in parallel or sequentially. The recommendations: 2) decision-making, 3) risk and degrees of freedom, 4) effective communication, and 6) lines of authority are present in many organizations. However, these areas must be analyzed and reconfigured to operate in a complex environment. In this regard, leaders working in complexity become designers of new organizational operating frameworks.

The final milestone planning group (III) enterprise structure configuration builds on existing systems and structures in an organization. The recommendations include 5) standard work practices, 7) planning and budgeting, 11) learning approach, and 12) leadership model. These recommendations leverage existing organization norms but are modified to operate in complexity. In order to successfully reconfigure the enterprise’s structure, the organization would need to have sufficiently progressed in groups I and II. The foundational understanding

developed in the first two milestone planning groups will help ensure successful reconfiguration. Organizational structure influences the workforce's behavior; it is an opportunity to organize for success. Successful implementation relies on the complete execution of the recommendations. Leverage new ways of thinking. Mental models should not be a snapshot view of the world.

Table 16 displays the three planning groups: I) Workforce capability, II) Leadership alignment, and III) Enterprise configuration and each associated recommendation to complete.

Table 16

Milestone Planning Groups

Milestone Planning Group	Recommendation #
I. Workforce Capability	1, 8, 9, 10
II. Leadership Alignment	2, 3, 4, 6
III. Enterprise Configuration	5, 7, 11. 12

Systems Approach. These recommendations do not reside in an isolated silo and must be viewed from a systems perspective. The implementation of the recommendations will have interrelationships that require awareness and integration. Since milestone planning group I is workforce-centric, and milestone planning group II is leader centric, there will be interdependencies or conflicts to be addressed. For example, the facilitated teaming and critical thinking approach from group I applied to the workforce will need to be accompanied by the related

leadership areas from group II, such as decision-making and risk degrees of freedom. An open and free-flowing dialogue between these areas will create a deeper understanding and common alignment in executing these functions. Other emerging interrelationships will need to be considered as they unfold.

In the milestone planning process, strategic pauses and a check on how the implementation is proceeding can help identify areas that need integration but important aspects go unnoticed. Deploying milestone planning group III will be aided by the successful traction from milestone planning groups I and II. The work of increasing workforce capacity and focus on leadership alignment provide a baseline for launching milestone planning group III. Implementation from a systems perspective requires exercising the art of seeing the forest through the trees. Paying close attention to gaps in the interrelationships and integrating solutions will help to create a learning organization.

Theoretical Implications and Broader Impact

Practitioner Level. The study details the participants' experiences, which provide evidence in the data that combining experiential learning with enabling leadership can influence emergent outcomes. The study further illuminates that combining experiential learning with enabling leadership creates organizational knowhow. A significant concept missing from the literature is the notion of an uncertainty barrier that must be navigated. If this barrier in the complexity cloud is

not recognized and crossed, the existing principles in the literature will be less successful.

Competency training approaches of the workforce are necessary but not sufficient to operate in complexity. The individual knowledge and skills delivered in the initial competency model ordinarily provide basic domain knowledge and technical skills but are void of how to operate in complexity. Complex environments require not only a different mindset for problem-solving but also team-related skills and proficiency are needed to exercise solutions.

Enterprise Level. The grounded theory results provide insight into the generalizability of the study outside this pool of participants and the NAVAIR organization. A key finding is that the enterprise's organizational structure must be reconfigured to operate in complexity. Today's systems and structures are designed for simple and complicated environments and perform poorly in complexity. The organizational structure will open an area for organizational design theorists to study and offer solutions.

This study can be leveraged to examine areas with a similar technical workforce operating in complexity. A few potential areas that can translate the theoretical foundations and model are businesses such as general aviation suppliers, technical defense industries, and computer and software developers. Researchers could build upon this study in domains that specialize in design, innovation, or systems integration.

Broader Impact. The creation of knowhow is necessary in many areas of society. Both public and private organizations can benefit from implementing the recommendations. As the world becomes increasingly technical, it moves toward more complexity. The information age further confounds the ability of entities to operate as they have traditionally done. Government bodies and associations need to influence emergent outcomes and create knowhow but need to approach the challenge. Policy creation should consider complexity as it is being developed.

Knowhow is underrepresented or absent in the complexity leadership literature. To create the competitive advantages sought by enterprises, proposed operating models should extend to the result of creating organizational knowhow, it is the north star to pursue. The researcher believes that the creation of knowhow is the seed that grows innovation and growth in the enterprise. The influencing of emergent outcomes to create organizational knowhow needs to be developed or addressed in the literature.

Practical Implications and Broader Impact

Practitioner Level. As mentioned in the recommendations section, there are varying degrees that a practitioner may implement the proposed recommendations. It is crucial, however, that the recommendations are the minimum needed to provide the capability to navigate the uncertainty barrier. If only a portion of the recommendations are deployed or are not fully executed, then the ability to navigate complexity is diminished.

Practitioners should consider investing in a systems approach to operations with an organizational structure that is specifically designed for complex environments. Furthermore, after the employee's initial competency training, shift the training approach to one more suited for a complex environment. Stop doing the traditional or legacy performance management processes and develop one consistent with the challenges and rewards in a complex environment. Working effectively in complexity should be a key career development component.

Enterprise Level. Complexity should be acknowledged and emphasized, as many teams work in a complex operating environment (McCrystal et al., 2015). When an organization is operating but not acknowledging a complex environment, many barriers to success are confronted with limited or non-existent protocols to overcome roadblocks. The lack of knowledge of complex environments will create frustration in the workforce and lead to unsuccessful outcomes.

A key output from this study is the importance of the necessary skills needed for optimal functioning in a complex environment, as outlined in the second theme, exploiting capability and organizational structure. Identifying the skill level in the workforce necessitates an initial workforce assessment and organizational conditions to improve efforts in a complex environment. Once a baseline assessment has been completed on the workforce skills and organizational structure, the enterprise can close identified gaps to improve performance in complex domains. Providing the workforce with mental models for complex

environments provides a sense-making mechanism to reduce concerns and anxiety about emergence.

Broader Impact. The goal is the importance of knowhow as the ultimate output of successful operations. Although a branch of study on complexity is robust in the literature, how to lead and work in that environment is sparse for practitioners. As noted earlier, combining and synchronizing experiential learning and enabling leadership provides a successful approach, and if not used together in coordination and synchronization with the entire progression will not be as successful.

