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The Impact of Adaptive Leadership Capacity on Complex Organizational Health Systems Outcomes

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2017

Abstract

The Impact of Adaptive Leadership Capacity on Complex Organizational Health Systems Outcomes

by

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JD, Cooley Law School, 1991

MS-N, Andrews University 1984

BSN, Nazareth College, 1973

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Services

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Abstract

Nonlinear and chaotic environmental changes characterize health services organizations as complex adaptive systems in which leaders must exercise non-traditional leadership practices to succeed. Health services leaders who have learned and implemented traditional linear management approaches are ill prepared to lead in complex environments. This study tested complexity and adaptive leadership theories of agility and resilience in complex health systems. The purpose of this quantitative cross-sectional internet-based survey study was to quantify relationships between independent variables of agility and resilience and secondary dependent variables of financial, patient satisfaction, quality and human capital outcomes. The impact of turbulence was also examined. Included sample data were collected from 533 employed healthcare leaders using probability-based systematic proportional random sampling methods and were analyzed through correlation, regression, one-way analysis of variance, *t* tests, and Hayes PROCESS statistical analytics. Agility correlated with and predicted patient satisfaction outcomes. Resilience independently correlated with and predicted financial performance and patient satisfaction outcomes and augmented the correlation and predictability of agility. Agility and resilience cumulatively predicted financial performance outcomes. Turbulence was related to agility, resilience, financial performance, and patient care quality outcomes and mediated relationships with financial and patient care quality outcomes. Health services leaders may apply these findings to promote social change through the implementation of the agile and resilient leadership approaches necessary to achieve organizational performance outcomes that benefit vulnerable populations.

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Dedication

This dissertation is dedicated with humble appreciation to my husband Tom, son Bryan, and daughter Jennifer in recognition of their unwavering support, tolerance, patience, and encouragement throughout my educational and dissertation journey.

Acknowledgements

The most significant lesson learned during the dissertation process is that successful completion is dependent upon a community of expertise, action and support. While this dissertation is a product of a community rather than solitary process, individual recognition of all contributing individuals is beyond the scope of this acknowledgement. Examples include the hundreds of health services leaders who contributed their valuable time and insights through completion of the internet survey for this study and the individuals who willingly provided secondary organizational dependent data outcomes. However, individuals who merit specific acknowledgement exist.

I would like to express my sincere thanks to Mr. Mike Hall and Mr. Dan Mondoux who willingly provided technical support and advice upon request irrespective of the time. The outstanding sample size representing multiple levels of leaders throughout the United States would not have been attained without the unwavering time, sponsorship and support of my organizational sponsor. As a member of my dissertation committee, Dr. Susan Nyanzi provided expertise and advice that strengthened the caliber and substance of this dissertation. As an additional dissertation committee member, Dr. Vasileios Margaritis provided time and valued feedback that enhanced the professional quality of this dissertation. Also appreciated was the time provided by the committee URR, Dr. Mehdi Agha. Of special note is the expertise, time, advice and patience persistently shared by my dissertation chairperson, Dr. Jeff Snodgrass who served as an

impactful model and advisor. Completion of this dissertation would not have been possible without his guidance. Finally, many thanks to my husband Tom for his compassion and support and unwavering belief that accomplishment of this dissertation was feasible during the times when completion seemed far beyond my reach.

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Chapter 1: Introduction to the Study

Introduction

Nonlinear, unpredictable, and chaotic changes within the current health services system require that health care organizations implement non-traditional, evolving, and adaptive leadership practices to ensure the achievement of desired organizational outcomes (Geer-Frazier, 2014; Malloch & Melnyk, 2013; Pipe et al., 2012). The study and validation of effective leadership practices within the complex health services environment remains in its early stages (Dinh et al., 2014; Hannah, Uhl-Bien, Avolio, & Carvarretta, 2009; Hempe, 2014; Junior, Pascussi, & Murphy, 2012). Yet, the significant impact health services structures and processes have on patients who pursue services during periods of vulnerability indicates the value of research that defines the leadership and organizational practices necessary to ensure effective patient- and community-based service delivery outcomes (Dai, De Meuse, & Tang, 2012; Junior et al., 2012; Pipe et al., 2012; Stefl, 2008).

In this chapter, I discuss the context of my research which was aligned with the aforementioned social imperative. Next, I present study's background to introduce the environmental influences and leadership practices which define its purpose, intent, and significance. A problem statement and statement of the study's purpose follow, which are congruent with the nature of the study and its research questions and hypotheses. Additionally, I introduce the theoretical framework for this study, and present an overview of the theories that are aligned with complex adaptive systems (CAS) and complexity leadership theory and practices. This framework precedes my description of

the nature of the study. Definitions, assumptions, scope, delimitations, and limitations add further clarity to this study's purpose and intent. Finally, I articulate the social change contributions of this study's findings.

Background of the Study

The current health care landscape has been characterized by chaotic, complex, diverse, and urgently changing phenomena which challenge health services systems and leaders to demonstrate unprecedented skills and develop new processes in response to complex changes (Corazinni et al., 2014; Geer-Frazier, 2014; Malloch & Melnyk, 2013; Pipe et al., 2012; Stefl, 2008). Changes such as increasing costs without commensurate enhancements in patient care quality, perceived organizational inefficiencies, disproportionate requirements for costly long-term and chronic care services, technological shifts, and constrained financial and workforce resources have required the exercise of leadership approaches that effectively achieve outcomes within these complex systems of change (Malloch & Melnyk, 2013; Pipe et al., 2012; Stefl, 2008; Weberg, 2012).

Environmental responses to these changes have included (a) redesigned regulatory, clinical, medical, insurance, and reimbursement criteria; (b) reduced reimbursement opportunities for health services providers; (c) increasingly complex information systems and technology; (d) an evolving regulatory and public emphasis on patient- and population-based satisfaction, quality, and safety outcomes; and (e) a regulatory focus on culture and the promotion of new models of population- and person-centered care (Centers for Medicare and Medicaid Services [CMS], 2015a, 2015b, 2016;

Corazinni et al., 2014; Junior et al., 2012; Malloch & Melnyk, 2013; Pipe et al, 2012; Stefl, 2008; United States Department of Health and Human Services, 2015; Weberg, 2012). This responsiveness is congruent with complex adaptive systems (CAS) that are comprised of interconnected systems and processes which evolve, self-organize, and emerge in constant flux with nonlinear dynamic changes and extreme events (Edson, 2012; Hannah et al., 2009; Stefl, 2008). Within CAS, nonlinear administrative, adaptive, and enabling complexity leadership practices have been posited as facilitators of successful organizational outcomes (Akgun, Keskin, Byme, & Ilhan, 2014; Jordon, Lunham, Anderson, & McDaniel, 2010; Pipe et al., 2012; Psychogios & Garev, 2012).

Historically, health services leaders have learned and achieved successful outcomes through linear educational processes and experiences within predictable environments of change. Thus, they are ill prepared for leadership roles within complex adaptive systems of change (Junior et al., 2012; Pipe et al., 2012). Researchers have advanced complexity leadership as an approach aligned with CAS. Complexity leadership js a multidimensional approach achieved through enabling adaptive practices that are exercised within individual, group, and organizational structural, process, and relationship levels (Dinh et al., 2014; Edson, 2012; Ford, 2009; Hazy & Uhl-Bien, 2012). Despite the apparent existence of complexity and the ongoing challenge of aligning leadership practices that are responsive to CAS with the health services environment, research that quantifies adaptive complexity leadership effectiveness is only in its early stages (Dinh et al, 2014; Hannah et al., 2009; Hempe, 2013; Junior et al, 2012).

Problem Statement

As I have noted, researchers have posited the administrative, enabling, and adaptive practices of complexity leadership as the means through which leadership effectiveness may be achieved within CAS (Dinh et al., 2014; Edson, 2013; Ford, 2009). Concurrently, scholars have suggested that effectiveness is contingent upon the existence of enabling practices and structures which leverage and integrate administrative and adaptive characteristics, processes, and practices (Dinh et al., 2014; Ellis & Herbert, 2011; Ford, 2009; Hazy & Uhl-Bien, 2012; Leykum et al., 2007).

The impact of complex adaptive leadership practices has been studied in the context of adaptive sustainability within complex environments (Espinosa & Porter, 2011; Mitleton-Kelly, 2011), literature review through a competing values framework (Tong & Arvey, 2015) and identification of leadership practices aligned with adaptability (Dinh et al., 2014; Ellis & Herbert, 2011; Hannah et al., 2009; Lichtenstein & Plowman, 2009), and through qualitative studies of adaptive leadership behaviors aligned with culture change (Corazzini et al., 2014), and strategic practices within complex hospital settings (Junior et al., 2012). Researchers have also studied the impact of complexity on organizational design, structures and processes generally (Hempe, 2013), in the context of clinical governance (Ellis & Herbert, 2011), and on enhanced business effectiveness and adaptive innovation within turbulent environments (Akgun et al., 2014; Psychogios & Garev, 2012). Similarly, agility and resilience have been quantitatively studied in the context of learning and business outcomes within complex disruptive and turbulent environments (American Management Association, 2006; Edson, 2012; Huber, Gomes,

& de Carvalho, 2012; McCann & Selsky, 2012; McCanm, Selsky, & Lee, 2008; Richtner & Lofsten, 2014 ; Vinodh, Madhyasta, & Preveen, 2912; Wielamd & Wallenburg, 2012; Wong & Lam, 2012). While this research has illuminated important findings regarding complexity leadership within CAS, a gap exists in the quantitative identification of the impact of complexity leadership practices within the complex adaptive health services system (Dinh et al., 2014; Junior et al., 2012). Congruently, a problem in that domain stemmed from the discontinuity between leaders' traditional focus on linear leadership practices and experiences, and necessary agile and resilient complex adaptive leadership experiences, education, and practices within the current complex adaptive health services system.

Purpose of the Study

The purpose of this quantitative cross-sectional survey study was to quantify the impact of complexity leadership approaches within the health services system by identifying the relationship between the independent variables of *agility* and *resilience* and the dependent variables of *organizational financial performance, patient care satisfaction and quality,* and *human capital outcomes* within small, medium, and large health systems. I also considered the impact of *turbulence* on the achievement of organizational outcomes. The independent variables of *agility* and *resilience* were defined through a discrete agility index and a resilience index calculated from responses by upper-, middle-, and shift-level executive and management leadership staff within small, medium, and large health systems to a six point Likert-scale survey instrument. Concurrently, the dependent variable of organizational outcomes was defined through

four measures. These measures included financial achievement of budgeted recurring targeted operating margin, patient satisfaction outcomes as defined by scores obtained through Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys (CMS, 2013), patient care quality as defined by readmission rates for which reimbursement is denied (CMS, 2013), and human capital outcomes as measured by employee turnover rates. Turbulence was defined as an index that was calculated from responses to a five-point multiple choice survey questionnaire which measured perceptions of the pace and disruptiveness of change (McCann & Selsky, 2012; McCann et al., 2009). Controlling or intervening variables included organizational size defined as small, medium, or large.

Research Questions and Hypotheses

The research questions and hypotheses for this study included:

Research Question 1: Is there a relationship between leadership agility and the achievement of the dependent variables of financial performance, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems?

$H_0$1: There is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems.

$H_1$1: There is a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance, patient care

satisfaction and quality, and human capital outcomes within small, medium, and large health systems.

Research Question 2: Is there a relationship between leadership resilience and the achievement of the dependent variables of financial performance, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems?

$H_0$2 : There is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems.

$H_1$2: There is a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems.

Research Question 3: To what extent are the independent variables of agility and resilience where agility is defined by and agility index and resilience is defined by a resilience index predictive of organizational outcomes or the dependent variables of financial performance, patient care satisfaction and human capital outcomes within small, medium, and large health systems?

$H_0$3 : In the population, the independent variables of agility and resilience where agility is defined by an agility index and resilience is defined by a resilience index are not predictive of organizational outcomes or the dependent variables of organizational

financial performance, patient satisfaction and quality, and human capital outcomes within small, medium, and large health systems thus, all of the partial coefficients equal zero.

$H_1$3 : In the population, the independent variables of agility and resilience where agility is defined by an agility index and resilience is defined by s resilience index are predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems thus, all of the partial coefficients do not equal zero.

Research Question 4: To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of agility and the achievement of positive financial performance, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems?

H_O4-1: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is not mediated by environmental turbulence within small, medium, and large health systems.

$H_1$4-1: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is mediated by environmental turbulence within small, medium, and large health systems.

H_O4-2: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is not moderated by environmental turbulence within small, medium, and large health systems.

$H_1$4-2: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is moderated by environmental turbulence within small, medium, and large health systems.

Research Question 5: To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of resilience and the achievement of positive financial performance, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems?

H_O5-1: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is not mediated by environmental turbulence within small, medium, and large health systems.

$H_1$5-1: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is mediated by environmental Turbulence within small, medium, and large health systems.

H_O5-2: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes

explained by the independent variable resilience is not moderated by environmental turbulence within small, medium, and large health systems.

$H_1$5-2: In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is moderated by environmental turbulence within small, medium, and large health systems.

Theoretical Framework

The theoretical foundation for this study was grounded in CAS and leadership frameworks that were informed by complexity science, chaos theory, Prigogine's theory of dissipative structures, and the tension between the interchangeable concepts of linearity and non-linearity within complex organic environments of change. Consistent with chaos theory, which holds that organizations are subject to continuous disruptive evolution and emergence in response to turbulent and unpredictable fluctuations within systems, complexity science incorporates the study of interacting collective units or agents that evolve over time through interaction, self-organization, and emergence (Psychogios & Garev, 2012; Tong & Arvey, 2015). In chaos theory, change is a responsive state to the occurrence of unpredictable jolts and non-linearity between elements within a system (Meyer, Gaba, & Colwell, 2005; Morcol, 2005). Similarly, dissipative structures occur within open systems that demonstrate processes of continuous and unpredictable material and information exchange with the environment without a predictable pattern of cause and effect thus mirroring chaos (Morcol, 2005; Prigogine & Stengers, 1984). Environmental jolts, hyperturbulence, and organizational diffusion

result from processes of discontinuous change (Meyer et al., 2005). These phenomena are congruent with concepts of complexity theory.

Complexity theory is philosophically underwritten by a natural sciences perspective which holds that occurrences within the environment cannot be scientifically explained solely through a positivistic approach (Haynes, 2008). Rather, complexity theory emphasizes non-linear interrelationships and networks comprised of interdependent feedback loops that persistently evolve in response to unpredictable changes and interacting patterns (Elllis & Herbert, 2011; Kannampalli, Schauer, Cohen, & Patel, 2011). Thus, researchers using complexity theory focus on shared interdependencies between individuals, systems, and subsystems (Geer-Frazier, 2014). These interdependencies are demonstrated by the actions of ensembles or the basic unit within CAS, which align and organize internally and externally to form aggregates (Clark, 2013). Complexity theory, therefore, holds that CAS are units of analysis comprised of persistently dynamic and evolving interdependent agents that are linked within overlapping and interactive networks (Akgun et al., 2014; Psychogios & Garev, 2012). Similarly, complexity theory contends that organizations within and as a CAS incorporate numerous nodes, agents, or units that interact and are influenced through nonlinear, unpredictable, and persistently emerging activities or behaviors (Hempe, 2013; Psychogios & Garev, 2012). Researchers have suggested that the exchange and processing of information which results from leadership practices and behaviors influence the manner in which a CAS learns and adapts to positively enable

organizational effectiveness (Akgun et al., 2014; Junior et al., 2012; Tong & Avery, 2015).

In their seminal study, Uhl-Bien, Marion and McKelvey (2007) advanced complexity leadership as a new paradigm for leadership influence and effectiveness within CAS. Functioning as an organic blend of linear and nonlinear leadership theories and approaches (Regine & Lewin, 2000), complexity leadership theory includes the three leadership approaches of administrative leadership or hierarchical, bureaucratic, transactional, and controlled coordinated, efficient, and effective practices, adaptive leadership characterized through learning and creative practices which result from network interactions in response to the tensions generated within the CAS, and enabling leadership practices of problem solving, learning, adaptability, and emergence (Uhl-Bien, Marion, & McKelvey, 2007). Researchers conceptualized emergence as an adaptive evolutionary state resulting from the interdependent processes of reformation and self-organization (Psychogios & Garev, 2012; Tong & Arvey, 2015; Uhl-Bien et al., 2007). Researchers further suggested that these interdependent processes were achieved through a meso-approach that incorporates multiple levels and layers (Ellis & Herbert, 2011). The achievement of adaptive emergence required that leaders implement enabling practices which integrate or bridge administrative and adaptive practices and capabilities (Dinh et al., 2014; Ford, 2009; Geer-Frazier, 2014; Uhl-Bien & Marion, 2009).

Research has demonstrated that enabling complexity leadership capabilities within CAS may be achieved through the persistent exercise of adaptive capacity or resilient and agile complexity leadership practices (Junior et al, 2012; McCann et al.,

2009; McCann & Selsky, 2012; Psychogios & Garev, 2012; Vinodh et al, 2012). One may therefore posit that a complexity leadership framework incorporates the variables of complexity leadership practices, adaptation, adaptive capacity, resilience, agility, emergence, organizational effectiveness, and sustainability. As an enabling link, researchers have correlated adaptive capacity with organizational outcomes which demonstrated improved communication effectiveness, clarity, resilience, agility, and stress reduction (McCann et al, 2009; McCann & Selsky, 2012; Pipe et al., 2012; Vinodh et al., 2012). These enhancements result from enabling capabilities which are characterized by the flexible capacity to decisively and effectively anticipate, act, and evolve within variable and unpredictable circumstances of change (Hazy & Uhl-Bien, 2012; McCann et al., 2009; Vinodh et al., 2012).

I determined that this theoretical framework was particularly relevant to my dissertation topic because it defined the premise, characteristics, and dynamics of a CAS within the context of complexity science and chaos theory. Further, it demonstrated congruence with a dissipative structures approach in terms aligned with the complex adaptive health services system (Corazzini et al., 2014; Junior et al., 2012; Pipe et al., 2012; Uhl-Bien et al., 2007). The promotion of complexity leadership as a strategy for the achievement of positive outcomes within CAS further indicated necessary leadership approaches within a CAS such as health services (Psychogios & Garev, 2012; Tong & Avery, 2015, Uhl-Bien et al., 2007). Consistent with complexity leadership theory which proposes the necessity of enabling leadership practices which link administrative and adaptive leadership approaches (Dinh et al., 2014; Ford, 2009; Geer-Frazier, 2014; Uhl-

Bien & Marion, 2009) I noted the existence of a logical relationship between complexity leadership practices, adaptive capacity, and leadership agility and resilience (McCann et al., 2009; McCann & Selsky, 2012; Pipe et al., 2012; Vinodh et al., 2012). To the extent that leadership agility and resilience were aligned with specific organizational outcomes within the complex adaptive health services system, I hypothesized that effective complexity leadership practices could be identified within the complex health services environment.

Nature of the Study

This was a quantitative cross-sectional survey study in which I used a probability-based systematic random stratified sampling approach within categories of small, medium, and large health systems. My quantitative cross-sectional focus was aligned with the goal of identifying the correlations and relationships between agility, resilience, specific leadership practices, and the organizational outcomes that are congruent with effectiveness (Junior et al., 2012; McCann et al., 2009; McCann & Selsky, 2012; Vinodh et al., 2012).

The theoretical population for this study consisted of upper-, middle-, and shift-level health care services leaders who perform leadership duties within U.S. health care systems. The accessible population consisted of a sampling frame which equaled approximately 5,176 health care leaders who performed duties within a multistate U.S. health services corporation comprised of small, medium, and large health systems. This corporation will be referred to as System X in the text which follows to protect the confidentiality of the data source. To control for the potential influence of organizational

size, complexity, and number of leaders present within a health system due to its size (Junior et al., 2012; Psychogios & Garev, 2012), I sorted leadership staff by their employment status within small, medium, and large health systems. I ran a power analysis through GPower to determine the appropriate sample size aligned with an effect size necessary to enable a valid inference about the population under study, and to avoid Type I and II errors (Faul, Erdfleder, Bucher, & Lang, 2009; Marshall, 1996).