The implementation guidance discussed earlier in the successful implementation section can be used across many types of organizations, both public and private. The implementation method encourages using both milestone planning and systems approach. If the interrelationships are not integrated with a systems approach, there will be gaps in effectiveness while operating in a complex environment.

Strengths, Weaknesses, and Limitations of the Study

An important feature of this grounded theory research design is its portability and application in other complexity research. The conceptual framework from Chapter Two provided a launching point to develop propositions and research questions. The framework provides a sound foundation and can be modified for future research for leadership in a complex environment.

Strengths

This study used grounded theory and specifically addressed the experiences of the workforce with enabling leadership and experiential learning to influence emergent outcomes and create organizational knowhow. The findings provided robust data that explicate insights into how to influence emergent outcomes and ultimately create organizational knowhow and are outlined in the themes and Uncertainty Breakthrough Model. A strength of the study, in general, is emphasizing the unique requirements of working in complexity.

The study's design offered data collection and analysis at different organizational levels, providing a comprehensive view of the research. The study also followed rigorous methods to ensure the theoretical saturation of ideas which improved the validity and reliability of the study. The study's output provided a roadmap to implement recommendations, which addressed three levels or units of analysis: individual practitioner, team, and organizational.

Weaknesses

There are no simple solutions for working in a complex environment; the study provided foundational approaches to navigating the complexity cloud. Naturally, there are limitations where specific dialogue was not pursued. This may have led to ancillary or other factors not addressed.

Limitations

The study followed the protocol described in Chapter Three and affirmed the anticipated limitations. The recruiting method began with the researcher selecting the initial interview group from personal knowledge of members' experience (purposeful sampling) in complexity. Next, the selection used the snowball approach to find candidates to check theoretical saturation and reduce bias. The recruiting process resulted in a pool of interviewees with a robust military aviation background and minimal experience outside that domain. This common background created similar organizational mindsets.

In the recruitment of the candidates, most of the interviews represented the program, finance, and technical domains of execution. The areas of funds appropriation and strategic resourcing were under-represented. This make-up of the sample created an emphasis on the engineering, finance, and program side of the enterprise. This concentration on the technical aspect of the business may not translate to other areas of the organization. Similarly, no new employees were interviewed in this study, so the perspectives of a newcomer or inexperienced person were not included.

For the most part, the participants' backgrounds did not include knowledge of the academic language used in the literature. However, the use of alternate phrases as outlined in Appendix F (interview guide and questions) bridged that gap and helped the interviews proceed smoothly. The interviewees were eager to be

interviewed and provided a depth of information. There was a strong interest in the area of study and the participants demonstrated a genuine and authentic openness which provided a measure of validity to the study.

The nature of qualitative grounded theory uses a relatively few numbers of participants when contrasted to large-scale quantitative inquiry. This limited number of interviews may not be generalizable or scalable to other areas in a general business environment.

Contribution to Applied Practice

The data collected in this study provided more profound insights into the challenges of working in a complex environment. The findings assert the theme uncertainty barrier consists of; poor coping in complexity, less than optimal communications and organizational trust, risk and failure avoidance, and over-reliance on non-applicable processes are critical to overcome and are not addressed in the literature. Additionally, the following two themes, empowered leadership and capability and organizational structure, are essential to success and are addressed in the model. The findings reveal that all three themes, uncertainty barrier, empowered leadership, capability and organizational structure, work in tandem and affect the ability to influence emergent outcomes and the creation of organizational knowhow.

Discussion of Future Directions

Future Research

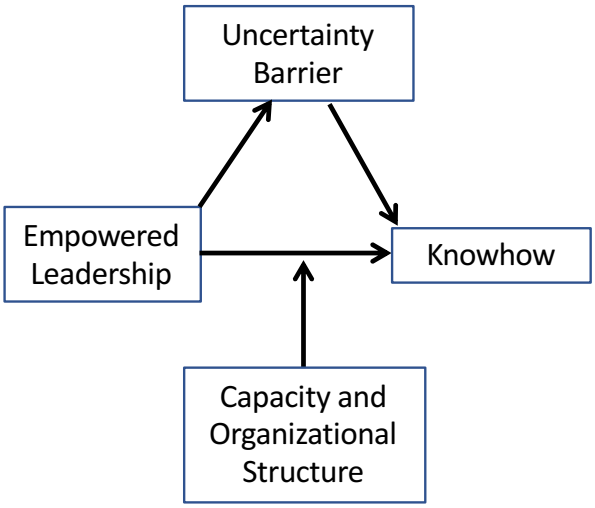
As stated earlier, understanding the organization's baseline capability to operate in a complex environment is the first step to identifying the gaps to focus the enterprise's resources. Gaps identification can be guided by the 12 recommendations described earlier. When organizational gaps are determined, a robust plan can be created to provide the workforce with the necessary components to function effectively in a complex environment. A future research area could be to identify the best way to assess initial conditions and determine to what degree the efficacy or effectiveness of assessing initial conditions. The future recommendation section describes a maturity model that can be adopted.

Figure 31 shows a proposed mediation and moderation analysis that could measure the direct effects of the uncertainty barrier and the indirect effects of capacity/organizational structure on competitive advantage. As noted in earlier sections, the literature shows a deficiency in extending complexity leadership theory to the logical goal of creating knowhow and therefore improve an enterprise's competitive advantage. Testing these relationships empirically is an important future analysis. A key factor in the research design for Figure 31 is the development of a schema to further conceptualize uncertainty. In order to measure the mediating and moderating effects for knowhow, the development and validation

of observable variables to operationalize the latent variable of uncertainty is necessary.

Figure 31

Mediating and Moderating Effects on Knowhow



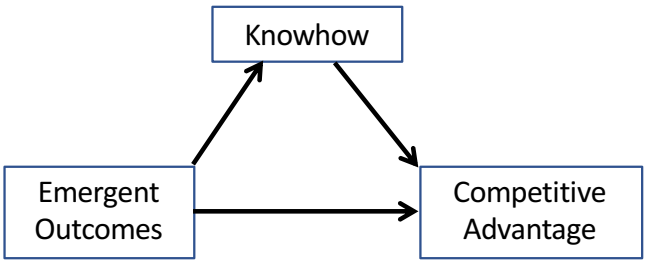
Adapted from Hayes (2018)

Proposed hypothesis: In a complex environment, to what degree does the uncertainty barrier mediate and the capacity/organizational structure moderate knowhow.