I collected data using an internet survey approach and examined secondary data (Cole, 2013). Internet-based pilot and primary surveys were randomly distributed to leadership staff through a probability-based systematic and proportionate random sampling approach for the measurement of agility, resilience, and turbulence within small, medium, and large System X health systems (Akgun et al., 2014; American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012; System X, 2014; Vinodh et al., 2012). Since the anticipated sample population existed within a large geographic area, my use of an internet-based survey process enabled a timely and cost effective mode of data collection, while proportionate sampling promoted representative comparative analytics between groups (Akgun et al., Cole et al., 2013; Trochim, 2006). I identified organizational outcomes by examining organizational documents that illustrated performance outcome measures for recurring financial operating margins, patient satisfaction HCAHPS measures and employee turnover rates. I also reviewed documents that showed unplanned readmission rates for categories of illness that are subject to CMS denial of payment as an indicator of quality. As noted, indexes which were analyzed to illustrate the existence of agility, resilience and the

mediating and moderating impact of Turbulence on the achievement of these organizational outcomes were identified through the internet survey process (American Management Association, 2006; McCann et al., 2009)

I studied data and demographics through statistical correlation, regression, Hayes PROCESS, one-way analysis of variance, and independent *t*-test analytics to identify the relationships, strength, and linear correlations between the variables of agility, resilience, turbulence, and organizational outcomes (Akgun et al., 2014; Field, 2013; McCann et al., 2009; Pallant, 2013). Statistical analysis included validation of required statistical assumptions such as linearity, outliers, missing data, normality, homogeneity of variance, and multicolinearity (Anderson et al., 2013; Field, 2013; Pallant, 2013).

Definition of Terms

I defined the theoretical and conceptually aligned terms as follows:

Adaptation: A state of responsive alignment and adjustment initiated to enable a state of organizational fit congruent with internal or external forces during periods of uncertainty and the disruption of existing structures, processes, or norms (Chakravarthy, 1982; Hannah et al., 2009; Lengnick-Hall & Beck, 2005).

Complexity: A multidimensional and integrated state of independent variables or factors that collapse or align with one another in unexpected, spontaneous, and unique ways (Hannah et al., 2009; Putnik, 2009).

Complexity Science: A framework which characterized innovation and creative emergence through the processes of self-organizing systems and activities that were

stimulated in response to external system inputs and internal characteristics (Weberg, 2012, p. 272).

Complex Adaptive Systems: Systems which contained diverse agents and networks which disproportionately influenced one another through an open, organic, and persistently evolving process of adaptation and exchange resulting in the emergence of new and creative structures and outcomes (Regine & Lewin, 2000; Tan et al., 2005; Weberg, 2012).

Complexity Leadership: A multilevel leadership approach which incorporated administrative, adaptive, and enabling leadership practices within CAS (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007; Uhl-Bien & Marion, 2009)

Complexity Leadership Theory: The study of leadership dynamics and interactions that are exercised within CAS (Uhl-Bien & Marion, 2009).

Chaos: A disruptive state that occurs in response to nonlinear events in an unpredictable manner (Morcol, 2005).

Dissipative Structure: An emergent open form of self-organization, reorganization, or transition that is characterized as a change from an existing structure to a new or more complex structure through exchanges of energy, matter, and information with a turbulent environment in response to internal or external far-from equilibrium conditions (Gemill & Smith, 1985; Metcalf & Benn, 2013; Morcol, 2005; Prigogine & Stengers, 1984).

Wicked Problem: A question or issue that is challenging, unpredictable, messy, and whose resolution is likely to be uncertain and worse than the initial problem giving rise to concern (Churchman, 1967; Kannampallil et al., 2011).

Definitions which were aligned with variables or components of complexity leadership theory within a CAS included the following:

Adaptive Capacity: The ability to manage change at individual, group, organizational, and system wide levels within turbulent and complex environments through agile and resilient capabilities (McCann et al., 2009; McCann & Selsky, 2012).

Aggregates: Structures that result from the interactions of ensembles within a system of change (Clarke, 2013).

Agility: The capability to respond quickly, decisively, flexibly, fluidly, and proactively within environments of change (McCann et al., 2009; Pellissier, 2012).

Attractor: The point of order or end state within a system of change (Haynes, 2008; Paley, 2010).

Ensemble: A basic unit that includes sets of individuals that are aligned through common characteristics or interests (Clark, 2013).

Linear Model: A model in which a "particular variable [is] linearly dependent on a set of antecedent variables up to an error term: $y = Xb + u$" (Meyer et al., 2005, p. 461). Linear models presumed a predictable cause and effect relationship (Morcol, 2005).

Nonlinear Models: A model in which a predictable or proportional cause and effect relationship cannot be presumed (Meyer et al., 2005; Morcol, 2005).

Resilience: The proactive, transformational and dynamic capacity to leverage change and disruption to embed new processes and structures within a newly created stable state (Lengnick-Hall et al., 2011; McCann et al., 2009; Richtner & Lofsten, 2014; Wieland & Wallenburg, 2013).

Turbulence: Unstable, random, volatile, uncertain. and unpredictable changes and patterns that may be identified through perceptions of the pace of change and its disruption (American Management Association, 2006; McCann et al., 2009; Psychogios & Garev, 2012).

Definitions of terms associated with dependent variables obtained through secondary data sources were as follows:

Patient Satisfaction: The achievement of positive scores received from patients in response to a CMS approved survey for measurement of Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) (CMS, 2013). Specifically, patient satisfaction was defined by a patient's overall rating of a hospital (CMS, 2016).

Patient Care Quality: Unplanned readmission rates of designated patients following discharge within categories of illness as defined by the Centers for Medicare and Medicaid Services [CMS] (2013, n.d.).

Organizational Financial Performance: Targeted fiscal year recurring operating margin (System X, 2016b).

Human Capital Outcomes: Employee turnover rates or percentages (Curtis, Hanias, & Antoniades, 2011; Jefari, Shahanaghi, & Tootooni, 2015).

Assumptions

This study included assumptions associated with the nature of the study, the validity and reliability of secondary data collection processes and outcomes and the nature of research participants. Also included were assumptions related to data collection, manipulation and analysis. In this study, I incorporated a linear quantitative research design (McCann et al, 2009; Vinodh et al., 2012), even though complexity science and CAS involve nonlinear processes (Dinh et al, 2014; Lichtenstein & Plowman, 2009; Leykum, 2007; Uhl-Bien & Marion, 2009; Vesterby, 2008). I assumed that, though nonlinear conceptually, CAS take a linear course through adaptation over time (Clarke, 2013; Haynes, 2008), thus making quantitative measurement feasible.

I retrieved secondary data from organizational records. Secondary data was collected from multiple organizations within multiple states through the efforts of many individuals and processes. I assumed that the processes for data collection were consistent in all related organizations and were accurately documented (Anhern, 2005; Harriman & Patel, 2014). This assumption was derived from the fact that HCAHPS survey processes are dictated by CMS protocol (CMS, 2013) and that the data collection processes are coordinated by consistent System X employees.

Third, I assumed that there were similarities between study participants who were classified as upper-, middle-, and shift-level executive and management leadership staff within the same health system. This included the assumption that participants' educational backgrounds were consistent with the system's executive and manager position descriptions. Comparable access to and competency in the use of electronic

internet equipment and resources by all survey participants was also assumed. Thus, I determined that the potential for insufficient access or capabilities aligned with data collection was non-significant (Anhern, 2005; Harriman & Patel, 2014).

A forth set of assumptions included those regarding the survey processes of data collection, manipulation, and analysis. I assumed that controls embedded in the survey process prohibited multiple responses by the same survey participant. I also assumed that the differences in timing between secondary data collection processes and the internet survey process did not adversely impact independent and dependent data comparability. Since surveys were not distributed to leaders employed by my employer, I assumed that my employment role did not influence outcomes. Consistent with this study's design and methods, I implemented exclusions and assumed that they were sufficient. When considering representativeness of the attained sample against the general population, I assumed that the System X employed leadership population remained substantially similar to the census provided by System X and that the American College of Healthcare Professionals (2016) profile provides a reasonable description of the general population of healthcare leaders. Finally, while also a limitation, I assumed that the perceptions of leaders represented measures of agility, resilience, and turbulence (American Management Association, 2006, McCann et al., 2009; McCann & Selsky, 2012).

Limitations

Limitations of this study included lack of control over study participant characteristics and cultures, limits associated with the use of telephone surveys, the use of secondary dependent variable lagging indicator outcome data, the timeline in which this

study was conducted, and assumptions reflecting causation and independent variable outcomes data. It should be noted that I discuss additional limitations aligned with methodology and measurement in greater detail in Chapter 3.

The influence of unique cultural or other personal characteristics of participants was uncontrolled and unknown (Anhern, 2005; McCann et al., 2009). Since HCAHPS scores were obtained by telephone interviews (CMS, 2013), potential participants who did not have access to telephones were excluded by design. Additionally, while data was collected simultaneously, financial, human capital, quality, and patient satisfaction data represented lagging indicators (CMS, 2013, System X, 2014). Thus, the data I collected to identify the agility, resilience, and turbulence indexes were not precisely matched in time to all organizational outcomes (Guangrong et al., 2013). Finally, it should be noted that since the independent variables of agility and resilience were not manipulated within the research design, causation was implied (McCann et al., 2009). Similarly, since these independent variable outcomes were identified through survey participant perceptions, it is unknown whether these perceptions were inflated, deflated, or accurate (Yauch, 2011).

Scope and Delimitations

In this study, I examined the impact of adaptive leadership capacity in a not-for-profit multi-state health services system. I selected this system because of its consistent system-wide values, policy requirements, and strategic approaches thus, neutralizing a potential source of bias among survey participants (Anderson et al., 2013; System X, 2014). However, generalizability to alternative populations such as those in for-profit health services systems may be limited (Guangrong et al., 2013). Agility and resilience

were chosen as independent variables for this study due to the theoretical and practical continuity of these variables with enabling complexity leadership practice capabilities necessary to bridge the gap between practice and adaptation to foster emergence (McCann et al, 2009; Pipe et al., 2012). While I studied these variables within a discrete period of time, some researchers have suggested that complexity should be studied over an extended period of time given its nonlinear character (Clark, 2013; Haynes, 2008; Morcol, 2005; Vesterby, 2008).

Significance of the Study

The outcomes from this research may lead to change on individual, organizational, and social levels within the health services system. Health services leadership behaviors and competencies which positively impact organizational outcomes within a CAS can be integrated into individual leadership selection, educational and development programs to enable personal and practical success (Dai et al., 2013; Pipe et al., 2012). Concurrently, my findings regarding leadership approaches which promote the achievement of short- and long-term positive organizational outcomes within turbulent circumstances or environments may be used to enhance organizational performance, sustained viability, and the continued existence of services necessary to care for populations (Dai et al., 2012; Junior et al., 2012; Pipe et al., 2012). Finally, where leadership practices enhance patient care satisfaction and quality, and human capital outcomes, a social value is realized by the stakeholders who access the health services system during experiences of vulnerability and need (Junior et al., 2012; Pipe et al., 2012). Collectively, ethical and practical social value is furthered by theoretically

and practically based complex agile and resilient leadership behaviors that enable an integrated and emergent health services perspective on social responsibility, responsiveness, and performance within diverse and changing circumstances (Junior et al., 2012; Stefl, 2008).

Summary and Transition

The health services environment has evolved to exemplify a CAS which requires non-traditional agile and resilient complexity leadership capabilities and behaviors (Dinh et al., 2014; Edson, 2012; Ford, 2009). While researchers have qualitatively explored leadership in CAS through a variety of topics, quantification within the complex health services system is lacking (Dinh et al, Hannah et al., 2009; Hempe, 2013; Junior et al., 2012). In this study, I quantified the relationships and correlations of the independent variables of agility and resilience complexity leadership practices with designated organizational outcomes in a multi-state not-for-profit health services system that extends from the east to west coasts of the United States. I also quantified the impact of turbulence on these relationships and correlations. The study approach and quantitative cross-sectional survey study design was grounded in theoretical foundations of complex adaptive systems, complexity, dissipative structures, chaos, adaptation, adaptive capacity, and complexity leadership (Clark, 2013; Morcol, 2005; McCann et al., 2009; McCann & Selsky, 2012; Meyer et al, 2005; Psychogios & Garev, 2012; Tong & Avery, 2015; Uhl-Bien et al., 2007).

In Chapter 2 I provide further detail regarding the theoretical foundation. I discuss the literature search strategy that I implemented, offer an extensive review of the

theoretical foundation for this study, provide a theoretical review of the constructs of interest and of the independent, dependent, and covariate variables aligned with this study, and conclude with a summary of what is known and unknown regarding this research topic.

Chapter 2: Literature Review

Introduction

Problem

In the current health services system, leaders have traditionally learned and achieved successful outcomes using linear educational processes and experiences in predictable environments of change. Thus, they are often ill prepared for leadership roles within CAS (Junior et al., 2012; Pipe et al., 2012). Researchers have posited that administrative, enabling, and adaptive practices of complexity leadership are means through which leadership effectiveness may be achieved within CAS (Dinh et al., 2014; Edson, 2013; Ford, 2009). Researchers have also suggested that effectiveness is contingent upon enabling practices and structures which leverage and integrate characteristics and processes aligned with administrative and adaptive complexity leadership practices (Dinh et al., 2014; Ellis & Herbert, 2011; Ford, 2009; Hazy & Uhl-Bien, 2012; Leykum et al., 2007). These enabling practices are conceptually aligned with adaptive leadership capacities evidenced through characteristics of agility and resilience (McCann & Selsky, 2012).

The impact of complex adaptive leadership practices has been studied in the context of adaptive sustainability within complex environments (Espinosa & Porter, 2011; Mitleton-Kelly, 2011), literature review within a competing values framework (Tong & Arvey, 2015) and identification of leadership practices aligned with adaptability (Dinh et al., 2014; Ellis & Herbert, 2011; Hannah et al., 2009; Lichtenstein & Plowman, 2009), qualitative observation of adaptive leadership behaviors aligned with culture

change (Corazzini et al., 2014), mixed methods analysis of competencies necessary for successful leadership within a health care system (Ford, 2009), qualitative exploration of strategic practice effectiveness within complex hospital settings (Junior et al., 2012), learning agility (Dai et al., 2013), quasi-randomized study within a patient care context (Leykuum et al., 2007), the impact of complexity on organizational design and structures both generally (Hempe, 2013) and in the context of enhanced business effectiveness and adaptive innovation within turbulent environments (Akgun et al., 2014; Psychogios & Garev, 2012). Similarly, agility and resilience have been quantitatively studied in the context of learning and business outcomes within complex, disruptive and turbulent environments (American Management Association, 2006; Edson, 2012; Huber et al., 2012; McCann & Selsky, 2012; McCann et al., 2008; Richtner & Lofsten, 2014 ; Vinodh et al., 2012; Wielamd & Wallenburg, 2012; Wong & Lam, 2012). While the aforementioned research illuminates important findings regarding complexity leadership within CAS, a gap exists regarding the quantitative identification of the impact of complexity leadership practices within the complex adaptive health services system (Dinh et al., 2014; Junior et al., 2012). Congruently, a problem stems from discontinuity between leaders' traditional focus on linear leadership practices and experiences, and the agile and resilient complex adaptive leadership experiences, education, and practices needed within the current complex adaptive health services system.

Purpose

The purpose of this quantitative cross-sectional survey study was to quantify the impact of complexity leadership approaches within the health services system by

identifying the relationship between the independent variables of agility and resilience, and the dependent variables of organizational outcomes within small, medium, and large health systems. The impact of turbulence on agility, resilience and the achievement of organizational outcomes was also identified. The independent variables of agility and resilience were measured through a discrete agility index and a discrete resilience index calculated from responses by upper-, middle- and shift-level executives and managers within small, medium, and large health systems to a six-point Likert scale survey instrument. The independent variable of turbulence was measured through an index identified by responses to five-point multiple choice questions which identified perceptions of the pace and disruptiveness of change (McCann & Selsky, 2012; McCann et al., 2009). The secondary data dependent variables of organizational outcomes included financial achievement of recurring budgeted target operating margin, patient satisfaction outcomes as defined by scores on HCAHPS surveys (CMS, 2013), patient care quality as defined by unplanned hospital readmission rates (CMS, 2016; CMS, n. d.), and employee engagement outcomes as measured through total voluntary and involuntary employee turnover rates. Controlling or intervening variables included organizational system size defined as small, medium, or large.

Overview: Chapter Content and Literature Synopsis

Chapter 2 is organized by sections that include discussions of the literature search strategy that I implemented, the theoretical foundation that served the basis of this study, and the literature on key variables and concepts. A summary and conclusions follow in which I articulate major themes, identify what is and is not known related to the topic of

this study, discuss the manner in which this study filled a research gap, and address the study's professional and social relevance.

The literature review begins with an examination of the internal and external health services environments and the relationship between these environments and the concept of turbulence. Next, I present a foundational review of complexity science and CAS concepts. Included are the aligned theoretical concepts of dissipative structures, wicked problems, and non-linearity. A reflection on traditional leadership practices provides a transitional opportunity for consideration of the relevance of complexity leadership practices within the health services system. I then discuss the applicability of complexity leadership practices to concepts of adaptive capacity, agility, and resilience. Finally, I examine key variables and concepts related to the measurement of organizational outcomes within a balanced scorecard framework and key demographics.

Literature Search Strategy

I initiated a multidimensional literature review search strategy for this study. Prior to full initiation of a search, I consulted with a librarian to validate strategies and identify potentially useful databases. Following, I used a Boolean approach to search for terms and concepts associated with leadership in CAS (Caramani, 2009). I searched for keywords and themes such as *turbulence, complexity science, complex adaptive systems, complexity leadership, agility, resilience, gender, age, experience, culture,* and *leadership* in multiple business and management, health sciences, and multidisciplinary databases and journals. These included Business Source Complete, ProQuest Central, Academic Search Complete, MEDLINE with full text, CINAHL Plus full text, and

general dissertations within the Walden University library data base (Walden University, 2015a). I also used Google Scholar extensively to locate specific journal articles, and searched specific journals such as *Academy of Management Journal, Emergence: Complexity and Organizations, and Leadership Quarterly*.

Prior to using a given journal article as a component of the literature review, I scanned its abstract for relevance to my dissertation, keeping in mind the article's research method, theoretical foundation, and quality and age of references. I discarded journal articles that did not articulate outcomes identified through research or foundational theories.. Studies and theoretical or informational sources that were not peer reviewed were generally excluded unless they contributed a unique or foundational perspective to the research topic, or represented a professionally legitimate source for professional knowledge or statistics. Examples included health care related statistics such as those provided by the CMS (2015a, 2015b). When a foundational or seminal theory was cited in an article under review, I sought to track down the primary source to the extent possible. Examples include foundational theory related to complexity science, dissipative structures, complex adaptive systems, systems-oriented perspectives on change, traditional leadership theories, and complexity leadership. Finally, I sought research published within the past 5 years to ensure timely characterization.

Theoretical Foundation

The theoretical foundation for this study was grounded within CAS and leadership frameworks that are informed by complexity science, chaos theory, Prigogine's theory of dissipative structures, and the tension between the interchangeable

concepts of linearity and non-linearity within complex organic environments of change. Consistent with chaos theory which holds that organizations are subject to continuous disruptive evolution and emergence in response to turbulent and unpredictable fluctuations within systems, complexity science incorporates the study of interacting collective units or agents that evolve over time through interaction, self-organization, and emergence (Psychogios & Garev, 2012; Tong & Arvey, 2015). In chaos theory, change is a nonlinear responsive state to the occurrence of unpredictable jolts and non-linearity between elements within a system (Meyer et al., 2005; Morcol, 2005). Similarly, dissipative structures occur within open systems that demonstrate processes of continuous and unpredictable processes of material and information exchange with the environment without a predictable or proportionate pattern of cause and effect thus mirroring chaos (Curtis, Hanias, & Antoniades, 2011; Morcol, 2005). Environmental jolts, hyper-turbulence, and organizational diffusion result from processes of discontinuous change (Meyer et al., 2005). These phenomena are congruent with concepts of complexity theory.

Complexity theory is philosophically derived from a natural sciences perspective which holds that occurrences within the environment cannot be scientifically explained solely through a positivistic approach (Haynes, 2008). Rather, complexity theory emphasizes non-linear interrelationships and networks comprised of interdependent feedback loops that persistently evolve through emergence and self-organization in response to unpredictable changes and interacting patterns (Hazy & Uhl-Bien, 2012; Kannampalli et al., 2011). Thus, researchers using complexity theory focus on shared

interdependencies between individuals, systems, and subsystems (Geer-Frazier, 2014). These interdependencies are demonstrated by the actions of ensembles or the basic unit within CAS which align and organize internally and externally to form aggregates (Clark, 2013). Complexity theory, therefore, holds that CAS are a unit of analysis comprised of persistently dynamic and evolving interdependent agents that are linked within overlapping and interactive networks (Akgun et al., 2014; Psychogios & Garev, 2012). Similarly, complexity theory contends that organizations within and as CAS incorporate numerous nodes, agents, or units that interact and are influenced through nonlinear, unpredictable, and persistently emerging activities or behaviors (Hempe, 2013; Psychogios & Garev, 2012). Researchers have suggested that the exchange and processing of information which results from leadership practices and behaviors influence the manner in which a CAS learns and adapts to positively enable organizational effectiveness (Akgun et al., 2014; Junior et al., 2012; Tong & Avery, 2015).