Figure 32 shows the proposed mediation analysis that will measure the effect of knowhow on competitive advantage. The research has determined that knowhow is an essential objective of the enterprise. Similarly, the literature describes sustainable competitive advantage as a critical enterprise goal, and it stands to reason that determining the effects of knowhow on competitive advantage is important.

Figure 32

Mediating Effects of Knowhow on Competitive Advantage



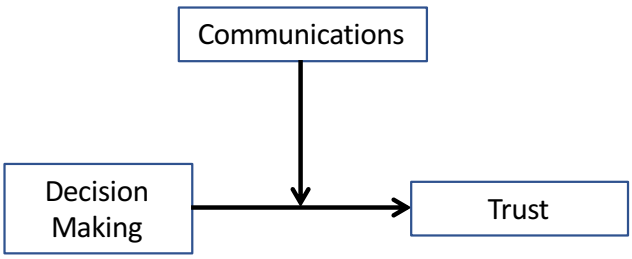
Adapted from Hayes (2018)

Proposed hypothesis: In a complex environment, to what degree does knowhow mediate competitive advantage.

Figure 33 shows the proposed moderation analysis measuring the size of the interaction between communications and trust. Chapter Four noted that further research can ascertain more specific detail on trust's direct and indirect relationships. Trust is a critical factor, and only progress can be made if trust in the organization is at the appropriate level.

Figure 33

Moderating Effects of Communications on Trust



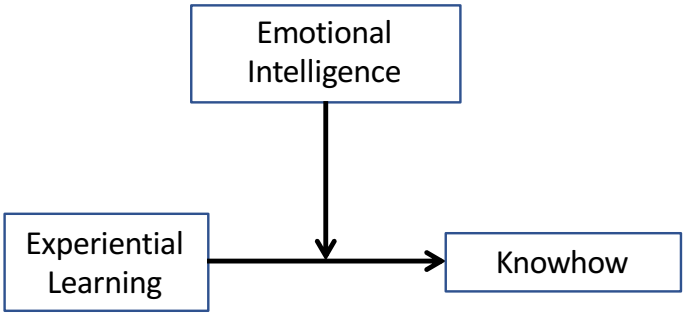
Adapted from Hayes (2018)

Proposed hypothesis: In a complex environment, to what degree does communication moderate trust.

Figure 34 shows the proposed moderation analysis that will measure the size of the interaction between emotional intelligence and knowhow. The data suggested the value of emotional intelligence and its contribution to the experiential learning cycle. Another potential research area would be determining how and to what degree emotional intelligence facilitates the experiential learning cycle. If emotional intelligence is determined to be a success factor, practitioners can focus on increasing it in the organization.

Figure 34

Moderating Effects of Emotional Intelligence on Knowhow



Adapted from Hayes (2018)

Proposed hypothesis: In a complex environment, to what degree does emotional intelligence moderate knowhow.

Further research could develop a more detailed methodology on mapping when different approaches apply in different environments. A guide or map on what to focus on in the Cynefin environments would help middle managers

operationalize their efforts. Furthermore, the gathering of real world case studies of effective and less than effective approaches would further aid the practitioners in effectively navigating complexity.

Future Recommendations

This study canvassed technical and program leaders and Naval Air Systems Command team members. There are opportunities to translate and test the concepts discovered in this grounded theory study in other businesses or domains. Potential business sectors such as Aviation Suppliers, Airlines, and Defense Industries are future areas to expand this research. Additionally, technical domains that routinely work in complex environments, such as systems integration, technical design, and general innovation companies, could benefit from further studies of enabling leadership and experiential learning in complex environments.

As stated earlier, understanding the baseline of the organization's capability to operate in a complex environment is an important first step to success. A recommended approach to conducting an assessment is using a maturity model to assess the conditions of the workforce to operate in complexity.

Table 17 shows an adaption of the Carnegie Melon University capability maturity model (CMM) across the top row. The CMMI was originally developed to assess the capability of software developers. It has since been used to assess capability or readiness in other areas. A maturity model aims to identify the level or stage of development in an organizational domain. This approach could be used to

assess organizational maturity or initial condition to operate in a complex environment and to validate the effectiveness of the deployed training upon completion.

Table 17

Capability Maturity Model (CMM) for assessment

	Performed	Managed	Defined	Measured	Optimized
Breaking Through Uncertainty Barriers		✓			
Exploiting Capability and Organizational Structure	✓	Develop Questions to assess level on maturity continuum			
Empowering Leadership Approach			✓		

Another area that further research could have a positive impact on success operating in complexity is a modeling and simulation approach. Multiple inputs and outputs can be designed from results obtained from the analysis of testing proposed in the future research section. A simulation designed using proposed variables can test the knowledge of the workforce and allow experimenting with minimum interruption in the business. Proposed variables could include: identification of complexity, risk-taking in complexity, effective communications developing trust, planning and budgeting, and capability development.

After the simulation model design is established, this process modeling approach can be used as a training tool to test the organization's maturity level for

effectively working in complexity. It stands to reason that after the development of an initial baseline and identification of gaps, the maturity model could be developed into a dynamic approach adapting to the changing environments. Furthermore, future research could show the practitioners how to layer the recommendations that were mentioned earlier in the chapter more definitively across the Cynefin quadrants. Future research on the mapping of recommendations in different Cynefin environments can aid in discovering more interdependencies not discovered in the initial investigation.

Summary and Researcher's Reflections

In conclusion, the individual research questions are answered below. The thematic answer to the core research question is summarized as well. The following section provides the researcher's reflections.

Research Question Summary

The answer to each of the RQs is noted below:

- RQ1-Enabling leadership influences emergent outcomes by creating the necessary leadership approach and supports organizational learning. It provides the emotional confidence that the team is performing correctly.
- RQ2-Experiential learning influences emergent outcomes by providing a sense-making learning mechanism that can be used at all organizational levels. The cycle encourages cognitive (and physiological) work effort to impact results.

- RQ3- Enabling leadership creates organizational knowhow by developing critical thinking and a learning organization that provides an effective feedback loop for collaboration.
- RQ4- Experiential learning creates organizational knowhow by accelerating the search for knowledge and uncovers more approaches to solve challenges. It increases the workforce's execution success by encouraging experimentation as part of the learning cycle.

The study answered the four research questions, summarized in this core or overarching research question: *In a complex environment: What are the experiences of leaders and team members who use enabling leadership and experiential learning to influence emergent outcomes, and how does it create organizational knowhow.* By unpacking the themes, the integrated answer to the core research question is: Navigating complexity is a dynamic or liminal journey that necessitates the synchronized use of enabling leadership and experiential learning.

In summary, synchronizing experiential learning and enabling leadership provides a practical approach for operating in a complex environment. Enabling leadership is the utility to create the environment, and experiential learning is the mechanism for effectively influencing outcomes to create organizational knowhow. Organizations must use enabling leadership and experiential learning with full development to ensure the enterprise can navigate the uncertainty barrier.

Researcher's Reflections

The theme of the uncertainty barrier opened the aperture in the study for a clear focus on the reasons for the unsuccessful influencing of emergent outcomes. Leaders and team members need to consider how to navigate through the uncertainty barrier to avoid becoming stuck and not understanding how to resolve it. The workforce in a complex domain will not understand the "why" of unsuccessful navigation through complexity unless they are given the leadership and learning focus, individual capability, and organizational infrastructure to function in that domain.

The literature describes developing and sustaining competitive advantage as a critical enterprise goal. Therefore a deficiency in complexity leadership theory is not extending emergent outcomes to the logical goal of creating knowhow and consequently improving an enterprise's competitive advantage. Similarly, the preponderance of literature on initial workforce development or competency training is individual-based. The data reflects that continuous and active learning should be team-based to excel in a complex environment. Organizations should consider changing how they train and recruit to add team-based training to their portfolio of complex environment competencies.

The research questions in the context of this grounded theory study allowed for detailed discussions in the interviews of the efficacy of using enabling leadership and experiential learning in a complex environment. The three themes,

breaking through uncertainty barriers, exploiting capability and organizational structure, and empowering leadership, are comprehensive and provide a complete overview of successfully navigating through complexity. The resulting themes and categories provided multiple findings, conclusions, and recommendations. The preponderance of the study's recommendations is equally applicable to other business environments or domains.

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Appendix A

Informed Consent Form

I am inviting you to participate in a research study. Please read this consent form carefully before you decide to take part in this study. This form provides the information you will need to make an informed decision. The researcher will answer any questions you have before you sign this form.

I. Title of the study: Complexity Leadership Theory; The influence of Experiential Learning Theory on Organizational Adaptability and Knowhow.

II. Purpose of this study: The purpose of this study is to explore the experiences of managers, team leaders and team members at all levels as they operate in a complex environment.

III. Procedures: *If you choose to take part in this study, the process is as follows*:

- I will send you e-mails (with follow up calls as necessary) to schedule and then confirm the agreed upon date, time and location for the interview. You will be asked to complete a questionnaire and provide background information.
- The interview will last approximately 60-90 minutes. You will be asked a series of questions regarding experiential learning, complexity, enabling leadership, and organization knowhow and adaptability in your work

environment. Your experiences and perceptions of enabling leadership, experiential learning, and organizational knowhow will be important to the study.

- You will be offered the opportunity to participate in any follow-on sessions to discuss the findings. A final analysis will be completed and published in the dissertation. Findings may also be published in articles as well as presented at conferences or other educational programs.
- At no time will you be identified in the report. Pseudonyms will be used for each participant, (e. g. Executive 1, Team Leader 3, Team Member 5).

IV. **Audio Recordings:** The interview will be recorded and the researcher will take hand written notes during the interview. The audio recordings will be transcribed and you will be offered an opportunity to review the transcript and make any corrections. The recordings will be deleted and destroyed upon completed transcriptions. The transcriptions will be uploaded into the NVivo application for analysis using pseudonyms for each participant.

V. **Potential risks of participation:** There are minimal risks to take part in this study. Your confidentiality will be protected. The activities for this study are within the standards associated with a normal workday.

VI. **Potential benefits of participation:** You will not get any direct benefits from taking part in this study. As a result of your participation, you may benefit from reflection of your experiences and gain a deeper insight into

operating in a complex environment. The findings will contribute to the existing literature on complexity leadership.

VII. Compensation: Participation in this study is completely voluntary and there will be no compensation offered.

VIII. Confidentiality: Your identity will be kept confidential to the extent provided by law. You may be quoted using a pseudonym in published materials without reference to possible identifying information. The researcher will maintain the data in a password protected system with sole access. The pseudonym or unique code for each participant will be stored on a password protected USB drive and locked away separately from the location of the transcripts where the researcher has sole access.

During the interview, participants will not be referred to by name and reminded not to refer to their leader or team by name. If during the interview, participants refer to their respective team or leaders' names, those will be redacted from any transcript. Your participation will be completely anonymous, on one inside or outside the organization will know you participated.

In rare circumstances, authorized personnel (e.g. institutional review board) may request to see research information to ensure proper procedures were followed. Research records will be kept confidential and the audio

tapes will be destroyed upon successful completion of the dissertation defense.

IX. **Voluntary participation:** Your participation in this study is completely voluntary. There is no penalty for not participating. You may refuse to answer any of the questions asked of you.

X. **Right to withdraw from the study:** You have the right to withdraw from the study at any time without consequence.

Whom to contact if you have questions about the study:

Principal Investigator: Bruce Rideout
(301) 875-7376 brideout2017@myfit.edu
Dissertation Committee Chair: Dr. Abram Walton
(321) 674-7494 awalton@fit.edu

Whom to contact about your rights as a research participant in the study:

Dr. Jignya Patel, IRB Chairperson
Florida Institute of Technology
150 West University Blvd, Melbourne, Fl 32901-6975
FIT_IRB@fit.edu (321) 674-7391

Agreement:

I have read and understand the procedure described above. I voluntarily agree to participate in this procedure and I have read this document.

_____ _____

Participant Signature Date

_____

Participant's (printed) name

_____ _____

Principal Investigator Signature Date

_____

Principal Investigator (printed) name

Appendix B

Invitation e-mail to Interview

Subject: Invitation to participate in doctoral dissertation research

Enclosure: Informed Consent Form

As you may know, I am a doctoral student at the Florida Institute of Technology conducting a study for my dissertation. This research will explore experiential learning theory, complexity leadership theory and organizational knowhow. As an enterprise member who works in complex environments, your perspective makes you an excellent candidate to be interviewed to further understand how to improve organizational knowhow.