In their seminol study, Uhl-Bien, Marion and McKelvy (2007) advanced complexity leadership as a new paradigm for leadership influence and effectiveness within CAS. Functioning as an organic blend of linear and nonlinear leadership theories and approaches (Regine & Lewin, 2000), complexity leadership includes the three leadership approaches of administrative leadership or leadership that incorporates hierarchical, bureaucratic, transactional, and controlled coordinated, efficient, and effective practices, adaptive leadership characterized through learning and creative practices which result from network interactions in response to the tensions generated

within CAS, and enabling leadership practices of problem solving, learning, adaptability, and emergence (Uhl-Bien et al., 2007). Researchers conceptualized emergence as an adaptive evolutionary state resulting from the interdependent processes of reformation and self-organization (Psychogios & Garev, 2012; Tong & Arvey, 2015; Uhl-Bien et al., 2007). Researchers further suggested that these interdependent processes were achieved through a meso-approach which incorporated multiple levels and layers (Ellis & Herbert, 2011). The achievement of adaptive emergence required that leaders implement enabling practices which integrate or bridge administrative and adaptive practices and capabilities (Dinh et al., 2014; Ford, 2009; Geer-Frazier, 2014; Hazy & Uhl-Bien, 2012; Uhl-Bien & Marion, 2009).

Research has demonstrated that enabling complexity leadership capabilities within CAS may be achieved through the persistent exercise of adaptive capacity or agile and resilient complexity leadership practices (Junior et al, 2012; McCann et al., 2009; McCann & Selsky, 2012; Psychogios & Garev, 2012; Vinodh et al, 2012). One may therefore posit that a complexity leadership framework incorporates the variables of complexity leadership practices, adaptation, adaptive capacity, resilience, agility, emergence, organizational effectiveness, and sustainability. As an enabling link, researchers have correlated adaptive capacity with organizational effectiveness through the demonstration of improved communication effectiveness, clarity, resilience, agility, and stress reduction (McCann et al., 2009; McCann & Selsky, 2012; Pipe et al., 2012; Vinodh et al., 2012). Researchers determined that these enhancements resulted from enabling capabilities which were characterized by the flexible capacity to decisively

anticipate, act and evolve within variable and unpredictable circumstances of change (McCann et al., 2009; Vinodh et al., 2012).

As noted, I determined that this theoretical framework was particularly relevant to my dissertation topic because it defined the premise, characteristics, and dynamics of CAS within the context of complexity science and chaos theory. Further, it demonstrated congruence with a dissipative structures approach in terms that are aligned with the complex adaptive health services system (Corazzini et al., 2014; Junior et al., 2012; Pipe et al., 2012; Uhl-Bien et al., 2007). The promotion of complexity leadership as a strategy for the achievement of positive outcomes within CAS further indicated necessary leadership approaches within CAS such as health services (Psychogios & Garev, 2012; Tong & Avery, 2015, Uhl-Bien et al., 2007). Consistent with complexity leadership theory which proposes the necessity for an enabling connection or link between administrative and adaptive leadership approaches (Dinh et al., 2014; Ford, 2009; Geer-Frazier, 2014; Uhl-Bien & Marion, 2009) I noted the existence of a logical relationship between complexity leadership practices, adaptive capacity and leadership agility and resilience (McCann et al., 2009; Pipe et al., 2012; Vinodh et al., 2012). To the extent that leadership agility and resilience were aligned with specific organizational outcomes within the complex adaptive health services system, I hypothesized that effective complexity leadership practices could be identified within the complex adaptive health services system.

Literature Review Related to Key Concepts and Variables

The Health Care Services Environment

The chaotic nature of the health care services landscape includes multiple complex structural and relational interdependent social and political networks that are subject to diverse and changing stakeholder interests and priorities (Clarke, 2013; Ford, 2009; Stefl, 2008). These interests and priorities have influenced and have been influenced by issues aligned with costs, resources, outcomes and quality, inefficiencies, organizational complexity, technological shifts, and population-based demographics (Clarke, 2013; Druss & Dimitropoulos, 2013; Ford, 2009; Harris-Kojetin, Senqupta, Park-Lee, & Valverde, 2015; Junior et al., 2012; Park, Cherry, & Decker, 2011; The World Bank, 2015; United States Census Bureau, 2015; U.S. Department of Health and Human Services, 2014; Vincent & Velkoff, 2010; Weberg, 2012; World Health Organization, 2014; 2015a,b,c).

Health care costs within the United States have been considered excessive when compared internationally (Weberg, 2012). Comparative spending illustrated an average health expenditure per capita in the United States of $8,553 in 2011 (The World Bank, 2015, p.10) compared to overall health expenditures per person in countries aligned with the Organisation for Economic Co-operation and Development (OECD) of $4,584 (World Health Organization, 2015a, p. 4). As of 2013, the average health expenditure per capita in the United States had increased to $9,146, thus demonstrating an increasing trend (The World Bank, 2015, p.10). Conversely, when viewing life expectancy of men and women in 2012, countries within the top ten rankings illustrated a life expectancy for

men within a range of 79.7 -81.2 years and a life expectancy for women within a range of 87.0-84.0 years (World Health Organization, 2014, para 10) as compared to a United States life expectancy of 76 years for men and 81 years for women as of 2013 (World Health Organization, 2015b). These statistics illustrated that the United States did not rank within the top 10 countries for life expectancy while health expenditures exceeded average expenditures (The World Bank, 2015; World Health Organization, 2015b). Concurrently, when viewing the top 10 causes of death within the United States, three improved while the remaining seven either remained the same or declined (World Health Organization, 2015c, p. 3).

Though United States' health services expenditures appeared to increase, it was also suggested that health care resources availability is challenged (Weberg, 2012). Concerns that the expansion of health care coverage under the Affordable Care Act (United States, 2011) will increase demand thus, strain existing workforce and organizational resources have been cited (Park et al., 2011). For example, while a nursing shortage does not seem imminent, it has been noted that the nursing resources were misaligned when viewing the distribution of nurses based upon current and future resource availability (U.S. Department of Health and Human Services, 2014). Additionally, while it has appeared that the nursing workforce supply may be sufficient in numbers, these projections have not factored in the potential impact of new models of patient care and the willingness of new entrants into the health care field to work assumed hours within this projection (U.S. Department of Health and Human Services, 2014). Similarly, when viewing present and future physician resource availability and

distribution, insufficient supplies and services have been projected thus suggesting the need for expanded use of advanced care practitioners and new models of patient care delivery (Park et al., 2011). Health services systems, structures, and practices have compounded these challenges (Geer-Frazier, 2014).

Health services inefficiencies have escalated within an environment where traditional practices are no longer effective (Geer-Frazier, 2014; Weberg, 2012). Within a complex external environment, enhanced complexity has stimulated responsiveness to the presence of internal environments, processes, and structures aligned with complex technological resources and the pluralistic priorities and expectations of diverse stakeholders whether patients or professionals (Junior et al., 2012). Similarly, rapid shifts in technology and information systems have compounded complexity within the internal and external environments (Clark, 2013; Druss & Dimitropoulos, 2013). Enhanced information technology systems have also required increased capital and related expenditures, literacy, technical and administrative supports, and consensual engagement of consumers and professionals (Druss & Dimitropoulos, 2013).

Within this environment of changing forces, patient demographics have demonstrated evolutionary shifts towards population states that require increased levels of elder and long term care. The United States elder population of individuals over the age of 65 is expected to more than double from an estimated (sic), "40.2 million in 2010 (to)….88.5 million …in 2050" (Vincent & Velkoff, 2010, p. 1). Dependency ratios or the extent of dependency of elder populations is expected to grow from (sic), "67 to 85 between 2010 and 2050" (Vincent & Velkoff, 2010, p. 3). Increases in aged populations

promote long-term care requirements (Harris-Kojetin et al., 2013). Annual expenditures for long term care have been estimated within a range of (sic), "$210.9 billion (and)… $360 bilion" (Harris-Kojetin et al., 2013, p. 2). In an environment where patients, families and state and federal third party payers must meet the challenges of paying for increasing health services costs, health services utilization is also projected to increase as the baby boomer population ages (Harris-Kojetin et al., 2013).

The cumulative influence of these forces within the internal and external environment have promoted a complex and organic environmental responsiveness characterized by redesigned regulatory, reimbursement, clinical, medical, technological, and insurance criteria. Providers have been and will be evaluated against multiple quality indicators and event reporting systems that are initiated to ensure cost effective, timely, and consistent patient care systems without adverse events (CMS, 2016; Malloch & Melnyk, 2013). Similarly, the Affordable Care Act (ACA) has been designed to enable reimbursement model changes which focus on quality, innovation, decreasing expenditures, and the expansion of value based purchasing structures among multiple health care sites and providers (United States, 2011). The evolving regulatory and public emphasis on ensuring payment for outcomes such as patient and population based satisfaction, quality, and safety rather than for resource utilization alone has been exemplified by numerous changes. For example, Hospital Compare, a website available to consumers, provided detailed information to consumers regarding individual provider performance measure outcomes for care in areas such as heart attack or failure, pneumonia, surgical outcomes, data from the Hospital Consumer Assessment of

Healthcare Providers and Systems (HCAHPS) perceptions of timely and effective care, readmission complications and deaths, medical imaging use, and information which shares future plans for evaluation of providers (Centers for Medicare and Medicaid Services [CMS], 2015a). Under the Health Insurance Portability and Accountability Act of 1996 (HIPPA), standards for the use of electronic medical records and national identifiers aligned with provisions of the ACA have required providers to certify expanded use in compliance with national standards for electronic health records (CMS, 2013). Additionally, effective 2015, the Physician Quality Reporting System required that providers report quality of care data to CMS or be subject to negative payment adjustments two years following or in 2017 (CMS, 2015b). Concurrently, physician reimbursement has begun the transition from a fee-for-service to fee-for-value payment system with the enactment of the Medicare Access and CHIP Reauthorization Act of 2015 through a payment system that is contingent upon meeting thresholds aligned with quality, resource use, clinical practice improvement activities, and electronic medical record meaningful use criteria (Siljander & Gross, 2015). As with payments to hospitals, this act required that payments to physicians be adjusted positively or negatively dependent upon aggregate performance against a pre-determined threshold (CMS, 2015b; Siljander & Gross, 2015). Continued efforts to regulate payments to health services providers were also exemplified by Medicare Administrative Contractors who have been incentivized to identify billing errors, expanded efforts to identify retrospective over- or under- Medicaid payments to providers, and CMS Supplemental Medical Review Contractors (Romano & Colagiovanni, 2015). Mandated by the ACA, the Agency for

Healthcare Quality and Improvement has enhanced a focus on quality through a national quality strategy which emphasized patient safety, person centered care, care coordination, and effective treatment (Agency for Healthcare Research and Quality, 2015). The focus on quality has been further expanded to include the workplace environment through CMS regulations which include new nursing home standards that mandated a focus on culture change as a part of state quality improvement efforts (Corazzini et al., 2014). Within the work environment, new models of professional practice and population and person centered care have evolved in response to this health services environment (Druss & Dimitropoulos, 2013; Junior et al., 2012; Malloch & Melnyk, 2013).

The changing nature of the health services environment has required new competencies and the introduction of clinically integrated professional governance processes to enable quality improvement priorities (Ellis & Herbert, 2011; Stefl, 2008). Evidence driven professional relationships were emphasized (Malloch & Melnyk, 2013) through the efforts of multiple health services roles and professionals (Junior et al., 2012). Structures such as medical homes and accountable care organizations have emerged which align provider accountabilities within new structural paradigms aligned with healthcare reform (Druss & Dimitropoulos, 2013). Similarly, the emphasis on person centered care and care coordination suggested by the Agency for Healthcare Research and Quality (2015) promoted an evolution of patient care structures from a singularly to a collectively focused priority. These changes have stimulated ongoing technological and information system enhancements (Druss & Dimitropoulos, 2013).

Technological changes have also resulted in response to the changing health services landscape. Compliance with information systems' meaningful use criteria and policies which incentivize the use of electronic health records by health services providers has been emphasized (Druss & Dimitrropoulos, 2013). Providers have cited difficulties with implementation due to the cost, complexity, and competencies needed to enable successful implementation (Druss & Dimitropoulos, 2013). Technology enhancements that will require new systems and capabilities have also been demonstrated through emerging innovations which included large data warehouses, enhancements in information technology connectivity, cloud computing, and three-dimensional printing capabilities to manufacture organic tissue replacement for patients (American Management Association, 2006; Reig, Valverde, & Reig, 2015).

In the aggregate, the forces and responses that have been exhibited within the health services environment illustrated an environment of complex, turbulent, chaotic events or wicked questions that result from discontinuous changes, jolts, and hyper-turbulence within complex adaptive dissipative systems (Clarke, 2013; Ford, 2009; Malloch & Melnyk, 2013; Metcalf & Benn, 2013; Stefl, 2008; Yukawa, 2015). These phenomena are congruent with turbulent CAS that are defined, emerge, and function through interconnected and evolving systems and processes that influence and are influenced by one another (Edson, 2012; Hannah et al., 2009; Jordon et al., 2010; Stefl, 2008; Tan et al., 2005).

Turbulence

The concept of turbulence suggests the prevalence of uncertainty, volatility, and unstable environments that commonly require changing practices to ensure survival and desired organizational outcomes (American Management Association, 2006; Psychogios & Garev, 2012). Consistent with the concept of random, nonlinear, and unsystematic fluctuations which produce chaotic and unstable patterns within systems (Psychogios & Garev, 2012), turbulence has been conceptualized within integrated internal operational and external environments (McCann et al., 2009). Researchers who examined the concept of turbulence suggested that turbulence was described through the existence of discontinuous change within environments characterized by far-from-equilibrium states (Meyer et al., 2005), uncertainties (American Management Association, 2006), or random nonlinear unsystematic fluctuations which produce unstable or unanticipated patterns (Psychogios & Garev, 2012). These characteristics suggested alignment with a focus on change in general.

Models of change have incorporated episodic to sustained and continuously disruptive change phenomena that are viewed from reactive and proactive perspectives (American Management Association, 2006; Haynes, 2008; Mintzberg, 1992), Change has been similarly conceptualized as random, periodic, unstable, or complex (Haynes, 2008) while empirical surveys of managers within diverse organizations have illustrated that change is influenced by customers, values, technology, politics, legal and regulatory influences, changes in economics, competition, materials costs, globalization, and demographics (American Management Association, 2006; McCann & Selsky, 2012).

Congruently, the historical and seminal perspective of change articulated by Mintzberg (1992) proposed that change be theoretically conceptualized within a model that incorporates change cycles, content, type, episodes or stages, patterns, the management of change, and the link between change and agility. Within this framework, successful responsiveness to change required both adaptation to change and the capacity to achieve stability in a manner that effectively resonated with states of adaptation (Mintzberg, 1992; McCann et al., 2006; McCann & Selsky, 2012). Researchers have suggested that concepts of change that are aligned with turbulence require the management of uncertainty and the exploitation of change to enable organic nonlinear and linear structures and processes necessary for organizational effectiveness (Breu, Hemingway, Strathern & Bridger, 2001).

Yauch (2011) suggested that perceptions as well as environmental measures of turbulence should be identified since it is those perceptions which influence actions. It was proposed that competition, customer perceptions and requirements, supply chain structures and processes, and the social, technological, environmental, economic, and political business environments be examined for intensity and change (Yauch, 2011, p. 388). Consistent with occurrences within the health services environment, identified sources of turbulence have included customers, suppliers, competitors, government agencies, stakeholders, technology, the influence of a corporate parent or multiple divisions or units, and other outside forces such as the economy (Ford, 2009; Tan et al., 2005; Wong & Lam, 2012; Yauch, 2011). In response to these occurrences, it has been suggested that leaders shift practices from linear to balanced non-linear systems and

practices within a complexity leadership framework that is exercised within turbulent environments of change (Akgun et al., 2014; Meyer et al., 2005).

Complex Adaptive Systems

Definitions and characteristics. The characterization of CAS is predicated upon theoretical concepts of complexity, systems and complexity science. Grounded in the natural and physical sciences, the concept of complexity incorporates a wholistic evolutionary perspective and process of alternating periods of change, stability, reordering, equilibrium, and disequilibrium (Haynes, 2008; Kannampalli et al., 2011; Plowman et al., 2007). The resulting non-linear paradigm suggests the existence of alternating simple and complex patterns of stability that influence system characteristics and causal relationships (Morcol, 2005). Degrees of complexity which emerge are influenced by the system and interactions within and between systems (Ellis & Herbert, 2011; Kannampallil et al., 2011; Morcol, 2005). Foundational to the concept of complexity and complexity science is the conclusion that simple, complex, chaotic, linear, or non-linear order emerges through natural processes of open exchange and self-organization within complex systems (A. Lewin, 1999). These concepts are congruent with a general systems approach.

A theoretical systems theory approach suggests that a change in one or many of multiple interconnected and interdependent parts and stakeholders such as relationships, infrastructures, and information processes may stimulate change in another part or collection of parts (Rouse, Boff, Sanderson, & Kondraske, 2011; Schneider & Somers, 2006). Systems have been conceptualized within a performance envelop subject to

multiple dimensions of performance aligned with tangible and intangible system resources (Rouse et al., 2011). Early foundational systems theory classified systems into multiple levels which extended from static structures to transcendental structures (Boulding, 1956). It was premised that as systems evolve to increasing levels of openness and complexity, movement towards equilibrium and homeostasis, synergy, and responsiveness subject to hierarchical relationships may result (Schneider & Somers, 2006). Complexity science was derived from general systems theory through the notion that the organization is an open and social system that requires responsiveness and interaction with multiple or discrete internal and external environments (Nienaber & Svensson, 2013). While a system may be complicated due to the prevalence of multiple or diverse parts or processes, complexity required the existence of an open systems view that that is evolutionary, adaptive, integrative, and emergent (Espinosa & Porter. 2011; Liang, 2013; Mittleton-Kelly, 2011; Psychogios & Garev, 2012). Principles of complexity and complexity science suggest an explanatory concept of systems described through successive states that achieve unpredictable or unintended forms of order through stimulus-response relationships (Haynes, 2008; Kannampalli et al., 2011; Paley, 2010; Plowman et al., 2007). Complexity theory has been predicated upon these concepts.

A complexity theory perspective suggests that organizations and systems are open, adaptive structures and processes comprised of numerous autonomous agents that persistently interact in unpredictable ways that influence the structure and processes of agents within interconnected networks (Edson, 2012; Hempe, 2013; Junior et al., 2012; Psychogios & Garev, 2012). These systems embark on a process of multidimensional co-

evolution (Mittleton-Kelly, 2011). Similarly, complex adaptive systems have been viewed as systems within which agents interact and mutually influence one another to create a new paradigm or outcome through adaptive creativity and choice (Nienaber & Svensson, 2013; Regine & Lewin, 2000). Researchers have posited that diverse, interconnected, self-organized and ordered systems and structures purposefully evolve and self-organize through learning and adaptation to create emergent structures in response to a persistent exchange of environmental and networked feedback wherein change within one system part influences emergent self-organization or change within another (Edson, 2012; Plowman et al. 2007; Tan et al., 2005; Weberg, 2012).

It has been suggested that complex systems modeling should demonstrate recognition of fluid and alternating states of equilibrium within systems that are formed through interconnected feedback loops and processes that promote alternating states of self-organization through chaotic rather than random activities (Pellissier, 2012). Since the impact of behaviors within one system part may affect other system parts in inconsistent ways that often result in the formation of complex patterns from simple rules it has been posited that the study of complex systems should incorporate both a reductionist and a holistic approach (Pellissier, 2012). Within this framework, CAS have been characterized as systems which self-organize and adapt through processes of co-evolution and path dependence in response to non-linear feedback, random reordering, and feedback loops within interacting networks (Espinosa & Porter, 2011; Nienaber & Svenson, 2013; Psychogios & Garev, 2012; Tong & Arvey, 2015). These interacting networks are comprised of shared interdependencies between vertical, horizontal, and

spatial dimensions of internal and external individual, organizational, and system oriented levels (Espinosa & Porter, 2011; Geer-Frazier, 2014). Researchers have illustrated the resulting evolutionary reordering through progressive states of a new emergent order (Espinosa & Porter, 2011; Haynes, 2008).

The emergent states which evolve through processes of learning, adaptation, and information processing (Edson, 2012; Junior et al., 2012) have been described as far-from-equilibrium states which are states that differ from prior states (Mittleton-Kelly, 2011; Morcol, 2005; Nienaber & Svensson, 2013). The change which results has been positioned by researchers at a point identified as the edge-of-chaos or the point of instability between order and chaos where phase transition and subsequent emergent innovation occurs (Tan et al., 2005; Espinosa & Porter, 2011; Pellissier, 2012). The edge of chaos was defined by Pellissier (2012) through principles of nonlinearity and the suggestion that disproportionate effects may result from small changes, feedback loops which promote new alternatives, the existence of order through strange attractors, interpretation contingent upon scale, fractals or similar patterns which reflect progressive states of magnitude, and processes of self-organization in response to randomness or instability (p. 53-54). Alternatively, Liang (2013) redefined the relationship between chaos and emergence, suggesting that emergence should be viewed within the dimension of order and emergence and emergence and chaos. Liang (2013) theorized that dissipative structures appear between the edges of order and emergence while structural transformation occurs between states of emergence and the edge of chaos within a defined space (Liang, 2013). Liang's (2013) theory proposed that within the space which

follows the edge of chaos, disintegration occurs (Liang, 2013) rather than creative emergence and co-evolution (Espinosa & Porter, 2011). This contrast notwithstanding, CAS change has been described through the actions of agents with schemata or a self-organizing network of units or parts that facilitate change through the exchange of energy (Liang, 2013; Meyer et al., 2005; Pellissier, 2012). Change has been conceptualized through the actions of a basic unit comprised of workers, workgroups or ensembles that interacted to form aggregates (Clarke, 2013). Researchers have contended that these ensembles or aggregates interact towards an attractor state or a point of order within a system of change (Haynes, 2008; Paley, 2010). The tendency to converge towards a similar or prior structure through configurations of attractors was similarly characterized as a return to a basin of attraction (Hazy, 2006). These actions were aligned with dissipative structure phenomena which occurred in response to turbulence or the occurrence of wicked questions.

Dissipative structures theory. Complexity science and CAS frameworks are congruent with the historical theory of dissipative structures (Metcalf & Benn, 2013; Meyer et al., 2005; Sterian & Sterian, 2012). Beginning with chaos theory which suggests that non-linear and unpredictable events within an environment create disruptions which promote change, dissipative structures theory illustrates an evolution towards a structure and process that emulates destructive yet evolutionary outcomes (Morcol, 2005; Prigogine & Stengers, 1984). Foundational dissipative structures theory suggested that changing or far-from-equilibrium conditions were transformed from chaotic and disorderly conditions to those of evolutionary order through interaction

within and between internal and external systems and processes to create self-organizing dissipative structures (Gemmill & Smith, 1985; Meyer et al., 2005; Prigogine & Stengers, 1884). Building upon foundational dissipative structures theory, Gemmill and Smith (1985) promoted a focus on leveraging inherent stabilities for effective responsiveness during periods of instability resulting from system jolts, turbulence, or conflict. These instabilities were believed to act as catalysts for transformational change through a process of pushing systems and structures out of existing parameters into new parameters of disorder, dissipation or entrophy that resulted in new complex and evolved evolutionary forms of self-organization (Gemmill & Smith, 1985; Metcalf & Benn, 2013; Prigogine & Stengers, 1984; Sterian & Sterian, 2012). Gennill and Smith (1985) expanded upon dissipative theory through an articulation of four conditions believed to be necessary for evolutionary progression within turbulent environments. The first condition was disequilibrium which acts as a catalyst in response to a jolt or major change, followed by symmetry breaking or the dissolution of existing structures or systems, resulting in experimentation or the identification of alternative forms or options and concluding with reformation or the identification of new organizational principles and outcomes (Gemmill & Smith, 1985). This process suggested non-random resonance through an evolutionary progression of linkages between past and future configurations (Gemmill & Smith, 1985; Meyer et al, 2005). Thus, order results from far-from-equilibrium states that self-organize into emergent systems and processes (Bujakiewicz-Koronska, 2009; Metacalf & Benn, 2013; Putnik, 2009).

The strength of the interaction that occurs within a system during phases of dissipative structure change was thought to influence the strength of the outcome which resulted (Sterian & Sterian, 2012). Early foundational dissipative structure theory suggested that dissipative structures are an adaptive response to far-from-equilibrium conditions initiated through the exchange of energy with the environment and the creation of new structures (Goldstein, 1988; Sterian & Sterian, 2012). Contemporary theory has subsequently aligned dissipative structures theory with the shift from a calm to a disruptive state in which emergence through fine grained patterns influence course grained or larger systems or structures contingent upon system constraints (Hazy & Uhl-bien, 2012). The system must therefore be open to change through a reordering or dissipation of current structures to ensure survival through processes of learning and reconfiguration (Gemmill & Smith, 1985; Putnik, 2009) thus suggesting the importance of leadership competencies and actions which enable transformation rather than entrophy within an open systems framework (Gemmill & Smith, 1985; Metcalf & Benn, 2013; Pergogine & Stengers, 1984; Putnik, 2009).

Wicked problems. It has been posited that dissipative structures which arise from turbulence result from wicked questions or problems (Yukawa, 2015). Wicked problems are problems that appear challenging due to the existence of complex interacting elements and lack of clearly apparent solutions to questions or problems (Metcalf & Benn, 2013). The concept of wicked problems historically derived from Churchman (1967) who described wicked problems as problems comprised of complex, confusing, and conflicting values and solutions that potentially had a profound impact

upon a given system-at-large. In many cases, the solution to wicked problems appeared to be worse than the problem itself thus, required a global systems oriented perspective (Churchman, 1967). Wicked problems were considered an overwhelming mess which occurred within complex systems that are ill structured, unpredictable, and subject to extensive change or turbulence (Kannampallil et al., 2011; Yukawa, 2015). Since wicked problems existed within unpredictable environments, resolution predicated upon past practice and experience was uncertain and not applicable thus required adaptive leadership approaches that questioned paradigms, created mental models, enabled collaboration and strategic communications, demonstrated tolerance for emergence, expressed an appreciation for the value of conflict, tested alternatives, and employed practices of persistent reflection (Metcalf & Benn, 2013; Yukawa, 2015). Congruent with the characteristics of CAS, wicked problems required an adaptive nonlinear perspective to problem solving (Metcalf & Benn, 2013; Yukawa, 2015).

The concept of wicked problems is similar to the concept of environmental jolts. Jolts have historically been aligned with organizational seismic tremors which may reveal short and long term weaknesses within foundational organizational structures and processes (Meyer, 1982). For example, through a qualitative and quantitative case study approach, Meyer's (1982) foundational study of three hospitals during a doctors' strike found that successful organizational performance was contingent upon phases of anticipatory, responsive, and readjusting processes of adaptation that were aligned with evolving ideologies unconstrained by structures (Meyer, 1982). More recently, Liang (2013) proposed that adaptation to jolts requires a redefinition of the relationships

between chaos and emergence though processes of self-organization within dissipative structures (Liang, 2013). Similarly, emergence, characterized as the order which emerges though nonlinear processes and component interactions which form differing structures which are greater than the collective parts, has been viewed as a primary differentiating feature of a CAS (Rouse et al., 2011).

Nonlinearity. A significant defining feature of CAS theory is that of nonlinearity (Kannampallil, 2011; Leykum et al., 2007). Historically, leadership and change was viewed through a Neutonian perspective which suggested that causality was linear, predictable, and if not predictable, was the result of a knowledge gap (Morcol, 2005). Newtonian theory encompasses three laws which include the presumptions that velocity is constant unless acted upon, direction is influenced by force, speed and mass, and that the forces of action and reaction act and respond in a complementary, simultaneous and linear manner (Pellissier, 2012, p. 20). Complex adaptive systems theory challenged this perspective.

Complex systems theory views change and the impact of change as a force that is unpredictable and disproportionate (Meyer et al., 2005; Schneider & Somers, 2006). As previously stated, a change in one part of a system is conceptualized to result in a more or less significant change in another part of the system (Meyer et al., 2005; Schneider & Somers, 2006). The outcomes which result are emergent, adaptive, and variable thus not inherently predictable through traditional cause and effect predictions (Akgun et al, 2014; Kannampallil, 2011). Organic transformation subsequently emerges from multiple formal and informal organizational levels and feedback loops that are disassociated from

predictable cause and effect relationships (Geer-Frazier, 2014; Junior et al., 2012; Kannampallil et al., 2011). Similarly, the grounding of CAS theory in chaos theory suggests that changes occur as a result of unpredictable nonlinear change while dissipative systems theory proposes that systems are open rather than closed and experience unpredictable structures and outcomes in response to the exchange of energy with the environment (Morcol, 2005; Prigogine & Stengers, 1984).

As noted previously, traditional leadership theory and practice have been characterized through linear mindsets and perceived experiences (Pellissier, 2012). This traditional view has been congruent with a model that incorporates progressive phases of planning, acting, analyzing, measuring, and reevaluation rather than pursuing a focus on patterns, interactions, interdependencies, networks and relationships within a complex system (Kutz & Bamford-Wade, 2013; Pellissier, 2012). The turbulence and complexity within the present heath services system has suggested the relevance of realigning traditional leadership practices with an adaptive complexity leadership approach that is congruent with the present health services environment (Akgun et al., 2014; Meyer et al., 2005).

Traditional Leadership Theory and Practices

While an extensive review of all past leadership theories is beyond the relevant scope of this paper, notable prior leadership theories are illustrative of the divergence between linear and nonlinear approaches to leadership styles and approaches necessary to effectively achieve outcomes. Past and seminal theoretical approaches suggested that

leadership effectiveness may be conceptualized through a focus that is leader-driven, situationally-driven, or follower-driven (Day, 2014; Plowman et al., 2007).

Leader driven approaches have their early roots in trait and behavioral theories of leadership (Blake, Mouton, Barnes, & Grieiner, 1964; Clark, 2013; Derue, Nahrgang, Wellman, & Humphrey, 2011; Kirkpatrick & Locke, 1991; Mumford, Zaccaro, Harding, Jacobs, & Fleishmann, 2000). Early leadership theory proposed that leadership effectiveness requires the possession of traits such as drive, social or personal motivation, honesty and integrity, emotional stability and self-confidence, intelligence and cognitive abilities, and business oriented knowledge (Kirkpatrick and Locke, 1991), Some traits, such as knowledge, were believed to be influenced by experience and training (Kirkpatrick & Locke, 1991, Mumford et al., 2000). The perspective that experience and training were aligned with leadership effectiveness was also incorporated by researchers into theoretical approaches which emphasized the importance and influence of leadership skills as key drivers for outcomes rather than traits alone. It was posited that essential problem solving effectiveness was enabled by the use of social skills such as intelligence, motivation, drive, tolerant curiosity, cognitive skills and knowledge that is gained through time and experience (Mumford et al, 2000). Complex problem solving therefore was viewed as a linear process necessary to control conflict though experience based characteristics which reflected cognitive abilities, motivation and personality (Mumford et al., 2000). It has similarly been suggested that these skills promoted knowledge building, social capabilities and judgment necessary for problem solving and performance outcomes congruent with environmental influences (Mumford et al., 2000).

The focus on the influence of leadership skills as a discrete construct has similarly been evaluated in the context of planning quality and effectiveness within stable and turbulent or complex environments aligned with group process resulting in an experimentally validated conclusion that planning and structuring skills positively impact planning quality and effectiveness (p=0.005) within complex or turbulent environments (Marta, Leritz, &Mumforrd, 2005, p. 113). Leadership driven approaches have also redirected focus from leadership traits and skills to leadership behaviors.

Seminal historical leader-focused theory described through leadership behaviors included a focus on the leader's behaviors to enable change through relationships that promote trust and teambuilding and production or operational outcomes (Blake et al.,1964; Derue et al., 2011). Foundational theory proposed by Blake, Mouton, Barnes and Greiner (1964) modeled leadership styles and approaches through a managerial grid which identified styles of leadership dependent upon organizational needs and the need to direct the work of others within a linear graphic that illustrated a concern for people balanced against a concern for production. Within this model, the ideal style suggested was one labeled as (sic), "9,9 Management " (Blake et al., 1964, p. 136) or a style which resulted in the completion of work by employees trusted and committed to a common organizational outcome (Blake et al., 1964). Similarly to Blake et al. (1964) styles of leadership behaviors have been proposed in response to a response to people and production through the life-cycle theory of leadership (Blanchard & Hersey, 1996). Under this model, leadership was posited as an approach best actualized through styles of telling or directing, persuading or coaching, participating or supporting, or delegating

(Blanchard & Hersey, 1996). Blanchard and Hersey's (1996) model proposed that telling was necessary when roles and responsibilities must be clearly defined, persuading was necessary in situations where individuals require encouragement or support, supporting was best implemented to support resolution, and delegating was appropriate where groups function without formal leadership designation subject to a leader's assessment of the capabilities of followers to effectively perform in response to an identified situation or circumstances. Similarly, leadership behaviors that are task, relational, or change oriented have been identified or attributed within domains which include content, analytical levels of groups, individuals, dyads, or organizations, and processes of evaluation which target groups or distinct individuals (Derue et al., 2011). As an integrative model, Derue et al.(2011) suggested that leader task, relational, and change oriented behaviors were enabled through traits and characteristics which included demographics such as gender and age, competencies such as emotional stability, self efficacy, and intelligence, and interpersonal attributes such as emotional intelligence and extroversion (p. 10). When viewed through an integrative trait and behavioral model of leadership,, leader behaviors were aligned with a greater variance in leadership effectiveness than traits while suggesting the efficacy of an integrative model which incorporated the mediating impact of traits (Derue et al., 2011). These pre-mentioned theoretical models collectively suggest that leadership behaviors should be implemented with consideration of the environment or situations confronting the leader (Blake et al., 1964; Blanchard & Hersey, 1996; Derue et al., 2011).

Situational theory and approaches have been historically illustrated through contingency theory (Ayman, Chemers, & Fiedler, 1995; Strube & Garcia, 1981) and decision-making theory (Sternberg & Vroom, 2002; Vroom, 2000; Vroom & Jago, 2007). Fiedler's contingency theory proposes that leadership effectiveness is a function of a match between leader characteristics and groups, whether the applicable situation is task or relationship oriented, and the leader's level of authority or position power (Aymen et al.,1995; Strube & Garcia, 1981). Within this theoretical perspective leadership effectiveness is contingent upon leader attributes and situational control within a multi-level multi-source model that requires a person-situation match to ensure effectiveness as demonstrated through satisfaction, overall performance, and levels of stress (Ayman et al, 1995, p. 149). The leader's orientation was defined through the least preferred co-workers (LPC) scale while situational control was viewed as a function of the climate or disposition of the group, the structure of the task which required completion and authority or power (Aymen et al., 1995). Leaders who demonstrated a high LPC were found to be significantly relationship oriented and most effective within situations of moderate control while leaders who demonstrated a low LPC were noted to be significantly task oriented and to function most effectively within situations of high and low control ($p<0.05$) (Strube & Garcia, 1981, p. 316).

Situational factors have also been aligned with leadership decision-making processes through a focus on the characteristics of a required decision and the characteristics of the group to whom decision-making authority may be granted (Sternberg & Vroom, 2002; Vroom, 2000; Vroom & Jago, 2007). Suggesting that one

may predict effectiveness contingent upon the similarity between situations, it was posited that situations impact organizational effectiveness and the effectiveness or consequences of a leader's behaviors (Vroom & Jago, 2007). Effective leaders were identified as those who synthesized characteristics of wisdom, intelligence, and creativity (Sternberg & Vroom, 2002) to analyze situational factors and the importance of a decision with consideration of the decision's importance, a group's perceived commitment, support, competence, knowledge, and expertise, and a leader's influence to determine whether decision- making should be facilitated by delegation, consultation, or independent decision-making by the leader or group (Vroom, 2000; Vroom & Jago, 2007). Concurrently, situational variables were believed to moderate decision-making effectiveness dependent upon the alignment of behavior with situational demands (Sternberg & Vroom, 2002; Vroom & Jago, 2007). As illustrated within situational leadership theories, the role of the leader in response to followers may therefore influence effectiveness (Aymen et al., 1995; Sternberg & Vroom, 2002; Strube & Garcia, 1981; Vroom & Jago, 2007).

Follower-driven leadership theories that promoted the role and empowerment of followers such as path goal theories (House, 1971; Vroom & Jago, 2007), leader-member exchange (Davies, Wong, & Laschinger, 2011; Furst & Cable, 2008; Smith, Montagno, & Juzmenko, 2004; Wilson, Sin, & Conlin, 2010), and servant leadership (Avolio, Walumbwa, & Weber, 2009; van Dierendonck, 2011) have also been posed. Through follower driven theories, empowerment of followers characterized as enhanced control or authority over one's job have been aligned with performance effectiveness through

experimental simulation (Biron & Bamberger, 2011), quantitative analysis of survey results aligned with influence and attribution (Furst & Cable, 2008), and an examination of the contributions of both leaders and followers to the leader-follower relationship (Wilson et al., 2010).

Grounded in expectancy theory, path goal theory had its historical roots in the presumption that individuals were motivated towards task accomplishment when a subjective expectation exists that successful completion of a task is possible and will be personally satisfying (House, 1971). Path goal theory characterizes the leader's role as one of removing obstacles from the path of the individual through means such as goal clarification, provision of sufficient resources and rewards, and through processes of initiating structure and consideration (House, 1971; Vroom & Jago, 2007). Path goal theory, also characterized as a theoretical contingency approach to leadership, promotes a match between situationally aligned behaviors, contingent follower and environmental characteristics, and conditions that stimulate job satisfaction, leader acceptance, and enhanced performance and rewards (House, 1971; Vroom & Jago, 2007). The theoretical focus on empowerment of followers contingent upon the relationship with a leader is congruent with leader-member exchange approach (Furst & Cable, 2008, Wilson et al., 2010).

The theoretical leader-member exchange (LMX) approach to leadership focuses on the strength and nature of the relationship between leaders and subordinates (Wilson et al., 2010). The LMX approach is predicated upon a dyadic relationship characterized through interpersonal levels of trust, loyalty, support, a positive sense of liking or

compatibility, professional respect, and hard or soft leadership influential processes (Davies et al., 2011; Wilson et al. 2010). Hard leadership processes such as the imposition of sanctions or punishment or soft leadership processes such as consultation or ingratiation have been moderated by positive leader-member exchange when quantitatively considered in the context of resistance to change where high levels of leader-member exchange suggested a positive attribution to change (p<0.01-0.05) proposed by a leader (Furst & Cable, 2008, p. 457). In contrast, the leader-member exchange relationship may also be conceptualized from the perspective of what both the leader and member contribute to the relationship when aligned with resource theory. Within this context, Wilson, Sin, and Conlon's (2010) theoretical literature review suggested that leaders and members mutually contribute to a relationship within the resource categories of affiliations, status, service, information, goods, and money to the extent of their capabilities and opportunity. The strength of the mutual exchange which resulted has been aligned with the extent to which a positive LMX relationship exists (Wilson et al., 2010).

In contrast to the pre-mentioned theories which emphasize the importance of mutuality between leaders and subordinates, servant leadership theory suggests that organizational effectiveness is achieved through ethical and values oriented service, empowerment, and development on behalf of followers (Smith et al.,2004; van Dierendonck, 2011). Within the context of servant leadership theory, servant leaders view service to others as the primary motivating factor for leadership practice through authentic processes of placing value on others, enabling a process of community building,

promoting a future vision, and promoting shared leadership structures and processes (Smith et al., 2004). Researchers have found that servant leaders empower followers through a consistent demonstration of traits and practices such as empathy, humility, trustworthiness, effective communication and listening skills, and the promotion of the success of others through processes of effective delegation (Avolio et al., 2009; van Dierendonck, 2011). Follower characteristics which have been associated with effective servant leadership congruently included those of personal growth and development, greater degrees of health and wisdom, and the incorporation of servant leadership characteristics within follower practices (van Dierendonck, 2011). While servant leadership practices were found to be focused on outcomes aligned with serving others (Avolio et al., 2009; Smith et al., 2004; van Dierendonckj, 2011), transactional and transformational leadership practices have been found to be focused on the achievement of organizational outcomes and well-being through followers (Bass & Avolio; 1994; van Dierendonck, 2011).