The information gathered from this research may produce a better insight into more effective emergent outcomes from complexity. We may discover new frameworks that help us understand how to work more effectively in complexity. Your participation is completely voluntary, and you may stop at any time. The interview is strictly confidential and should not take up too much time. I am required to ask that you sign and return the approved consent form (enclosed) indicating your understanding and agreement to participate in the study. Thank you for your consideration and hope you decide to participate.

Bruce Rideout
Mobile: (301) 875-7376
Brideout2017@myfit.edu

Appendix C

Confirmation e-mail to interview

Subject: Confirmation to participation in doctoral dissertation research

Enclosure: Pre-Interview Questionnaire

Thank you for agreeing to participate in an individual interview as part of my dissertation research. This research explores experiential learning theory, complexity leadership theory and organizational knowhow and adaptability. Your participation is completely voluntary, and you may stop at any time. The interview is strictly confidential and should not take up too much time. I have enclosed a pre-interview questionnaire for you to fill out and return prior to the interview. I also ask if you could send a recent resume or biography so I can become familiar with your background. These records will be destroyed at the completion of the research.

If you have any questions that you would like to discuss prior to the interview I can be reached at Brideout2017@myfit.edu or (301) 875-7376. I look forward to scheduling our session, please let me know your availability during the week of _____. I value your participation and appreciate your willingness to be part of my study.

Bruce Rideout
Mobile: (301) 875-7376
Brideout2017@myfit.edu

Appendix D

Pre-interview Questionnaire

Demographics:

Name_____

Education: Please indicate your highest level of education completed.

__ Associate Degree or some College __ Bachelor's Degree

__ Master's Degree __ Doctorate Degree

Position: Please indicate your current position within the organization.

__ Team member __ Manager

__ Team Leader __ Executive

How long have you been in your current position?_____

In what area or domain do you work?_____

Please indicate your gender:

__ Male __ Female

Are you at least 21 years old:

__ Yes __ No

Please indicate the years you have been employed by your current organization:

__ 1 year or less < 5 years __ at least 5 years < 10 years

__ at least 10 years < 15 years __ at least 15 years < 25 years

__ at least 25 years < 30 years __30 years or greater

Definitions

Complex Environment – The interaction or interdependencies of a system's parts are unpredictable; the system cannot be understood by only analyzing its elements.

Enabling Leadership – Individual (leader or team member) who interfaces and coaches' people in the two organizational systems: operational and entrepreneurial. Actively aids in creating knowhow and organizational adaptability through emergence and leveraging networks.

Experiential Learning – The Learning process that is more than knowledge delivery; it is the creation of knowledge through grasping and transforming from cognitive work effort. Experiential Learning is significantly more than on the job training (OJT) or 70-20-10 concept. Four Modes: experiencing, reflecting, thinking, and acting.

- Grasp - abstract conceptualization, concrete experience;
- Transform - reflective observation, active experimentation

Screening Questions - This study seeks to explore the experiences of participants who have either used or observed experiential learning and enabling leadership in complex environments.

- Have you worked within what could be considered a complex environment?

  __ Yes __ No

- Have you worked with or observed an enabling leader?

  __ Yes __ No

- Have you worked as an enabling leader?

  __ Yes __ No

- Have you used any part of the experiential learning cycle?

  __ Yes __ No

- Have you observed an organization endeavor to develop its knowhow?

  __ Yes __ No

- Have you observed an organization endeavor to develop its adaptability?

  __ Yes __ No

Appendix E

Interview Protocol and Script

Hello, my name is Bruce Rideout. Thank you for your time, I appreciate you talking to me today. The purpose of this interview is to explore your experiences in your organization regarding complexity leadership, experiential learning, and how it impacts enterprise knowhow. All the information that you provide today will remain confidential. Your name will be given an alias or code and no identifying information will be included as part of this study. You do not need to name any person or project title in this inquiry. If at any time you would like to take a break, let me know.

I would like to reserve the privilege of interviewing you again to clarify concepts as the study progresses. I will ask you who else I should interview for this research study and ask for your suggestions them at the end of the session.

I plan to record the audio of this interview to ensure the accuracy of the data. Once the interview is complete, the audio will be saved on a secured drive. The audio file will be transcribed. You will have the opportunity to review the transcript for accuracy. Before I start the interview questions, I would like to confirm your consent to conduct and record the interview. I confirm that I have the signed consent form. After your permission, I will start the interview (begin recording).

Appendix F

Interview Guide and Questions

The pre-interview questionnaire informed the investigator prior to the interview. The interview approach is adaptive and can mitigate bias through dialogue (clarifying questions). Identify areas where enabling leadership was practiced and experiential learning theory was used. Ask about their experiences and outcomes; determine what impact it had on the organization. To control any participant's limited knowledge of academic language; use replacement words or phrases for theoretical concepts in complexity leadership theory and experiential learning theory. This research focused on leaders and team members' experiences while working in a complex environment.

Definitions

Complex Environment – The interaction or interdependencies of a system's parts are unpredictable; the system cannot be understood by only analyzing its elements.

Enabling Leadership – Individual (leader or team member) who interfaces and coaches' people in the two organizational systems: operational and entrepreneurial. Actively aids in creating knowhow and organizational adaptability through emergence and leveraging networks.

Experiential Learning – The Learning process that is more than knowledge delivery; it is the creation of knowledge through grasping and transforming from cognitive work effort. Experiential Learning is significantly more than on the job training (OJT) or 70-20-10 concept. Four Modes: experiencing, reflecting, thinking, and acting.

Grasp - abstract conceptualization, concrete experience;

Transform - reflective observation, active experimentation

Research Questions:

This research focused on leaders' and team members' experiences working in a complex environment. Enabling leadership supports adaptive space which is fluid or transitory and is initiated by organizational pressures and tensions between the exploratory and exploitation sides of the business (Uhl-Bien & Arena, 2017). Experiential learning theory posits that the learning process that is more than knowledge delivery; it is the creation of knowledge through grasping and assimilating through cognitive work effort (Kolb, 1984).

RQ1. *In complex environments, what are the experiences of leaders and team members who employ enabling leadership in order to influence emergent outcomes?*

RQ2. *In complex environments, what are the experiences of leaders and team members who employ experiential learning in order to influence emergent outcomes?*

RQ3. *In complex environments, how does enabling leadership influence the ability to create knowhow in the organization?*

RQ4. *In complex environments, how does experiential learning influence the ability to create knowhow in the organization?*

Synonyms or alternate phrases for:

Complex or Complexity - problems with no linear cause and effect. The interaction of a system's parts is unpredictable; The system cannot be understood by only analyzing its elements.

Experiential learning - the learning process that is more than knowledge delivery; it is the creation of knowledge through grasping and transforming from cognitive work effort.

Emergent outcome - directional influence of independent agents that creates a new level of order

Enabling or Enabling Leadership – Team member or leader who creates the environment for operational and entrepreneurial leaders to leverage each other for successful emergent outcomes.

Adaptive Space - collaborative zone where networks and agents can accelerate problem solving

Interview Questions

Initial Questions:

1. Tell me about your role in the organization?
    - ◊ Probe for: level of network interactions
2. Describe what is it like working in a complex environment?
    - ◊ Probe for: do pressures create ordered or adaptive responses
    - ◊ Probe for: unpredicted outcomes (emergence)

Intermediate Questions:

3. What are the *most successful* experiences you know of where leaders or team members employed **enabling leadership** to influence emergent outcomes?
    - ◊ Probe for: how problems are framed and solutions generated
4. What are the *least successful* experiences you know of where leaders or team members employed **enabling leadership** to influence emergent outcomes?
    - ◊ Probe for: obstacles, causes, and consequences
5. What are the *most successful* experiences you know of where leaders or team members employed **experiential learning** to influence emergent outcomes?
    - ◊ Probe for: how problems are framed and solutions generated

6. What are the *least successful* experiences you know of where leaders or team members employed **experiential learning** to influence emergent outcomes?
    - ◊ Probe for: obstacles, causes, and consequences
7. To what degree did **enabling leadership** increase the ability to create knowhow in the organization?
    - ◊ Probe for: central phenomenon or process
8. Why/How was **enabling leadership** able to increase the ability to create knowhow in the organization?
    - ◊ Probe for: What helped; What hindered?
9. What component or attribute of **enabling leadership** was absent, that if present, would have added to the increase of knowhow in the organization?
    - ◊ Probe for: Specific attributes, behaviors, practices
10. To what degree did **experiential learning** increase the ability to create knowhow in the organization?
    - ◊ Probe for: central phenomenon or process
11. Why/How was **experiential learning** able to increase the ability to create knowhow in the organization?
    - ◊ Probe for: What helped; What hindered?
12. What component or attribute of **experiential learning** was absent, that if present, would have added to the increase of knowhow in the organization?

- ◊ Probe for: central phenomenon or process

Optional Questions:

13. What strategies do you use to operate or cope in a complex environment?
    - ◊ Probe for: central phenomenon or process
14. How does your organization gain knowhow and adaptability?
    - ◊ Probe for: specific observations
15. What do you think are the most important ways to create organizational knowhow and adaptability?
    - ◊ Probe for: specific interactions or conditions that influence success

Wrap-up Questions:

16. Is there anything else you would like to share to help me better understand your experiences with complexity, enabling leaders, experiential learning, and creating organizational knowhow?
    - ◊ Probe for: further clarity on specific key points
17. Is there anything else that you would like to share that occurred to you during the interview?
    - ◊ Probe for: what was new discovery for you
18. Are there any questions you would like to ask me?
19. What personal discovery did you have during this interview process?

Do you have any additional interview participant names to suggest?

Appendix G

Institutional Review Board approval

Florida Institute of Technology
Institutional Review Board

Notice of Exempt Review Status
Certificate of Clearance for Human Participants Research

Principal Investigator:	Bruce Rideout
Date:	May 24, 2022
IRB Number:	22-055
Study Title:	Complexity Leadership Theory: The Influence of Experiential Learning Theory On Organizations

Your research protocol was reviewed and approved by the IRB Chairperson. Per federal regulations, 45 CFR 46.101, your study has been determined to be minimal risk for human subjects and exempt from 45 CFR46 federal regulations. The Exempt determination is valid indefinitely. Substantive changes to the approved exempt research must be requested and approved prior to their initiation. Investigators may request proposed changes by submitting a Revision Request form found on the IRB website.

Acceptance of this study is based on your agreement to abide by the policies and procedures of Florida Institute of Technology's Human Research Protection Program (http://web2.fit.edu/crm/irb/) and does not replace any other approvals that may be required.

All data, which may include signed consent form documents, must be retained in a secure location for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Access to data is limited to authorized individuals listed as key study personnel.

The category for which exempt status has been determined for this protocol is as follows:

3. Research involving benign behavioral interventions in conjunction with the collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording if the subject prospectively agrees to the intervention and information collection and at least one of the following criteria is met:
    a. The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; or
    b. Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or
    c. The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and IRB can determine if there are adequate provisions in place to protect the privacy of the subjects and confidentiality of the data.

Appendix H

Authority to Conduct Research

NAVAIRWARCENDIVINST 3900.1 (Series)

AUTHORIZATION TO COMMENCE HUMAN SUBJECT RESEARCH

1. Protocol Title:	2. Protocol Number:
Complexity Leadership Theory: The Influence of Experiential Learning Theory on Organizations	UP-20-01140

3. Principal Investigator (PI):	4. PI's Phone Number:	5. PI's Email:
Bruce W. Rideout	(301) 875 - 7376	brideout2017@my.fit.edu, Bruce.w.rideout.civ@us.navy.mil

6. PI's Department:

NAVAIR PEO (CS)

7. Research Summary:

This study seeks to explore and understand the experiences of employees who work in complex environments. The study will embark on an examination of complexity leadership theory to see if emergent outcomes can be influenced by enabling leadership using experiential learning theory. The researcher will look for cross walks between effective patterns and behaviors of enabling leadership to see if experiential learning influenced emergent outcomes.

The objective is to use a Grounded Theory Qualitative Approach to construct a practical theory, or conceptual framework, to provide applicable tools, or techniques that can be fed into leadership, training and education.