Transactional and transformational leadership theories illustrate two aligned yet contrasting approaches to leadership of followers within organizations (Bass & Avolio, 1994; Smith, Montegno, & Kuzmenko, 2004). Transactional leadership approaches are characterized through a focus on rules, standards, identification of expectations through overt or covert contracting processes, close monitoring, and a focus on short term stability and prevention (Bass & Avolio, 1994; Smith et al., 2004). Also described as an economic cost-benefit model of leadership, transactional leadership theory positions leaders to influence the behaviors of followers through processes of contingent rewards

or punishment subject to achievement of identified outcomes or through a process of management by exception which results in intervention only when a practice or outcome had not been achieved (Bass & Avolio, 1994; Smith et al., 2004; Weberg, 2010). The implementation of transactional leadership practices has been posited as necessary for organizational effectiveness through research (Bass & Avolio, 1974; Hamstra, Van Yperen, Wise, & Sassenberg; Smith et al., 2014). For example, transactional leadership practices have been suggested where stable structure and processes are necessary (Bass & Avolio, 1994) or to enable followers' performance goals (Hamstra et al., 2014).

In contrast to transactional leadership, transformational leadership theory suggests that leadership effectiveness is characterized through a focus on an abstract, optimistic, strategic, and long term future oriented visioning (Bass & Avolio, 1994; Hamstra et al., 2014; Smith et al., 2004; Weberg, 2010). A theoretical transformational focus includes the factors of (sic), "idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration" (Bass & Avolio, 1994, p. 542). More specifically, idealized influence has incorporated practices of ethical and moral role modeling, enthusiasm and open communications which articulate a shared vision have been associated with practices of inspirational motivation, encouragement of creative innovation and risk taking demonstrated processes of intellectual stimulation, and consideration reflected a focus on prioritizing the needs of followers (Smith et al., 2004; Weberg, 2010). Effective transformational leadership practices have enabled an interdependent and adaptive culture of shared expectations and values resulting in aligned organizational goals and objectives (Bass & Avolio, 1994; Smith et al., 2004; Weberg,

2010). For example, critical review of research aligned with processes of participative decision making suggested that transformational leadership practices were associated with increased staff satisfaction and well-being and decreased burnout (Weberg, 2010). Similarly, transformational leadership styles were significantly and positively related (p=0.001) with followers' engagement with mastery goals between and within groups (Hamstra et al., 2014, p. 418) while demonstrating qualitative promotion of positive cultural change characterized by employee engagement, learning, commitment, and competence (Bumford-Wade & Moss, 2010).

Collectively, the pre-mentioned leadership theories incorporate a focus on a unit of analysis that may include the leader, follower, or situation through a linear cause and effect model often contingent upon knowledge gained through experience (Avolio et al., 2009; Shirey, 2013; Sternberg & Vroom, 2002; Munford et al., 2000). Dinh et al. (2014) suggested that contemporary leadership theories may be more accurately aligned within a framework which incorporates a combined global, compositional, and compilational perspective congruent with emergent leadership approaches and outcomes that illustrate the multiple interactions between leaders, followers, and situations within multilevel processes and systems. Complexity leadership theory incorporates an organizing framework which includes variables of leaders, followers, and the situations within a complex interdependent, interrelated and adaptive systems framework that recognizes the interdependent, adaptive, and emergent nature of interactions within complex and turbulent systems (Avolio et al., 2009; Clark, 2013; Dinh et al., 2014; Hazy & Uhl-bien, 2012; Tong & Arvey, 2015; Uhl-Bien et al. 2007). It has been similarly proposed that

complexity leadership links conceptually to multiple traditional leadership styles through what Metcalf and Benn (2013) labeled as the leadership of convergence. Within this framework stable structures were aligned with leadership styles labeled as bureaucratic, autocratic, ethical or moral, a search for a particular attractor basin or stable state aligned with transformational, complexity, or emergent leadership styles, and where stability that is achieved through norms was sought, the prevalence of leadership styles that emulated collaborative participative, shared, authentic, or visionary forms of leadership were noted (Metcalf & Benn, 2013, p. 377).. This model conceptually reflected a leadership approach which emulated the multiple levels of complexity leadership through a converging or integrative focus on execution aligned with system characteristics within a fluid and evolving continuum rather than within a discrete time period (Hanson & Ford, 2010; Hazy & Uhl-Bien, 2012; Metcalf & Benn, 2013).

Complexity Leadership

Description. Complexity leadership has been posited as a means for leveraging rather than controlling factors and outcomes within turbulent environments (Hanson & Ford, 2010) through changing, overlapping, and unpredictable structures, hierarchies, and processes which are achieved through interactive adaptive learning networks (Hazy & Uhl-Bien, 2012; Uhl-Bien et al, 2007). Complexity theory suggests that successful leadership practices are conceptually enabled through collective capacity, shared leadership, learning, and knowledge (Clarke, 2013; Tong & Arvey, 2015). The theoretical analysis of complexity leadership practices within CAS requires consideration of system dynamics and aggregates that emerge through bonding, experimentation and

adaptation (Uhl-Bien et al., 2007; Hazy & Uhl-Bien, 2012). Emergence incorporates changes within a system through reformulation and processes of self-organization that are achieved through dis-equilibrium, deviation, a process of recombination, and the emergence of new or stabilized structures and processes (Hazy & Uhl-Bien, 2012). Consistent with the previously noted discussion related to dissipative structures theory, theorists suggested that emergence occurs at the edge of chaos through reformulation within a dissipative structures phenomenon in response to far-from-equilibrium conditions (Hazy & Uhl-Bien, 2012; Prigogine & Stegers, 1984). Complexity leadership theory incorporates the proposition that this process is actualized through complexity leadership behaviors and the function of leaders as integrative and multidirectional and dimensional tags (Clarke, 2013; Dinh et al., 2014; Hazy & Uhl-Bien, 2012; Schneider & Somers, 2006; Tong & Arvey, 2015; Uhl-Bien et al., 2007). Complexity leadership behaviors are theoretically characterized through interchangeable administrative, adaptive, and enabling approaches (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007)).

Administrative leadership has been described by researchers as hierarchical top-down authoritarian processes which have been more recently defined as course grained activities (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2012). Foundational theory aligns administrative leadership with activities such as task structuring, planning, resource acquisition and planning, alignment and control (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). In contrast, adaptive leadership has been characterized by researchers as a fine grained emergent leadership form which enables adaptation and non-linear change through complex direct and indirect interactive and interdependent networks that respond

through multiple feedback loops to environmental changes and requirements (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). Adaptive leadership has been conceptualized as an informal bottom-up collective leadership process that emerged through resonant and catalytic mechanisms which promoted behaviors though dissipation, phase transition, and non-linear processes of information exchange. While adaptive leadership was viewed as the emergent process of complexity leadership by researchers, the catalyst between administrative and adaptive leadership was identified as enabling or, more recently, as complexity leadership (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). Theoretically, enabling leadership approaches requires states of adaptive tension, networking, and interdependence to enable the transition between course and fine grained actions and outcomes (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). Similarly, researchers have proposed that leaders acting as tags catalyze emergent, holistic, and adaptive change through an integrative enabling or complexity leadership approach (Hazy & Uhl-Bien, 2012; Hanson & Ford, 2010; Schneider & Somers, 2006).

These leadership approaches have also been conceptualized within multiple levels. A meso model of complexity leadership proposed by Unl-Bien and Marion (2009) posited that informal enabling leadership processes were necessary to ensure adaptive bureaucratic processes of organization. This perspective suggested that the enabling function served as a necessary and critical component to ensure effective entanglement and outcomes that reflected creative processes that are unrestrained by the administrative function through practices of information processing, nonlinear thought processing and dialogue, and acknowledgment of attractor states (Uhl-Bien & Marion,

2009). Whether a system returns to a prior state or basin of attraction, or to a new state which encompasses multiple possible states or positions (Hazy, 2006) may be influenced by the manner in which leaders simplify transactions and promote a transformational systems state through the exercise of meta capabilities within a basin of attraction, a subset of all possibilities or within structural attractors, or through emergence (Hazy & Uhl-Bien, 2012). Leadership actions that catalyzed specific ends through the enabling process are theoretically congruent with the concept of the leadership of convergence (Hazy, 2006; Metcalf & Benn, 2013). Similarly, a leadership and capabilities model has been proposed that characterizes leaders within a change capabilities framework which suggested that organizational capability rather than individual capabilities are an appropriate variable to examine through meta-capabilities that promote exploitation, exploration, the generation of new capabilities, and unification in response to the environment (Hazy & Uhl-Bien, 2012).

Within these contexts, complexity leadership has been viewed as an interactive, formal, informal, and interdependent process (Hanson & Ford, 2010) which incorporated capabilities to leverage resources and opportunities in a balanced manner through behavioral signals (Hazy, 2006) within a committed and aligned culture that reinforced the importance of collective benefit, process improvement and effectiveness, a learning environment, innovation, and a persistent balance between benefits or investment and risk (Hazy, 2006). Hazy (2006) suggested that metrics aligned with complexity leadership should reflect integration between actions which promote value such as working for the common good and enabling new ideas and cultural cornerstones.

Research aligned with the application of complexity leadership theory has similarly demonstrated behaviors aligned with organizational outcomes within CAS.

Behavioral outcomes and characteristics. Clarke (2013) promoted a framework to illustrate behaviors and organizational characteristics that were aligned with positive outcomes within CAS. These behaviors and characteristics were categorized within the areas of autocatalysis, shared leadership, networks, learning and the creation of shared meaning, information flows and communication processes, tension and adaptation, and social capital (Clarke, 2013, p. 139). Congruently, the integration of discrete leadership styles such as transformational and transactional leadership approaches, diverse relationships, co-evolution and self-organizing behaviors, self-control and maturity aligned with emotional intelligence, environmental scanning, and flexibility have been posited as behaviors aligned with effectiveness within CAS (Clarke, 2013; Corazinni et al., 2014; Dai et al., 2014; Ellis & Herbert, 2011; Espinosa & Porter, 2011; Ford, 2009; Hannah et al., 2009; Hanson & Ford, 2010; Hempe, 2013; Lichtenstein & Plowman, 2009; Metcalf & Benn, 2013; Mittleton-Kelly, 2011; Psychogios & Garev, 2012; Regine & Lewin, 2000). Collectively, it is my assessment that these frameworks provide a means to examine theoretical and empirically derived outcomes associated with complexity leadership.

Autocatalysis, as a process which incorporated use of the work environment to enable or promote actions through dissipation and emergence between ensembles by leaders who functioned as tags between and among stakeholders and processes, was evaluated through theoretical literature review (Akgun et al., 2014; Clarke, 2013;

Metcalf & Benn, 2013), qualitative and longitudinal case studies (Mittleton-Kelly, 2011; Plowman et al., 2007; Putnik, 2009), analysis of empirical studies which documented emergence (Lichtenstein & Plowman, 2009), and qualitative dynamic network analysis within hospital laboratory units (Hanson & Ford, 2010). Additionally, qualitative studies of commercial firms suggested that accreting nodes aligned with ideas that change in importance as knowledge is gained influence innovation, the creation of new ideas and self-organization (Akgun et al., 2014) while the use of history as a means to identify opportunities and learning through path dependence but not as a predictor has been aligned with effective strategy building and implementation (Best et al., 2012).

The positive influence of shared leadership models that demonstrated processes of coaching, empowerment, enabling, and coordination through implementation of flexible and informal distributed and shared responsibility leadership structures rather than bureaucratic, hierarchical, and controlling leadership structures within multiple stakeholder levels has been illustrated through journal, literature and theoretical reviews (Clarke, 2013; Dinh et al., 2014; Geer-Frazier, 2014), qualitative, quantitative, and longitudinal case studies (Akgun et al., 2014; Edson, 2012; Espinoosa & Porter, 2011; Junior et al., 2012; Mitleton-Kelly, 2011; Plowman et al., 2007) and through a realist review of the implementation of strategic initiatives to enable large system transformation (Best et al., 2012). Through a quantitative secondary data analysis of nursing home employee perceptions, the importance of multilevel and multidimensional decision making was also identified as a significant organizational and individual competency (Anderson et al., 2013). Similarly, a focus on people by leaders who visibly

shared risks and promoted mutual work processes through interdependence, trust, loose, autonomous, and organic structures, rather than control was aligned with effectiveness within CAS when viewed through longitudinal cross-sectional qualitative studies of organizations within turbulent environments (Psychogios & Garev, 2012; Regine & Lewin, 2000).

The influence of creating a sense of shared meaning has been aligned with the importance of shared leadership (Clarke, 2013). Researchers have theoretically aligned the creation of shared meaning with mutual sense-giving or engagement among individuals and groups (Clarke, 2013; Metcalf &Benn, 2013). Similarly, qualitative and case study reviews suggested that shared meaning was aligned with new relationships (Ford, 2009), individual and collective learning (Edson, 2012; Putnick, 2009), ethical and values based trusting relationships (Regine & Lewin, 2000), and engagement of diverse stakeholder groups (Best et al., 2012).

Theoretically and qualitatively shared meaning was also enabled by effective formal and informal consensual networking and communication processes (Clarke, 2013; Dinh et al., 2014; Edson, 2012; Espinosa & Porter, 2011; Ford, 2009; Geer-Frazier, 2014; Mittleton-Kelly, 2011; Putnik, 2009). Effective networks within CAS have improved interventions within health services in a statistically significant manner through practices which promoted interconnections (p=0.03) and co-evolution (p=0.001) (Leykum et al., 2007, p. 31). Networks associated with collaborative intra-organizational or industry relationships have concurrently been qualitatively aligned with leadership effectiveness within turbulent environments (Psychogios & Garev, 2012). Similarly, the importance of

informal as well as formal networks was identified as significant within CAS (Corazini et al., 2014; Hannah et al., 2009). For example, informal networks were qualitatively identified as enablers of culture change through observational study (Corazinni et al., 2014), organizational clarity within complex environments of change, and enhanced business effectiveness (Psychogios & Garev, 2012). Effective networking was also aligned with cross communications across boundaries (Espinosa & Porter, 2011). Information flow has further been identified as an enabler of effectiveness and resilience within CAS when viewed through qualitative, realist, and grounded theory aligned with appreciative inquiry perspectives comprised of feedback loops and the use of measures that are trusted, inclusive, understandable, consistent, and celebrated (Best et al.,, 2012; Edson, 2012; Regine & Lewin, 2000). Additionally, when quantitatively evaluated in the context of innovative business practices, the expansion of knowledge and information was found to be positively related ($p<0.001$) to innovation when aligned with mechanisms that promote resonance and accreting nodes (Akgun et al., 2014, p. 29). Information flow effectiveness has required individual and social relationships that are aligned with social capital (Clarke, 2013).

Social capital enhancement has been theoretically and qualitatively aligned with leveraging cognitive and relational processes to foster knowledge transfer (Clarke, 2013), engage multiple stakeholder styles and levels within organizations (Metcalf & Benn, 2013), build culture (Corazinni et al., 2014), and enable diverse entrepreneurial approaches (Psychogios & Garev, 2012). Empirical studies of emergence suggested the importance of interactions within relational spaces (Lichtenstein & Plowman, 2009)

while a focus on relationships within the multiple levels of work, individuals, a sense of congruent and interdependent purpose and values, and external systems and communities and environments (Akgun et al., 2014; Geer-Frazier, 2014; Regine & Lewin, 2000) have been associated with effectiveness within CAS. Similarly, enabling diverse relationships were enablers within CAS theoretically and qualitatively (Clarke, 2013; Ford, 2009; Hannah et al., 2009; Hanson & Ford, 2010; Metcalf & Benn, 2013; Mittleton-Kelly, 2011; Psychogios & Garev, 2012). Researchers and theorists have noted that open processes of information flow (Ford, 2009) associated with consistent feedback loops (Ellis & Herbert, 2011) enabled by diverse social and relational enhancements (Clarke, 2013) served to enhance or expand knowledge or accreting nodes in a manner that influenced information exchange, knowledge, and subsequent innovation (Akgun et al., 2014). In doing so, creative tension and adaptation aligned with emergence within CAS were fostered through open communication flows (Clarke, 2013).

As previously noted, tension and adaptation were cited as necessary phenomena associated with emergence from chaos or disruption through dissipation (Clarke, 2013: Ellis & Herbert, 2011; Mitleton-Kelly, 2011; Prigogine & Stengers, 1984; Putnik, 2009; Uhl-Bien et al., 2007). Adaptation in response to organizational fuzziness which results from change, informality, and complexity was cited as a necessary prerequisite for organizational effectiveness within Hempe's (2013) mixed methods mainly qualitative study of health and social care organizations. Qualitative case study review has further suggested that differences and organizational and stakeholder needs must be recognized and recombined to leverage turbulence (Corazinni, 2014; Ford, 2009). Concurrently, co-

evolution was statistically and significantly related (p=0.001-0.003) to adaptation where individuals demonstrated the ability to modify practices in response to internal and external forces (Leykum et al., 2007, p. 31) while the promotion of linkages, structures, information, and actions through dynamic networks in response to internal and external environments and forces positively enabled innovation within a CAS (Akgun et al., 2014). Co-evolution and self-organizing have concurrently enabled the creation of emergent patterns that are aligned with positive outcomes (Ellis & Herbert, 2011; Hanson & Ford, 2010; Regine & Lewin, 2000). Tension and adaptation were also empirically associated with experimentation and emergence (Lichtenstein & Plowman, 2009), innovation (Espinosa & Porter, 2011), and strategic alignment and implementation through self-organization and creativity (Junior et al., 2012). The process of adaptation reflected the significance of destabilization and disruption of existing patterns within CAS (Plowman et al., 2007) aligned with enabling a balance between adaptation and administrative control (Hannah et al., 2009). Effective adaptation within CAS also required a flexible approach which mirrors openness to multiple perspectives and alternate combinations of resources and processes (Hannah et al., 2009; Lichtenstein & Plowman, 2009; Psychogios & Garev, 2012; Regine & Lewin, 2000) by leaders that demonstrated maturity and emotional intelligence (Metcalf & Benn, 2013). These outcomes suggested the importance of blending leadership approaches within CAS. For example, outcomes identified through theoretical and qualitative review suggested that an interchangeable blending of transactional and transformational leadership is necessary to ensure creative visioning and motivation balanced against needs to establish congruent

goals and to enable stabilization (Corazinni et al., 2014; Ford, 2009; Lichtenstein & Plowman, 2009; Metcalf & Benn, 2013; Psychogios & Garev, 2012).

As an integrative theory. Dinh et al.(2014) proposed that leadership theory and research spans a diverse knowledge base of leadership approaches that transverse multiple perspectives on the manner in which leaders influence multiple processes, forms and outcomes within individual, group, organizational, community, and systems levels. Consistent with this framework (Dinh et al., 2014) and the leadership of convergence (Hazy, 2006; Metcalf & Benn, 2013) , it is posited that administrative, adaptive, and enabling complexity leadership theory approaches (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007) may serve as a unifying and integrative theory within which multiple leadership approaches may be organized.

The administrative complexity leadership focus on goals, objectives, process implementation and control within a hierarchical context (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007) may be aligned with transactional leadership practices which promoted contingent rewards, structures, rules, contracting, processes, short term stability (Bass & Avolio, 1994; Smith et al., 2004; Weberg, 2012). Concurrently, the adaptive complexity leadership focus on non-linear change, feedback loops, informal and collective interdependent processes, emergence, and path dependence (Espinosa & Porter, 2011; Hazy &Uhl-Bien, 2012; Uhl-Bien et al., 2007) may be reflective of leadership approaches that emphasized variance dependent on the importance of a focus on people or relationships versus organizational production (Blake et al., 1964; Blanchard &Hersey, 1996), the complexity of the environment in which a problem is solved (Marta et al.,

2005), and the alignment between a needed decision and group characteristics (Sternberg & Vroom, 2002; Vroom, 2000; Vroom & Jago, 2007). Similarly, the emphasis on influence, inspiration, stimulation, optimism, and long term strategy inherent within transformational leadership (Bass & Avolio, 1994; Weberg, 2010) may be aligned with the adaptive focus on emergent collective non-linear processes and relationships (Hazy & Uhl-Bien, 2012). Enabling leadership processes of adaptive tension, networking, interdependence, and tagging between administrative and adaptive leadership approaches (Hanson & Ford, 2010; Hazy & Uhl-Bien, 2012; Schneider & Somers, 2006; Uhl-Bien et al., 2007) may be aligned with empowerment of others as is suggested within path goal theories that promoted the importance of removing obstacles from the paths of followers (House, 1971; Vroom & Jago, 2007), leader-member exchange theory which recognized the influence of relationships between leaders and followers on organizational outcomes (Davies et al, 2011; Furst & Cable, 2008; Smith et al., 2004; Wilson et al. 2010), or servant leadership theories that promoted empowerment through service by leaders to followers (Avolio et al. 2009; van Dierendonck, 2011). Collectively, conceptual alignment between complexity leadership approaches and identified discrete leadership approaches may therefore, exist. Similarly, leadership effectiveness theoretically requires the exercise of enabling leadership practices within CAS (Hazy & Uhl-Bien, 2012). Researchers have posited that adaptive capacity realized through the interdependent exercise of agility and resilience is a necessary leadership enabling capability and practice within turbulent CAS (American Management Association, 2006; McCann & Selsky, 2012).

Adaptive Capacity

Summary. The concept of adaptive capacity was historically rooted within theories of adaptation (Chakravarthy, 1982). Early seminal theory viewed leadership as a strategic process which promotes organizational effectiveness through the achievement of an appropriate fit between the environment and one of three adaptive unstable, stable, or neutral states (Chakravrathy, 1982). Forms of adaptation were viewed as effective dependent upon the environment in which an organization existed (Chakravarthy, 1982). Theorists proposed that unstable states aligned with organizational buffering activities were defensive passive states that promoted organizational insulation from the environment, stable states served to promote a reactive and analytical organizational responsiveness to the environment, and neutral states promoted adaptation through proactive actions which served to embrace and leverage change (Chakravarthy, 1982; Lengnick-Hall & Beck, 2005). Thus, an unstable fit was believed to be best suited to environments best coped with through passive buffers within slowly changing environments, reactive strategies were believed to promote a stable fit within the environments of moderate complexity and visible requirements through provision and conservation of resources, and proactive strategies associated with a neutral fit were thought to be best aligned with highly complex environments in which anticipation and leveraging best promoted a shift from one state to another (Chakravarthy, 1982; Lengnick-Hall & Beck, 2005). Implementation of these forms required a balance between processes of adaptive specialization or the alignment of organizational fit within an adaptive state or adaptive generalization which incorporated the management of a

misfit to align with a higher order or adaptive state (Chakravarthy, 1982). This interchangeable balance suggested that adaptability was derived from the capacity to adapt or change while retaining organizational functionality (Kutz & Bamford-Wade, 2013; Erol, Sauser, & Mansouri, 2010).

Also historically aligned with the concept of adaptation was the foundational framework of rugged landscapes presented by Levinthal (1997). Simulated analysis characterized the process of adaptive emergence and the successive formation of landscapes influenced by prior activities impacted by a process of path dependence and the creation of tightly or loosely fitted forms within a given landscape (Levinthal,, 1997). Premised on the conclusion that since all organizations within a given environment were subject to the same forces, interaction effects resulted in either abrupt or rugged changes or smooth changes influencing singular variables (Levinthal, 1997). Similar to Chakravarthy's (1982) characterization of neutral adaptive organizational fits, Levinthal (1997) concluded that tight forms of landscapes are less adaptive than alternate loose forms thus, loosely coupled landscapes were suggested as forms that were more suited to creative exploration and exploitation.

As noted, the environments within which these processes were conceptualized appeared to retain or achieve states of equilibrium (Chakravarthy, 1982). Since turbulence was characterized as a constant state of dis-equilibrium or change, theoretical approaches evolved to incorporate the concept of robust transformation (Lengnick-Hall & Beck, 2005) and adaptive capacity (McCann & Selsky, 2012). Robust transformation incorporates assumptions that the existence of persistent changes and environmental jolts

illustrate a different type of change and equilibrium (Lengnick-Hall & Beck, 2005; Meyer, 1982). Robust transformation, described through the existence of fluid and episodic events, is predicated upon the view that transition is an opportunity for the spontaneous development of capabilities, that tension rather than balance promotes change, that change may initially result in deviation from a pre-determined strategy, and that slack resources can be leveraged to promote expansion, flexibility, and change (Lengnick-Hall & Beck, 2005). Thus, robust transformation promotes organizational behaviors that more comprehensively respond to an array of possible environmental conditions. Researchers posited that responses to these changes reflected repetitive routines which included organizational assumptions about the environment, routines that were adaptive, transformational, or consistent with past practices, and the exercise of consistent and predictable organizational competencies which could be aligned with multiple organizational levels and performance related variables (American Management Association, 2006; Lengnick-Hall & Beck, 2005; McCann & Selsky, 2012; Pulakos et al., 2002). Conclusively, a persistent theme within these frameworks has appeared to be one which incorporates the assumption that while organizations cannot control external forces, internal characteristics can be responsively changed or adjusted (American Management Association, 2006; Erol et al., 2010). .Adaptive capacity was identified through research as a framework within which alternate adaptive and transformational behaviors could be initiated in response to external forces (American Management Association, 2006; McCann & Selsky, 2012).

Adaptive capacity or the capability to effectively manage and thrive within conditions of change or in response to environmental jolts theoretically requires the balanced and interchangeable exercise of both agility and resilience within turbulent environments at individual, team, organizational, and ecological levels (American Medical Association, 2002; Hannah et al, 2009; McCann & Selsky, 2012; Meyer, 1982; Pulakos et al., 2002; Wieland & Wallenburg, 2012). Organizations have been required to demonstrate capabilities to alter strategies, processes, systems, and relationships in a manner that sustained effectiveness during periods of change or disruption (Erol et al., 2010). Similarly, adaptive capacity capabilities which included those of being purposeful, aware, action-oriented, resourceful, and networked have been positively aligned with competitive organizational value defined through profitability and competitiveness (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). These outcomes suggested the alignment of the discrete yet interrelated variables of agility and resilience with the achievement of positive organizational outcomes within complex adaptive and turbulent environments (Hannah et al., 2009;' McCann & Selsky, 2012). Given the current complexity and turbulence within the health services environment, purposeful actions by health services leaders to enable formal and informal wholistic responsiveness at multiple levels and through integrated processes and policies within this adaptive context was posited as a necessary prerequisite for organizational effectiveness (American Management Association, 2006; Hanson & Ford, 2010). When considered within the context of turbulence, market turbulence has been positively related to bonding behaviors ($p<0.01$), nonlinear behavior

(p<0.01), and attractor behavior (p<0.01) while technology turbulence has been similarly and positively related to nonlinear and attractor behaviors (p<0.01) (Akgun et al., 2014, p. 29). Similarly, agility, resilience, and turbulence cumulatively explained 0.178 of a variance in competitiveness when measured by *R2* for a sample of international and national manufacturing firms (McCann et al., 2009, p. 48). These interactions and relationships suggested a correlation between the variables of agility and resilience within the turbulent and complex health services environment and organizational outcomes.

Agility. The construct of agility is defined though use of consistent terms which include fast, early, flexible, responsive, and quick (American Management Association, 2006; Breu et al., 2001; Erol et al., 2010; Vinodh & Devadasan, 2011; Vindoh et al., 2012). These terms theoretically suggest that agility is demonstrated through the ability to recognize and leverage unforeseen or unpredictable events as opportunities within competitive environments in a manner that enables positive organizational outcomes and survival (Breu et al., 2001; Flumerfelt, Siriban-Manalang, & Kahlen, 2012; Yauch, 2011). When conceptualized within the context of learning, agility is defined through characteristics which exemplify the speed, flexibility, and willingness to synthesize multiple experiences within and across ideas and experiences through processing and perceptual alignment followed by flexible application of what is learned to achieve positive outcomes (Dai et al., 2013; Derue et al., 2012). Similarly, Derue, Asford, and Meyers (2012) have posited that agility should not be defined solely based upon ones willingness to learn but rather through a focus on speed and flexibility, thus emphasizing a behavioral rather than trait oriented perspective. Cumulatively, examination of these

definitions suggested characteristics aligned with agility within turbulent or unpredictable environments of change (American Management Association, 2006; Breu et al., 2001; Dai et al., 2013; Flumerfelt et al., 2012; Vinodh et al., 2012; Yauch, 2011).

Agility was characterized through research as the capacity to proactively assess the environment and respond quickly through processes such as flexible and fluid resource deployment and openness to change (American Management Association, 2006; McCann et al., 2009; Pellissier, 2012), strategic thinking unhindered by decision-making processes (Pellissier, 2012), learning (Dai et al., 2013; Flumerfelt et al., 2012), and empowerment and independent decision making (Breu et al., 2001; Vinodh et al., 2012). Quantitative multi-variant analysis achieved through factor loading and clustering demonstrated that workforce agility capabilities included intelligence and competencies when viewing the association between these competencies and variables of collaboration, culture, and technical information systems support (Breu et al., 2001). When contemplated in the context of the relationship between learning agility and executive success, characteristics such as mental attributes, the nature of change, achieved outcomes, and the existence of individual self-awareness was examined (Dai et al., 2013). These characteristics were congruent with enablers suggested by Vinodh and Devadason (2011) and Vinodh, Madhyasta, and Praveen (2012) who examined agility through a fuzzy logic quantitative case studies approach. Five enablers which included management structure and authority, manufacturing customer and business responsiveness and technical process outsourcing, workforce status and engagement, technology product design, life cycles, services, planning, methods, and automation, and

strategic quality and cost and time management were measured as components of an agility index (Vinodh & Davadasan, 2011; Vinodh et al., 2012). Significant relationships (p<0.05) were noted when agility was aligned with factors such as employee involvement and engagement, competency, responsiveness, flexibility, innovation, proactive performance, and competitiveness (Vinodh et al., 2012, p. 659). Examination of outcomes aligned with measures of agility have been congruent with that suggestion (Dai et al,m 2013; McCann et al., 2009; Pipe et al., 2012; Raney, 2014).

Performance outcomes were aligned with agility through Raney's (2014) case study illustrating that agility as a component of adaptive leadership enhanced staff inclusiveness, cost effectiveness, and responsive operations, by Pipe et al. (2012) who implemented quantitative paired t-tests to demonstrate that agility was significantly related (p< 0.001) to goal clarity, productivity, communication effectiveness, and time pressures when aligned with resilience during stressful situations (p. 816), and Dai et al. (2013) who quantitatively concluded that learning agility was significantly related to leadership competence (r=0.29, p<0.01), a significant predictor of hierarchical position in relationship to a CEO (r=0.25, p<0.05) and to total compensation (r=0.38, p<0.01) (p. 119). Both similarly and in contrast, McCann, Selsky, and Lee (2009) demonstrated a positive and significant (p equal to at least 0.05) relationship between agility and the achievement of organizational competitiveness but not discretely related to profitability through quantitative correlation and regression analysis (p. 48). In contrast, views which promoted the characterization of agility based upon the exercise of consistent behaviors were disputed by Yauch (2011). Yauch (2011) suggested that precise definitions of

processes, structures, or behaviors as necessary for the achievement of agility may discount the contribution or value of unique and creative approaches. Yauch (2011) also contended that agility should be evaluated based upon the high or low achievement of performance outcomes within environments of high or low turbulence rather than on the exercise of consistent behaviors.

Resilience. Perspectives and definitions related to resilience have varied from static to transformational views (Lengnick-Hall, Beck, & Lengnick-Hall, 2011; Richtner & Lofsten, 2014). The static view of resilience emphasizes the capacity to retain or sustain stability and structures and processes in a persistent manner when confronted by disruption or change while alternatively, a transformational or dynamic perspective defines resilience as the capacity to creatively leverage change and disruption as an opportunity to learn and develop new processes and structures in an evolutionary fashion (Lengnick-Hall et al., 2011; Richtner & Lofsten, 2014). Similarly, Wieland and Wallenburg (2013) suggested that resilience should be conceptualized as both a reactive capability demonstrated as a return to a prior state of stability following an event and a proactive capability exercised in advance or in anticipation of an event. In some instances, agility was considered to be a component of resilience (Erol et al., 2010; Wieland & Wallenburg, 2013) while in others, resilience was conceptualized as a discrete yet interdependent variable within the context of adaptation and adaptive capacity (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). Irrespective of these differing views, a common theme noted in definitions of resilience is one that requires the capability to cope with change and to return to a state of

organizational functioning that is in equilibrium with external environmental forces and internal capabilities through adaptation and transformation in response to turbulence or jolts (American Medical Association, 2006; Edson, 2012; Erol et al., 2010; Huber et al., 2012; Lengnick-Hall et al., 2011; McCann et al., 2009; McCann & Selsky, 2012; Richtner & Lofsten, 2014).

The characteristics of resilience have been articulated within an individual and organizational context. Erol, Sauser, and Mansouri (2010) theoretically examined the concept of enterprise resilience through attributes of (sic), "adaptability, agility, flexibility, (and) connectivity" (p.128). Emphasizing concepts of connectivity and interoperability, the importance of examining actions rather than skills or capabilities was noted (Erol et al, 2010). Individual use of feedback through processes of double loop learning within a grounded case study approach aligned with processes of creative destruction and subsequent innovation was concurrently aligned with enhanced resilience (Edson, 2012). Similarly, individual communications, connections, relationships, and interactions were theoretically, empirically and positively correlated with enhanced resilience when aligned with creativity, cognitive and emotional resources, and behavioral elements such as resourcefulness, habits, consistent practices, proactive as well as reactive preparedness, and learning (Erol et al., 2010; Lengnick-Hall, 2011; Richtner & Lofsten, 2014; Wieland & Wallenburg, 2013).

Organizational resilience was also aligned with characteristics of integrated systems responsiveness and networking, flexibility as evidenced by fluid structures and processes aligned with experimentation and a culture of innovation, redundancy or excess

capacity from which to draw resources during unexpected circumstances, and emergent, cooperative, and integrated actions aligned with internal capabilities and external forces (Erol et al., 2010; Huber et al., 2012; Pellissier, 2012). From a systems perspective, Erol et al. (2010) suggested that resilience was influenced by a system's purpose, boundaries, core elements, relationships and interconnections, and interaction with the environment whether passively influenced by the environment or actively influencing environmental forces. Concurrently, organizational processes and structures which promoted safety and risk taking, respectful formal and informal relationships that promoted informed decision making, and an environment of non-hierarchical interdependent accountability have been posited as capabilities which may enable organizational resilience (Lengnick-Hall et al., 2011). These capabilities were congruent with proposed resilience indicators identified within Huber, Gomes, and deCarvalho's (2012) theoretical model and tool which advocated for the measurement and development of resilience through awareness, commitment, and adaptability enabled through people, resources, and buffers or reserved capacities.

An integrative approach to individual and organizational resilience has also been articulated. Positive and significant efforts demonstrated through individual capabilities of communication ($p<0.06$), and cooperation ($p<0.01$) were integrated with agility ($p<0.01$) and processes of robustness ($p<.03$) to achieve customer value (Wieland & Wallenburg, 2013, p. 310). It has been suggested that agility was characterized by recognition of and quick responsiveness to change while robustness included proactive processes of forecasting and preparedness in anticipation of change (Wieland &

Wallenburg, 2013). Similarly, concepts of cognitive, behavioral, and contextual resilience incorporated recognition that aligned processes of interpretation, analysis, rethinking, and responding in a transformational manner required organizational systems and processes that promoted core values, diverse action oriented options, habits which encouraged diverse approaches, social capital, and both tangible and intangible resource availability (Lengnick-Hall & Beck, 2005). Resilience was positively and significantly related to cognitive resources and creativity ($p<0.01$) and to emotional resources and creativity ($p<0.005$) (Richter & Lofsten, 2014, p. 114). Cognitive resources included skills and knowledge while emotional resources included feelings such as trust and respect (Richter & Lofsten, 2014). Additionally, the concepts of dynamic systems, a culture of common or shared beliefs, reinvention, and creativity have been positively correlated with enhanced organizational competitiveness and profitability (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). As such, resilience has been articulated as a critical complex systems capability which is aligned in an integrated manner with collective and individual capacities, systems, processes, and stakeholders though adaptation, learning, and interchangeable experiences of change and stability (Erol et al., 2010; Richtner & Lofstern, 2014; Welsh, 2014)

Alignment with complexity leadership theory. Consistent with prior text, the concepts of agility, resilience, and adaptive capacity have been persistently aligned with the achievement of organizational outcomes within turbulent environments (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012; Uhl-Bien et al., 2007). The theoretical premise of this study suggested that adaptive capacity

is as an enabling leadership capability that is achieved through the exercise of agility and resilience within the context of complexity administrative, adaptive, and enabling leadership practices (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). It was further posited that as enablers, agility and resilience could be aligned with the achievement of organizational outcomes through the actions of leaders as tags who act on aggregates or ensembles within a CAS through dissipative structures alignment (Clark, 2013; Tan et al., 2005).

Within this framework, leadership was viewed within an active rather than passive process model of agility and resilience that fostered adaptation through connectedness which generally occurs during critical or chaotic states (R. Lewin, 1999). The process of enabling leadership through adaptive capacity incorporated management of interdependencies at multiple levels through the promotion of interfaces between adaptive and administrative leadership practices (Hanson & Ford, 2010; McCann & Selsky, 2012; Uhl-bien et al., 2007). The responsiveness which resulted addressed internal and external environments though establishment of the embedded conditions necessary for interrelated processes adaptation (Nienaber & Svensson, 2013; Uhl-bien et al., 2007). A balance between contradictory processes of tension and control was promoted (Hanson & Ford, 2010) through practices of exploration, exploitation, innovation, flexibility, evolution, and return to stability within creative structural changes (Hanson & Ford, 2010; Liang, 2013; Psychogios & Garev, 2012; Rouse et al., 2011). Paradoxical or contradictory processes were conceptually aligned with the importance of ensuring short term efficiency and innovative long term identification of internal and

external cues (Kutz & Bamford-Wade, 2013; Pellissier, 2012). As an enabling or connecting leadership approach, adaptive capacity was assessed as a leadership strategy for the creation of a co-evolutionary environment through agile processes which required flexible responsiveness and resilience to achieve a return to stability within a new and adaptive framework (Hazy & Unl-bien, 2012; McCann et al, 2009; McCann & Selsky, 2012;Uhl-Bien et al., 2007). Similarly, leadership agility was viewed as a catalyst which accelerates behaviors and adaptation through processes such as information gathering or identification and evaluation of options that are aligned with attractors or attractor behaviors (Akgun et al., 2014). The mediating influence of leadership was congruently aligned with the characterization of a leader as a necessary mediator or interpreter between the external environment and internal organizational conditions to ensure organizational sustainability (Metcalf & Benn, 2013). Since resulting changes should be embedded within an organization's culture (Mitleton-Kelly, 2011), evaluation of effectiveness was aligned with objective organizational outcomes (Yauch, 2011). Within the health services environment, the balanced scorecard provides a theoretical framework from which to assess health care organizational performance outcomes (Aidemark & Funck, 2009).

The Balanced Scorecard as a Model of Organizational Performance

Summary and description. The balanced scorecard (BSC) has been articulated by theorists and researchers as a standard for strategic and performance management and evaluation within health services (Curtis et al., 2011; Edward et al., 2011; Emami & Doolen, 2015; Jefari et al., 2015). Historically, the BSC was presented as a means to

ensure organizational alignment, accountability, consistent communication of organizational priorities, a structure and process of organizational performance monitoring, and a consistent feedback process of continuous improvement (Inamdar, Kaplan, & Bower, 2002). As a standard of organizational performance measurement, the BSC was a theoretical and practical means from which to identify the impact of adaptive capacity on organizational performance.

The BSC framework aligns four dimensions which include finance, customers, internal business processes, and organizational growth and leaning or development (Curtis et al., 2011; Inamdar et al., 2002; Jafari et al., 2015). These dimensions have incorporated specific performance measures aligned with each of these categories (Curtis et al., 2011). For example, financial performance has been articulated through financial outcomes such as net income from operations or return on investment, internal business processes have been evaluated through measures of patient care outcomes for quality and safety, customers have been evaluated through perceptions of satisfaction, and organizational growth, learning or development has been measured through human capital or employee engagement related measures (Aidemark & Funck, 2009; Chan, 2006; Curtis et al., 2011; Emani & Doolen, 2015).

As previously noted, at the writing of this paper, hospitals were required to meet designated value based purchasing outcomes as a prerequisite to reimbursement for services by the Centers of Medicare and Medicaid Services (CMS) which include clinical processes of care and the patient experience of care (CMS, 2015a). Percentages of patient satisfaction, which are identified through use of the HCAHPS survey process,

were measured as part of the patient experience of care domain while clinical outcomes such as patient hospital readmissions due to factors such as inadequate treatment, inadequate coordination of community based care following discharge, or complications from treatments experienced during a hospital admission have been identified as conditions for which payment is denied (CMS, 2013, 2015a; Malloch & Melnyk, 2013). At the writing of this paper hospitals were also required to meet predetermined percentage targets for patient satisfaction to obtain reimbursement amounts which may meet or exceed expected amounts (CMS, 2013). The CMS (2013,2015a) driven outcomes of patient care satisfaction were congruent with the BSC customer dimension while the focus on quality outcomes was congruent with the internal business processes dimension (Curtis et al., 2011). Similarly, dimensions of finance as measured by the impact of reimbursement on financial performance outcomes and resulting organizational financial status and the dimensions of organizational growth and development as measured by human capital metrics illustrated performance measures aligned with the BSC (Aidemark & Funck, 2009; Curtis et al., 2011). It was hypothesized that the achievement of these outcomes within the complex adaptive health system may be impacted by the exercise of adaptive leadership adaptive capacity within the turbulent health services environment.