8. Institutional Review Board (IRB) Approval Date:	9. Risk Level:	10. Category:
Jun 9, 2022	Exempt	None

11. IRB Chair Signature: COLEMAN.STEPHEN.MICHAEL.1 [redacted] Digitally signed by COLEMAN.STEPHEN.MICHAEL [redacted] Date: 2022.06.09 08:26:30 -04'00'

12. Date: Jun 9, 2022

INSTITUTIONAL OFFICIAL REVIEW

13. Institutional Official: ☑ Approved ☐ Disapproved

14. Institutional Official Signature: [signature]

15. Date: 6/16/22

16. Comments:

Appendix I

Grounded Theory Quality Evaluation

1. Does the study focus on a process, an action, or an interaction as the key element in the theory and consider the steps that unfold when studying the central phenomenon?
2. Does the coding process organize the data to build a larger theoretical model while alternating data collection with data analysis?
3. Is the theory presented in a creative manner? Does it use figures or diagrams where appropriate?
4. Does it advance a proposition that is connected with the categories in the theoretical model and refer to the emerging picture in the current study as a springboard for potential future research?
5. Is memoing used throughout the process of research? Are the recording methods used described in the conduct of the study?
6. Does the researcher display evidence of reflexivity or self-disclosure about stance taken in the study? Is reflexive thinking documented in a research journal or field notes.

Adapted from: (Creswell & Poth, 2018, p. 277)

Appendix J

Table of Codes, Sources, References and Descriptions (Code Book)

Codes	Description	Sources	References
Active Listening	Proactively assimilating information	3	7
Adaptive Environment	Flexible and information sharing atmosphere	5	11
Agility in Work	Proactive ability to shift or flow to work as needed	4	6
Alignment & Productivity	Harmony for mutual support for productive results	4	8
Analyze the problem	Dedicated time to study the issue's complexity	2	3
Anxiety & Training	Reducing anxiety through training	2	4
Asking the right Questions	More than technical questions, investigating other points of view impacted by decisions or efforts	2	5
Breaking old Patterns	Moving past old thinking or procedures, not confined by old approaches	3	6
Bias and Talent	Understanding the workforce's prevailing talent and biases.	3	3
Bridging Networks	Bringing different nodes in a network together	6	7
Building a Team	Forming and sustaining the cross functional talents of people into higher functioning groups	2	7

Codes	Description	Sources	References
Building Trust	Developing the two-way confidence in the between leaders and team members	11	20
Coaching and Mentoring	Actively developing the workforce through relationships with knowledge sharing and guidance	3	5
Collaborative Learning	Cooperation across organizational boundaries to facilitate learning	4	5
Communication, Internal & External	Passing information within and outside the team	12	15
Compassion for Employees	Caring for team members and their personal development	2	3
Complicated vs. Complex	Recognizing the difference between a domain that exhibits cause and effect relationships and a domain that presents unpredictability and unknowns.	7	16
Confidence and Risk Taking	Faith or belief that one can take risks in the organization	3	5
Conflict Resolution	Methods and processes used to resolve differences	2	2
Control, Loss of Control	The ability or lack of ability to directly influence choices that affect convergent or divergent thinking	1	2
Coping in Complexity	Degree of how the workforce handles unpredictability and the unknowns in complexity	21	34
Creating new Opportunities	Providing the workforce different situations to grow their experience	3	3

Codes	Description	Sources	References
Critical Thinking	Structured process that uses analysis of available facts to derive logical conclusions in problem solving	2	5
Data and Assumptions	The understanding of the available data and what assumptions were made to derive the data	3	3
Dealing with Emergence	Coping with the unknown and unexpected outcomes	4	6
Dealing with Tensions and Pressure	Coping with internal and external forces that impact the operating environment	4	4
Decision Making	Conclusions or deliberations designated for action with varying degrees of timing and effectiveness	12	21
Developing Knowhow	Creating knowledge that results in a sustainable capability of an organizational undertaking	2	6
Developing Skills	Creating the ability in the workforce to accomplish tasks or activities.	1	1
Diverse and Inclusive	To include differing opinions and knowledge to the team	3	4
Driving Innovation	Introducing or advancing new methods or products	6	8
Driving Results	Actions or outcomes created by pushing performance and decision making.	2	5
Embracing failure	Seeing failures as a path to success and the opportunity to improve	4	6

Codes	Description	Sources	References
Emotional Intelligence and Energy	Perceive, understand, and leverage emotions of the workforce or teams	2	5
Empathy for Workforce	Understanding the feelings and challenges of different levels in the workforce	2	2
Empowerment and letting go	Authority or power relinquished to others in the organization	3	4
Enabling leadership	Leaders or team members that foster dynamic relationships between the operational and entrepreneurial sides of the business	18	32
Engaging Employees	Employees that demonstrate an active and positive relationship with the organization	3	3
Exercising Power	Using the organic or delegated authority to achieve a result	2	4
Exercising Reflection	The active consideration or serious thought about an action or outcome	2	4
Existing Roles	Traditional roles or position descriptions.	1	2
Experiencing Resistance	Opposition to different approaches or efforts outside an orderly process	5	6
Experiential Learning	Grasping and transforming knowledge gained by cognitive work effort	17	23
Exploitation of Resources	Gaining benefit from existing organizational resources	2	3

Codes	Description	Sources	References
Failure and Trusting the Outcome	Failing to act or achieve goals by not relying on or trusting the outcome	2	2
Fearing Organizational Reaction	Organizations penalize failure, and consequently the workforce is less inclined to task chances or assume risks	4	6
Feedback Loops	Real time information or reaction on how well something performed	2	3
Flexibility and Empowerment	Delegating the flexibility and authority to adapt to the situation or problem	2	5
Focus on low Priorities	Spending energy on lower level efforts	1	2
Framing the Problem	How leaders approach describing the problem to solve and the guidance given	12	21
Frustration & Needed Change	Leaders are not making the straightforward changes, resulting in the workforce showing frustration	2	3
Hiring Approach	Hiring focus: enabling skills instead of purely technical abilities. Consider new leaders from outside the existing domain	2	2
Human Capital	Understanding and making use of the intrinsic abilities of leaders and team members for the best organizational outcomes	3	3