Alignment with agility and resilience. Outcomes associated with agility and resilience may be aligned with the BSC. The practice or presence of agility has been related through research to financial outcomes such as cost management and competitiveness (McCann et al., 2009; Vinodh & Davadason, 2011; Vinodh et al., 2012),

resource allocation (Raney, 2014), increased revenue and gross margin (Yauch, 2011), flexibility (Erol et al, 2010), and increased productivity (Pipe et al., 2012). The presence or exercise of agility has also been associated with quality through practices of innovation (Vinodh & Davadason, 2011; Vinodh et al., 2012) and manufacturing turns (Yauch, 2011). Agility has been positively associated with customer satisfaction outcomes which reflect service and customer responsiveness (Pipe et al., 2012; Vinodh & Davadason, 2011; Vinodh et al., 2012). Finally researchers noted that human capital measures of employee satisfaction, inclusiveness, or engagement (Raney, 2014; Vinodh & Davadason, 2011; Vinodh et al., 2012), employee empowerment (Breu et al., 2001), and turnover and stress (Pipe et al., 2012) were improved through the exercise of agility.

Resilience has also been aligned with concepts that are congruent with BSC performance measures. The presence of resilience has been related to financial measures of profitability and competitiveness (McCann et al., 2009) and structural resources of visioning and financial performance (Richtner & Lofsten, 2014). Measures related to quality such as the presence of robustness to enhance customer value through practices of anticipation and preparedness (Wieland & Wallenberg, 2012) and creative cognitive resources such as skill and knowledge (Richtner & Lofsten, 2014) were also aligned with resilience. Resilience was additionally related to customer satisfaction through processes which furthered communication and cooperation (Wieland & Wallenberg, 2012) and sensitivity to the needs of others (Pellissier, 2012). Finally, the presence or practice of resilience was associated with human capital outcomes through an emphasis on communication and cooperation (Wieland & Wallenberg, 2012), emotional resources

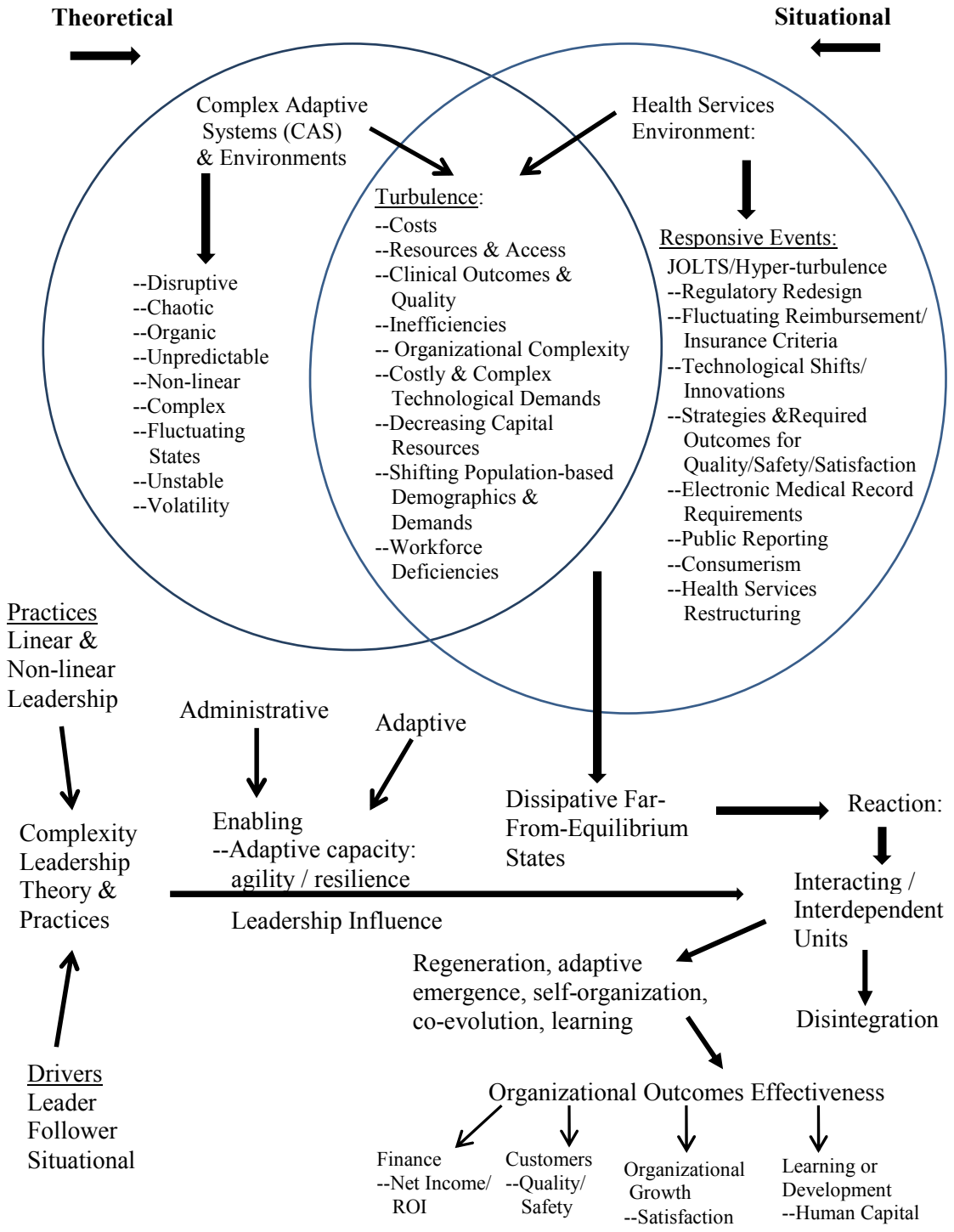
such as trust and friendship (Richtner & Lofsten, 2014), employee engagement (Huber et al., 2012), and sensitivity to others' needs (Pellissier, 2012).

As the previous text indicates, measures of agility and resilience have been congruent with the BSC framework. I proposed therefore, that measurement of outcomes achieved through the exercise of agility and resilience within a complex and turbulent health services system through a BSC framework demonstrated a logical measurement framework.

Theoretical Model

A synthesis of the research and theories was completed through the development of a theoretical model for this study. This model is illustrated within Figure 1, *A theoretical and situational crosswalk for adaptive leadership capacity in complex adaptive health systems*. This model suggested that a convergence between concepts of complex adaptive systems and environments and the situational health services environment resulted in turbulence and dissipative far –from-equilibrium events which required the exercise of complexity leadership for effective achievement of organizational outcomes through adaptive leadership capabilities.

Figure 1.0. A Theoretical and Situational Crosswalk for Adaptive Leadership Capacity in Complex Adaptive Health Systems



(figure continues)

Figure 1.0. This tested theoretical and situational model demonstrates the impact of adaptive leadership capacity on health systems organizational outcomes through leadership influence on the dissipative states which result from complex adaptive health systems responsive events. This model demonstrates a synthesis of the collective theoretical and practical works of Akgun etl al, (2014), Chakravrathy (1982), Clark (2013); CMS (2013; 2015a), Curtis et al. (2011), Dinh et al.(2014), Druss and Dimitrropoulos (2013), Ellis and Herbert (2011), Emani and Doolen (2015), Ford (2009), Geer-Frazier (2014), Gemill and Smith (1985), Hazy and Uhl-Bien (2012), Hempe (2013), Jefari et al. (2015), Junior et al. (2012), Kannampalli et al. (2011), Levinthal (1997), McCann et al. (2009), McCann & Selsky (2012), Meyer et al, (2005), Morcol (2005), Pipe et al. (2012), Prigogine and Stengers (1984), Psychogios and Garev (2012), Rouse et al. (2011), The World Bank (2015), Tong and Arvey (2015), Uhl-Bien et al. (2009), Uhl-Bien and Marion (2009), United States Census Bureau (2015), United States Department of Health and Human Services (2014), Vinodh et al (2012), and the World Health Organization (2014, 2015a,b,c)

Demographics.

Demographics that were examined within this study included those of gender, age, organizational size, title, and level of responsibility. Demographics were intended to identify the possibility of disproportionate influence (Burbuto, Fritz, Matkin, & Marx, 2007; Martelli & Abels, 2010) and to enable an assessment of generalizability (American College of Healthcare Executives, 2016). Issues pertaining to the generalization of the sample population to that of the overall population of healthcare leaders are discussed in detail within Chapter 3.

Characteristics such as gender, age, race, educational preparation, job tenure and organizational size have been aligned with organizational positioning and leadership effectiveness (Burbuto et al., 2007; Christman & McClellan, 2012; Cuadrado, Navas, Molero, Ferrer, & Morales, 2012; Martelli & Abels, 2010; NG, Eby, Sorensen, & Feldman, 2005; Rodriguez-Rubio & Kiser, 2013; Walumbwa, Lawler, & Avolio, 2007). Career progression has been aligned with gender where researchers have found that

females, though disproportionately represented within leadership positions, have experienced higher rates of promotion and salary increases (Dai et al., 2013). Similarly, NG et al. (2005) noted that gender moderated the relationship between objective and subjective measures of career success *(p*=0.05-0.01) (p. 391). However, when examining leadership approaches as perceived by leaders and followers Cuadrado et al,, (2012) found that perceptions related to leadership styles were similar with the exception that male and female subordinates rated same gender leaders' effectiveness more favorably (p<0.01) thus suggesting that gender similarity influenced perceptions of effectiveness. A similar conclusion was noted by Buubuto et al. (2007) who noted significant differences (p < 0.01-0.05) in the evaluation of leaders by followers where ratings of leadership and influence tactics were aligned with variables of gender and education (pp. 75, 77). Finally, significant differences in leadership perspectives between male and female leaders were noted by Rodriquez-Rubio and Kiser (2013) when evaluating views on service to others, family importance, and respect for human rights (p=0.01) (p. 132). While differences have therefore been noted between leaders based upon gender, Christman and McClennen (2012) cautioned against a precise gender stereotypes following completion of a delphi study which suggested that gender characteristics may be demonstrated interchangeably by both males and females. In summary, these studies collectively advocated the importance of identifying gender differences and proportionate representation within leadership samples due to the potential influence of differences on leadership styles, perceptions of leadership and approaches on outcome variables.

The demographic of age was also identified within this study. Differences in leadership approaches have been noted within differing age groups where measures of transformational and transactional leadership approaches aligned with differences in age suggested an interaction effect which revealed higher levels of transformational and related approaches of idealized influence, intellectual stimulation, and individualized consideration exercised by leaders aged 46 or greater (Burbuto et al., 2007, p. 80). Similarly, significant differences (p = 0.01-0.05) in perceptions of the importance of service, relationships, trust, management and authority have been aligned with differences in age (Rodriguez-Rubio & Kiser, 2013, pp. 138, 141).

Organizational size defined as small, medium, and large health systems was also measured. Organizational size was identified as an influential variable in relationship to social and economic organizational variables (Cuadrado et al., 2012). Concurrently, when examining leadership approaches within companies, the most significant differences between males and females were noted within small companies where females scored significantly higher in leadership approaches which were characterized as autocratic, task-oriented, relationship oriented, transformational, reinforcing, and negotiating (p < 0.01-0.02) when compared to males (Cuadrado et al., 2012, p. 3101). Additionally, my examination of the listing of eligible executives within the study's sampling frame suggested that a greater number of leaders would be accessible from larger organizations that employ higher numbers of associates thus, alignment of sampling units with organizational size promoted a proportionate sampling frame.

Race, culture, educational levels, and tenure or work experience were also considered for inclusion within this study's demographics. I assessed the influence of race and culture as beyond the scope of this study. Educational preparation has been positively aligned with career progression up to the level of a chief executive officer (Martelli & Abels, 2010) and career success (NG et al., 2005). Concurrently, higher degrees have been associated with higher ratings of the exercise of individualized consideration by leaders (Burbato et al., 2007). When aligned with gender, higher educational degrees have been noted as a predictor of female career success or promotion ($p < 0.05$; $p < 0.01$ one tailed) (NG et al., 2005, p. 391). Lastly, job tenure has been both positively and negatively aligned with leadership success (NG et al., 2005). According to NG, Eby, Sorensen, and Feldman (2005) job tenure has been positively related ($p< 0.05$) (p. 384) to career success as measured by salary level but negatively related *(*r= -0.02, $p<$ 0.05) (p. 385) when aligned with promotion. Given these differences, the scope of this study and the desire to duplicate the American Management Association (2006) survey to promote comparability with the survey process, these demographics were not measured. Job title and level of responsibility were included consistent with the American Management Association (2006) survey demographic listings and study cited by McCann et al. (2009).

Summary and Conclusions

Major Themes

Themes within this chapter incorporated a focus on the health services environment, implications for leadership practice, and a hypothesized leadership

approach through which it was posited that leadership effectiveness as evidenced by the achievement of positive organizational outcomes may be evaluated. As noted, forces within the health services environment have stimulated complex, persistent, and unpredictable changes that characterized the health services environment as an open, organic, and turbulent CAS (Clarke, 2013; Ford, 2009; Malloch & Melnyk, 2013; Metcalf & Bennm 2013; Nienaber & Svensson, 2013; Stefl, 2008; Yukawa, 2015). Turbulence and chaos were aligned with non-linear far-from-equilibrium conditions which resulted from environmental jolts, wicked problems, and dissipative structural phenomena (Kannampallil, 2011; Leykum et al., 2007; Sterian & Strian, 2012; Yukawa, 2015). Within CAS, complexity administrative, enabling, and adaptive practices were posed as a means for the realization of emergent and integrative leadership approaches that enable organizational effectiveness (Hanson & Ford, 2010; Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). As the theoretical connection or integrating element between administrative and adaptive leadership, enabling leadership practices were emphasized as an essential enabler of complexity leadership (Hazy & Uhl-Bien, 2012; Uhl-Bien et al., 2007). I hypothesized that adaptive leadership capacity comprised of the perceived capabilities of agility and resilience served as this enabling connection (Hazy & Uhl-Bien, 2012; McCann et al., 2009; McCann & Selsky, 2012).

Leadership effectiveness was assessed based upon the achievement of organizational outcomes (Yauch, 2011). I identified the BSC as an established means for assessment of organizational performance within the categories of finance, customers, internal business processes such as quality, and learning and development as evidenced

by human capital measures (see Curtis et al. 2011; Jafari et al., 2015). Outcomes associated with agility and resilience have been congruent with BSC categories (McCamn et al., 2009; Pipe et al., 2012; Raney, 2014; Richtner & Lofsten, 2014; Vinodh & Davadason, 2011; Vinodh et al., 2012; Wieland & Wallenberg, 2012). Thus, an examination of the impact of enabling agile and resilient complexity leadership practices within the complex and turbulent health services environment on the achievement of organizational outcomes as measured by the BSC was initiated to illustrate the effectiveness of a complexity leadership approach. The demographics of title, responsibility, gender, age and organizational size were solicited from study participants due to the potential impact of differences in these demographics on dependent variable outcomes or on the sample's representativeness and generalizability (see American College of Healthcare Executives, 2014; Burbuto et al., 2010).

Literature and Research Gaps

As previously noted, the impact of complex adaptive leadership practices has been studied in the context of adaptive sustainability within complex environments (Espinosa & Porter, 2011; Mitleton-Kelly, 2011), literature review within a competing values framework (CVF) (Tong & Arvey, 2015) and identification of leadership practices aligned with adaptability (Dinh et al., 2014; Ellis & Herbert, 2011; Hannah et al., 2009; Lichtenstein & Plowman, 2009), qualitative observation of adaptive leadership behaviors aligned with culture change (Corazzini et al., 2014), mixed methods analysis of competencies necessary for successful leadership within a health care system (Ford, 2009), qualitative exploration of strategic practice effectiveness within complex hospital

settings (Junior et al., 2012), learning agility (Dai et al., 2013), quasi-randomized study within a patient care context (Leykuum et al., 2007), the impact of complexity on organizational design and structures both generally (Hempe, 2013) and in the context of clinical governance (Ellis & Herbert, 2011), and enhanced business effectiveness and adaptive innovation within turbulent environments (Akgun et al., 2014; Psychogios & Garev, 2012). Similarly, agility and resilience have been quantitatively studied in the context of learning and outcomes within complex disruptive and turbulent environments (American Management Association, 2006; Edson, 2012; Huber et al., 2012; McCann et al., 2009; McCann & Selsky, 2012; Richtner & Lofsten, 2014 ; Vinodh et al., 2012; Wielamd & Wallenburg, 2012; Wong & Lam, 2012). While the aforementioned research illuminated important findings regarding complexity leadership within CAS, a gap or lack of research existed in the quantitative identification of the impact of complexity leadership practices within the complex adaptive health services system (Dinh et al., 2014; Junior et al., 2012). Congruently, a problem existed due to the discontinuity between the traditional focus on linear leadership practices and experience and necessary agile and resilient complex adaptive leadership experiences, education, and practices within the current turbulent and complex adaptive health services system. For leaders to effectively learn and perform within complex environments, quantitative identification of practices which enable success within a complex health services environment was identified as a necessary guidepost for selection, education, and ongoing development (see Dai et al., 2012; Junior et al., 2012; Pipe et al., 2012).

A complexity leadership approach to the achievement of outcomes within the health services environment promoted a shared, distributive, and collective multi-level and emergent leadership model that was aligned with the current and evolving health services environment (Dinh et al., 2014; Lichtenstein & Plowman, 2009; Uhl-Bien & Marian, 2009). Similarly, recognition that nonlinear processes influence structures and outcomes enabled a transitional perspective that was inherent within organic open systems that might otherwise be ignored (Dai et al., 2013; Dinh et al.,2014). As such, this proposed research began to fill these gaps through quantitative identification of the impact of complex enabling agile and resilient leadership practices characterized through a framework of adaptive capacity within turbulent health services environments on health services outcomes.

Professional and Social Relevance

The outcomes from this study may lead to change on individual, organizational, and social levels within the health services system. Health services leadership behaviors and competencies which positively impact organizational outcomes within a CAS may be integrated into individual leadership selection, educational and development programs to enable personal and practical success (Dai et al., 2013; Pipe et al., 2012). Concurrently, my findings regarding leadership approaches which promote the achievement of short- and long- term positive organizational outcomes within turbulent circumstances or environments may be used to enhance organizational performance, sustained viability, and the continued existence of services necessary to care for populations (Dai et al., 2012; Junior et al., 2012; Pipe et al., 2012). Finally, where leadership practices enhance

patient care satisfaction and quality and human capital outcomes, a social value is realized by the stakeholders who access the health services system during experiences of vulnerability and need (Junior et al., 2012; Pipe et al., 2012). Collectively, ethical and practical social value is furthered by theoretically and practically based complex agile and resilient leadership behaviors that enable an integrated and emergent health services perspective on social responsibility, responsiveness, and performance within diverse and changing circumstances (Junior et al., 2012; Stefl, 2008).

Transition to Chapter 3

Chapter 2 provided a framework for conceptualization of the forces which influenced leadership effectiveness within the current health services environment. As an enabling leadership approach, the impact of agility and resilience was articulated as a means for the achievement of organizational outcomes within a BSC framework. Research based guidance for leaders within CAS has been provided through qualitative study (Corazinni, 20154; Dinh et al., 2014; Edson, 2012; Espinosa & Porter, 2011; Ford, 2009; Hanson & Ford, 2012; Hempe, 2013; Junior et al., 2012; Plowman et al., 2000; Psychogios & Garev, 2012; Putnik, 2009; Regine & Lewin, 2000), quantitative study (Akgun et al., 2014; Anderson et al., 2013; Dai et al., 2013; Lichtenstein & Plowman, 2009), and literature and theoretical reviews (Clark, 2013; Ellis & Herbert, 2011; Geer-Frazier, 2014; Hannah et al., 2009; Leykum et al., 2007; Metcalf & Benn, 2013). Concurrently, the existence or impact of agility and resilience within business or general organizational environments has been examined (American Medical Association, 2006; Breu et al, 2001, Dai et al., 2013; Erol et al., 2010; Flumerfelt et al., 2012; McCann et al,

2009; McCann & Selsky, 2012; Pipe et al., 2012; Rainey, 2014; Vinodh & Davadasan, 2012; Vinodh et al., 2012; Wong & Lam, 2012; Yauch, 2011).