Codes	Description	Sources	References
Immersion and Learning from Experience	Deep involvement in assignments that provide experiential learning	7	15
Influence and Authority	Using influencing skills when working outside one's authority or span of control	3	3
Influencing Outcomes and Emergence	Providing real time effort to modify results while understanding emergence is unknown	11	27
Initial Conditions	Understanding how a starting place impacts the outcome	5	9
Intentional Learning	Deliberate or planned learning efforts	3	3
Interdependencies and Effectiveness	Understanding how interdependencies impact potential outcomes	3	3
Knowhow	The ability to accomplish a task or activity or perform a function.	13	20
Learning Space	Provide the right and left learning limits especially as it relates to experiments	2	3
Lessons Experienced or Learned	Highlighting the difference between describing an experience and truly applying the learning	2	2
Levels of Authority	Various limits for different roles to exercise empowerment	2	3
Leveraging Expertise	Using skills internal and external to the organization	2	2

Codes	Description	Sources	References
Leveraging Networks	Using contacts and interconnected people to introduce new ideas	8	15
Managing Change	Understanding the tempo and need for change	2	4
Mental Model, Fixed & Variable	A person's intuitive perception of the way things work. Described as fixed (values) and variable (new approaches)	1	2
Operating Environment	The norms of how work is accomplished in the organization	3	3
Organizational Culture	An understanding or having insight into the shared assumptions that are needed to cope in the organization	5	7
Organizational Simplicity	Reduced levels of decision authority and simpler lines of accountability	2	2
Patterns of Interactions	Individual, group, or organizational interactions and patterns of cooperation	4	5
Workforce Limitations	Level of development or lack thereof of leaders or team members	2	3
Performing Tasks	Undertakings that require knowhow as opposed to just knowledge	1	1
Planning to Plan	Planning guidance before developing a detailed plan	1	3
Problem solving	Focused effort on delivering a result that fixes an issue	3	3

Codes	Description	Sources	References
Providing for a Voice	An avenue of communication that can be heard at multiple levels	1	1
Providing Leadership Direction	Converting external direction to provide internal guidance to the team	2	7
Pulling to Order	The organization's reaction to emergence or unknowns where the leaders require the workforce to use traditional approaches and processes	6	18
Reacting to Unexpected Responses	How the organization reacts to agent responses that were not expected	3	3
Recognizing Complexity	The state of how well the workforce recognizes complex environments	7	15
Reductionism & Problem Solving	The tendency to subdivide an issue and not view how it interacts as a system during problem solving	2	3
Replicate from Experience	Recognizing patterns to leverage previous experiences	2	5
Responding to Failure	Leadership's reaction to failure and how it impacts the workforce	3	3
Rigid Planning & Agility	Efforts to balance the policies and statutes required while being agile in execution	1	1
Risk Taking & Leadership support	How the leaders view their role in risk taking and the support of the organization	12	24
Second and Third Order	Deeper than unexpected outcomes, what further	1	1

Codes	Description	Sources	References
Consequences	impacts can occur		
Self-correcting Processes	When allowed to fully develop, like things sort themselves out	2	4
Stress	Stressed by decisions made in this organization with outcomes that are very significant	1	3
Summary Statements	An approach on how to view progress and guide the workforce	1	1
System View & Layers	Layers of policy that impede a system view of the problem to be solved or product to be developed	3	4
Team Development	Team training to augment current competency individual training	2	5
The Right Measurements	Measurement systems – total output versus reductionist metrics approach	1	2
Traits of Complexity	Unpredictability, uncertainty unknowns, and emergence	2	2
Trusting the team	Confidence that the training and guidance given a team would provide a road to trust	3	5
Uncertainty & Work Approach	Uncertainty creating the need for different processes and work approaches	4	8

Codes	Description	Sources	References
Understanding Key Staff Members and their Roles	Emphasis on learning the strengths and development needs of your staff and the roles they have	1	1
Understanding the Goal	Singular goal or outcome-team members are busy (active) but less outcomes (action) are delivered	2	4
Unifying Vision	Top down view of the organizational goal	1	3
Using Outside Agents	Seeking outside knowhow and experience	1	1
Using Facilitation	Using consensus building with team work	2	4
Using Influence	Leveraging convincing skills to replace traditional authority	1	3
Utilizing Teams	Using teams versus a series of individual work efforts	2	4
Variation in Sense Making	Recognition that different domains see the world in different ways	1	2
Working in Complexity	Constant planning process and allocation of effort. Constant flow of new challenges	2	3
Worry About Unpredictability	Complexity can drive outcomes that are not predictable and venture into a potentially unsafe realm	2	2

Appendix K

Table of Categories, Sources, References and Representative Excerpts

Categories	Sources	References	Representative Excerpt
Capability and Development	13	44	*"All of the success I've ever been affiliated with, has been 100% enabled, by learning about and building capability in the teams...It's intuitively not easy for people to grasp, but nobody seems to budget time to focus on the attraction and the nurturing of their teams." (EM1)*
Communication and Trust	22	76	*"The currency with which we operate with our people is trust." (TF2)*
Coping with Complexity	22	59	*"It wasn't about the conditions that I was creating or only the acceptability of them being wrong, it was dealing with their own idea of what good work represents, that was the real challenge." (EM5)*
Critical Thinking	10	44	*"In a complex environment, if you understand or mastered the art of critical thinking, and planning, then you can navigate a complex environment much quicker." (EM2)*
Leadership Approach	22	97	*"You don't get to the knowhow without having leadership that is willing and able to guide the workforce in order to understand how to deliver on an outcome." (MM9)*
Learning Approach	14	59	*"I think we experience and act more than we reflect and think. We act without thinking." (EF1)*

Categories	Sources	References	Representative Excerpt
Organizational Environment	18	60	*"We've created these organizations for a very predictable, complicated world in that the rewards, and career paths, all these things are designed for a world of expertise." (MM3)*
Pulling to Order	14	57	"Y*ou're just fighting the culture, and the order the whole entire time, because people are fearful to go outside of what box they perceive they're supposed to stay in." (MF1)*
Purposeful Alignment	15	65	*"If all can agree that we are going to align and come together in a facilitative environment, adhere to the norms and the values of working using that approach, then we need to agree that there is a common challenge or need and we're going to work through that using [complex] mechanisms that we are not accustomed to." (EF2)*
Risk and Failure	16	57	*"Working in a complex environment can actually be almost terrifying...even if you're working in a totally safe office environment. Because if there are complexities that could drive outcomes that you can't predict." (EF3)*
Structure and Planning	12	42	*"If you are in a position where you can affect the structure of the organization, keep the structure as clean and simple as you can. Because the work is complex, the organization shouldn't be complex, and it shouldn't be hard for people to try to figure out how to navigate through an organization." (EF2)*