The methods discussed within Chapter 3 bridged the research gap which suggested the lack of quantitative study of the impact of adaptive leadership capacity within the health services system. Discrete measures of agility and resilience indexes were identified within the health services environment. Additionally, validation of the existence and impact of turbulence was identified through a discrete turbulence index to verify environmental characterization and the influence of turbulence. To ensure linkages between enabling practices and documented organizational outcomes (Yauch, 2011), quantitative alignment between agility and resilience and outcomes within a BSC framework was identified. Methods included quantitative analysis through correlations, regression, one-way independent analysis of variance, independent t-tests and use of the Hayes PROCESS model (Field, 2013). Discussion also included a reflection on issues pertaining to reliability, validity, limitations, ethics, and social change. Collectively, this content provided a framework this study's findings and conclusions.

Chapter 3: Research Method

Introduction

In this chapter, I discuss this study's research methods including the research design and approach, methodology, threats to validity, ethical implications and procedures, and potential limitations. It should be noted that I have removed identifiers related to System X where feasible to comply with confidentiality requirements that were contained within executed data use agreements with System X and that were consistent with the Internal Review Board (IRB) approval processes.

Specifically, the section on research design and approach includes an overview of study variables, and descriptions of the rationale, alignment with research questions, and time and resource constraints. The methodology section includes a description of this study's population, sampling strategy, frame and size, and sample population recruitment criteria. Additionally, I describe the secondary data sources I used and the instrumentation and operationalization of constructs. The methodology section also includes a description of variables and their operationalization, the data and statistical analysis plan that was aligned with research questions and hypotheses, and a description of the pilot study that I completed. Internal and external threats to validity and issues of construct or statistical validity are subsequently reviewed. I then discuss ethical implications and procedures including protections for survey participants and potentially vulnerable populations. I conclude Chapter 3 with an overview of study's limitations, a summary of the chapter, and a transition to Chapter 4.

Research Design and Approach

Study Variables

Study variables included three independent and four dependent variables. The three independent variables included agility, resilience, and turbulence. The four dependent variables included organizational performance measures within the BSC categories of finance, customers, internal business processes, and organizational growth and learning or development (Curtis et al., 2011; Inamdar et al., 2002; Jufari et al., 2015). As previously stated, I hypothesized that correlation, predictive, mediating, and moderating relationships may exist between these variables.

I defined the independent variable of agility as the capacity or capability to respond quickly, decisively, flexibly, fluidly, and proactively within changing environments (McCann et al., 2009; McCann & Selsky, 2012; Pellissier, 2012). The independent variable of resilience was defined as the proactive, transformational, and dynamic capacity or capability to leverage change and disruption to embed or create new processes or structures within a newly created stable state in response to turbulence and change (Lengnick-Hall et al., 2011; McCann et al., 2009; McCann & Selsky, 2012; Richtner & Lofsten, 2014; Wieland & Wallenburg, 2013). Finally, I defined the independent and potential mediating or moderating variable of turbulence as unstable, random, volatile, uncertain, and unpredictable changes and patterns that may be identified through perceptions of the pace of change and the disruption which results from change (American Management Association, 2006; McCann et al., 2009; Psychogios & Garev, 2012).

I defined the dependent study variables within the BSC framework categories of the health system data that were collected for this study. Collected dependent variable secondary aggregated health system data was congruent with the BSC framework. Finance was defined as financial performance or targeted recurring fiscal year operating margin. The BSC category of customers was defined as patient satisfaction or the achievement of HCAHPS patient satisfaction outcome measures (CMS, 2013). Concurrently, internal business processes were defined as quality or the achievement of clinical quality measures which reflect hospital readmission rates (CMS, n.d.). Finally, organizational learning or growth and development categories were defined as the human capital outcome of total employee turnover.

Research Design

This was a quantitative cross-sectional survey study that I completed using a probability-based systematic random sampling method with participants from small, medium, and large System X health systems. This approach was congruent with the purpose of this study, which was to quantify the impact of complexity leadership approaches within the health services system by identifying the relationship between the independent variables of agility and resilience and dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes. Correlation and predictive relationships between agile and resilient complexity leadership practices and organizational outcomes within a BSC framework without independent manipulation of the variables were identified. I also considered the impact of Turbulence on the achievement of organizational outcomes. Similarly, by applying a systematic

random sampling method proportionately to each System X small, medium and large health system, I was able to ensure proportionate sampling representation across the systems. Five research questions were designed to achieve the purpose of this study.

I designed Research Questions 1 and 2 to identify the relationship between the independent variables of leadership agility and resilience, and dependent variables of organizational financial performance, patient care satisfaction and quality, and human capital outcomes using correlation and simple linear regression analyses. Similarly, I designed Research Question 3 to examine the extent to which the independent variables of agility and resilience were predictive of the dependent variables of organizational financial performance, patient satisfaction and quality, and human capital outcomes using multiple regression analysis. Finally, I designed Research Questions 4 and 5 to examine the statistical moderating or mediating impact of turbulence on the variance of dependent financial performance, patient satisfaction and quality, and human capital outcome variables otherwise explained by the independent variables of agility or resilience. These research questions evolved from my review of theory and research which identified the need for quantitative methodologies and analysis enabled through random sampling of health services practices within a singular point in time consistent with a quantitative probability based cross-sectional design (Dinh et al., 2014). Congruently, through its alignment with research questions, my research design facilitated resolution of the aforementioned research gap and problem. As I previously noted, researchers have noted a lack of quantitative studies on the impact of non-linear adaptive non-traditional complexity leadership practices on organizational outcomes within the turbulent health

services environment (Dinh et al., 2014, Junior et al., 2012). I used this quantitative design and methodology to address the problem resulting from the discontinuity between the traditional focus on linear leadership practices and approaches and needed non-linear complex adaptive agile and resilient leadership practices.

Time and Resource Constraints

Anticipated time and resource constraints related primarily to secondary data availability and collection processes. Secondary data which included dependent variable outcomes in the small, medium, and large health systems that were the subject of this study were calculated conclusively at the end of System X's fiscal year ending in June for the preceding 12 months. Final fiscal year audited results were not published before the month of October (System X, 2016c). This study required the use of secondary data within a 12-month calendar year to align the timing and application of data outcomes more closely with the collection of independent variable data. Secondary dependent variable data required reconfiguration once available to realign secondary data listings with the calendar year ending December 31, 2015 rather than the fiscal year ending June 30, 2016. Irrespective of these potential constraints, data was available for the calendar year ending on December 31, 2015 when needed at the conclusion of independent variable data collection processes. As I noted in the Chapter 1 discussions of study limitations and assumptions, independent variables were representative of a discrete point in time, while dependent variables were representative of a longitudinal measure which extends over a 12 month period. Thus, all independent and dependent variable data

outcomes were not precisely matched. No significant resource constraints were experienced during the course of this study.

Methodology

Population

Researchers have convincingly established that organizational adaptive capacity is influenced by leadership staff (American Management Association, 2006; Malloch & Melnyk, 2013; McCann et al., 2009). The population I studied was a finite population of health care leaders working in U.S. health care systems. The sampling frame which I accessed for this study was embedded within this population.

This study's sampling frame included leadership staff employed by System X within small, medium, and large metropolitan and rural health systems that operated within a multistate religious not-for-profit health services system that extended from the state of New York to the state of California. Health systems within this sampling frame were classified into Groups 1, 2, 3 or 4 depending on their designation, overall size, market position, patient lives served, geographic scope, and competitive positioning. Group 1 health systems included leaders holding overall corporate or system –wide accountabilities. Group 2 health systems included large health systems, Group 3 health systems included medium sized systems, and Group 4 included small health systems. System X (2015) classified leadership staff though a job cataloging system that assigned positions to job levels based upon position responsibilities and decision-making authority. These levels extended from that of a chief executive officer or the individual who is the highest ranking member of the organization's or system's leadership team, to

that of leaders who supervised staff and activities on a daily or shift-specific basis within a discrete department or unit (System X, 2016d). Within Groups 1, 2, 3 and 4, the total accessible population of health services leaders who were classified within these aforementioned leadership levels equaled a sampling frame of 5,176 leaders. I solicited independent variable data from the sampling unit that was accessed from this sampling frame through use of an electronic internet survey process to enable fast and efficient data collection processes across a wide geographic area (Anhern, 2005; McCann et al., 2009; Wieland & Wallenburg, 2012; Williams et al., 2013).

Sampling

Sampling strategy. I applied a probability-based systematic random sampling design within each category of small, medium, and large health systems for this study (Pulakos et al., 2002). The application of this design promoted proportionate sampling from each of the Groups 1, 2, 3 and 4 System X health systems (Akgun et al., 2014). The System X sampling frame included Group 1 leaders representing 7.6% of the total, Group 2 leaders representing 59.4% of the total, Group 3 leaders representing 16.4% of the total and Group 4 leaders who represented 16.6% of the total. The sample from which sample units were solicited consisted of $N=N_1+N_2+N_3+N_4$ where N_1 consisted of Group 1 leaders who functioned within the system office or had system or corporate wide responsibilities, N_2 included leaders from Group 2 large health systems, N_3 consisted of leaders who functioned within Group 3 medium health systems, and N_4 consisted of leaders who functioned within Group 4 health systems. Excluded leaders who were listed within comparable job catalogue categories included practicing physicians, leaders who were

aligned with newly acquired health systems not yet fully integrated with System X's business systems and processes, leaders who did not have daily System X email access, leaders whose employment began following December 31, 2015 and leaders who participated in this study's pilot study process. Contingent workers who did not work regularly scheduled shifts were also excluded from the sampling frame. I initiated these exclusions to promote alignment between leaders who used and influenced similar systems and processes during comparable time periods since systems and processes may impact perceptions of agility and resilience (McCann & Selsky, 2012, Vinodh et al., 2012). Eligibility criteria are further identified within Table 1.

I solicited participation in this study by sample population leaders through use of a systematic random sampling approach within each N_1, N_2, N_3 and N_4 category Leaders were assigned numbers based upon the order in which they were listed on a leadership census listing followed by a random selection of every *kth* unit to equal a total N of 2,000 where N_1 equaled 152 leaders from Group 1 system-wide leaders, N_2 equaled 1,188 leaders from Group 2 large health systems, N_3 equaled 328 leaders from Group 3 medium sized health systems and N_4 equaled 332 leaders from Group 4 small health systems. As illustrated within the text that follows, this exceeded the required sample size of 100 recommended for this study through GPower analysis (Faul, Erdfelder, Lang, & Buchner, 2007). Since a return rate of 100% was unlikely, this sample size conservatively supported a targeted return rate of 15-20% and a required sample size of 100 with consideration of proportionate representation based upon health system size (Wieland & Wallenburg, 2012).

The sampling frame I selected was aligned with the purpose of this study which was to quantify the impact of complexity leadership approaches within the health services system by identifying the relationship between the independent variables of agility and resilience and the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes within small, medium, and large health systems with consideration of the possible moderating or mediating impact of turbulence on the achievement of organizational outcomes. The assurance of proportionate representation of data from System X health services leaders promoted an opportunity to identify outcomes through data proportionately aligned with the system's characteristics (Akgun et al., 2014). Congruent with similar studies related to agility and resilience (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012), leaders were identified as the chosen sample for this study since leaders are assessed by researchers to be in a position to have a broad organizational view of operations, culture, and processes (Akgun et al., 2014; Breu et al., 2001) through the transmission and receipt of cues (Hazy, 2006).

Sample size and parameters. The identification of proper sample size required alignment between the alpha level, power, and effect size (Faul et al., 2007). An alpha level illustrates the potential risk of an incorrect determination where as the alpha level is increased rigor decreases, the potential for a Type I error is increased, the potential for a Type II error decreases, and power increases as a result of the potential that an alternative hypothesis will be accepted with greater frequency (Faul et al., 2007; Trochim, 2006). Concurrently, as power increases the likelihood of recognizing a true difference increases

thus, as power increases, the potential for a Type II error decreases (Faul et al., 2007). Effect size impacts power since the magnitude of effect size illustrates the strength of the association between independent and dependent variables while the type of statistical effect that is pursued is aligned with a study's design and analytical statistical approach (Faul et al., 2007).

Within this study's sampling frame of leaders, I solicited a total sample size of 2,000. This sample size was congruent with GPower analysis which included the three predictors of agility, resilience, and turbulence. GPower analysis was set at *F* tests, linear multiple regression, fixed model, R^2 increase with a small effect size of 0.15, an alpha error of probability of 0.05, and a power level of 0.90. The solicitation of 2,000 sample units promoted a conservative opportunity for receipt of an adequate sample size of 100 units since the targeted 15-20% return rate equaled 150-200 sample units. As is noted in Chapter 4, Results, the sample acquired for analysis equaled 533 thus, far exceeded this requirement.

Recruitment

I recruited study participants through a two stage process subject to predetermined inclusion and exclusion criteria. These criteria are listed within Table 1. First, an email introduction distributed by a System X senior executive was distributed to randomly selected participants within the sampling frame. This email provided an introduction to and endorsement of the study in a form that complied with ethical and approved Walden University Internal Review Board (IRB) requirements (Walden University, 2015b). I distributed an email invitation to participate in the survey, informed consent, and a survey

link to randomly selected participants following this introduction. As with the introductory email, the content of this email and informed consent were congruent with approved IRB requirements. This email and informed consent is illustrated in Appendix A, Informed Consent and Survey Participation Invitation. I distributed a follow-up email three to seven days following initial survey distribution to request participation from participants who had not completed the survey in a form approved by the Walden IRB. Surveyed Agility and Resilience items are included within Table 2. The Walden University IRB approval number for this process was 06-30-16-0265743.

Table 1

Sample Population Inclusion and Exclusion Criteria

Sample Population Inclusion Criteria	Sample Population Exclusion Criteria
Participant is greater than or equal to 18 years old	Participant is a practicing physician without assigned leadership responsibility
Participant electronically provides informed consent	Participant is classified as an on-call or contingent worker without consistent day-to-day leadership accountabilities
Participant is identified as a leader within the System X job catalogue at a level of one, two three, four, five, six or seven	Participant was employed by System X after December 31, 2015.
	Participant does not have daily access to the System X email system
	Participant is employed within an organization that does not interact with the System X central transactional business center
	Participant participated in this study's pilot study process

Table 2

Agility and Resilience Survey Items

Agility Survey Items	Resilience Survey Items
My organization or primary work site is open to change.	My organization or primary work site has a strong sense of clarity and purpose that can survive anything.
My organization or primary work site actively and widely scans for new information about what is going on.	My organization or primary work site has a strong network of external alliances and partnerships
My organization or primary work site is good at making sense of ambiguous uncertain situations.	My organization or primary work site is expanding its external alliances and partnerships.
My organization or primary work site takes advantage of opportunities quickly.	My organization or primary work site has "deep pockets"—access to capital and resources to weather anything.
My organization or primary work site Is good at quickly deploying and re-deploying resources to support execution.	My organization or primary work site has clearly defined and widely held values and beliefs.

Note. Adapted from survey entitled *Building organization agility and resiliency*" by the American Management Association, 2006, as cited in *Agility and resilience in the face of continuous change: A global study of current trends and future possibilities 2006-2016,* ,2006, p. 64; and McCann et al., 2009, p. 48.

I initiated six survey distribution processes of up to 400 each due to information technology requirements and limits on permissible email distribution processes and volumes.

Secondary Dependent Variable Data Sources

I collected dependent variable data from secondary data sources that were calculated and published by System X as a means to evaluate and track organizational performance (System X, 2016a,b). Data included financial performance data which illustrated recurring operating margin, patient satisfaction measured through an HCAHPS overall rating of hospital score, patient care quality measured through identification of patient readmission rates, and human capital measures of total employee turnover excluding on-call employees. The names of individuals who provided this data have been

withheld to protect confidentiality. Dependent variables are defined further within Table 3.

Table 3

Operationalization of Variables and Coding

Variable Category	Variable	Level of Measurement	Description	Code[a]
Independent	Agility	Interval	Organizational openness to change, scanning for information, making sense of ambiguity, taking advantage of opportunities quickly, and quick deployment of resources for execution	AG1,2,3,4, 5
	Resilience	Interval	Organizational sense of identity, purpose, and survival capacity strong existing and expanding support network of external alliances and partnerships, access to capital or revenue, and clearly defined values and beliefs	RES 1,2,3,4,5
	Turbulence	Interval	The pace and disruption of change illustrated through frequency, number, surprises, predictability, conditions, Shocks and concerns related to change.	TURB 1,2
Dependent	Recurring Operating Margin	Interval	Income from recurring operations excluding impairments, restructuring and other non-recurring items divided by total operating revenue	MARGIN
	HCAHPS	Interval	Patient overall rating of hospital stay from percentage of ratings of "9" or "10" where "10" equals best hospital and "0" equals worse hospital possible	HCAHPS
	Unplanned Hospital Readmission Rates	Ratio	Unplanned hospital readmissions for any reason to any acute care hospital within 30 days of discharge from a hospitalization	READMTS
	Employee Turnover	Ratio	Total voluntary and involuntary employee terminations divided by total employee headcount excluding casual or on-call employees	TTURN

Notes: [a] = Codes were aligned to match independent and dependent variable results within system wide, large, medium and small health systems
b = Unplanned 30 day readmission rates include chronic obstructive pulmonary disease (COPD), heart attack (AMI), heart failure, pneumonia, and stroke, surgical coronary artery bypass graft or hip or knee replacement procedures, and hospital wide unplanned readmissions within internal medicine, surgery, gynecology, cardio respiratory, cardiovascular, and neurology. This is not a composite measure.)

Secondary data has been utilized by researchers to identify a dependent variable impact within the organizational setting (Martelli & Abels, 2010; Richtner & Lofsten, 2014; Rodriguez-Rubio & Kiser, 2013). The collection of secondary data by a source other than the researcher for a purpose which differs from that of the research study for which it is examined has been associated with unique considerations, advantages and

disadvantages (Johnson, 2006; Kadha & Eikermann, 2015). Since secondary data is not consistently collected in a manner congruent with the purpose of a given research study, it must be evaluated to ensure its applicability (Kimberlin & Winterstein, 2008). Similarly, it has been suggested that use of secondary data should be characterized to align with the analysis of a given study's existing data (Lockwood, 2006). Secondary data sets have promoted cost effective and efficient collection of large amounts of data over shorter periods of time while enhancing the richness of research data availability (Cross & Kelly, 2015; Psychogios & Garev, 2012). Congruently, secondary data sets that are procedurally and statistically verified by professionals before posting have reflected enhanced reliability (Lockwook, 2006). In contrast, disadvantages aligned with secondary data use have included the likelihood that secondary data was not collected with the researcher's intent, research question or purpose in mind, that variables or information important to the researcher may have been deleted to ensure confidentiality of secondary data participants, that data may not comprehensively cover the subject or geographic area of interest, that ethical implications may exist where confidential data may not be sufficiently blinded or may not reflect the original intent of the respondent or test subject, and that a lack of control over the data collection and variable selection processes may exist (Cross & Kelly, 2015; Lockwood, 2006). To minimize potential limitations aligned with the use of secondary data collection, researchers have been urged to ascertain data collection processes and timing, ascertain what variables are used and how those variables are analyzed, examine the data set to identify strengths and

weaknesses, clearly identify operational definitions, and if interpretive, establish inter-rater reliability (Kimberlin & Winterstein, 2008; Lockwood, 2006).

I treated secondary data for this proposed study with consideration of the pre-mentioned issues, advantages, and disadvantages. Secondary data sources provided data which was associated with leadership practices across multiple System X states in a cost effective and efficient manner. Similarly, since each data set was coordinated through a consistent source and individual, consistent interpretation and data collection processes was likely across all data points. I also personally interviewed each individual who collected secondary data to verify procedures, methods, and interpretive processes. Since accessed secondary data sets were reported nationally during designated periods of time for all health systems within System X (System X, 2016b), a consistent period of time was reflected by all data points. Finally, the definitions of major data constructs were consistently applied to all health systems within System X (System X, 2016b). These definitions are illustrated within Table 3.

Instrumentation and Operationalization of Constructs

The analysis which was aligned with this study's research questions and hypotheses required measurement of leadership perceptions of the constructs of agility, resilience, and turbulence. I distributed an internet based survey instrument to identify the independent variables of agility, resilience and turbulence. This survey instrument was derived from a survey tool that was developed by the American Management Association (2006) and validated by McCann et al. (2009). The complete American

Management Association (2006) survey tool was excluded from this writing since permission to publish it was not included when permission to use the survey was granted.

The survey instrument for this proposed study included an introduction, directions for completing the survey, and seven demographic questions that were aligned with documented executive leadership characteristics within the United States (American College of Healthcare Executives, 2016), the original American Management Association (2006) survey and survey participation exclusion criteria. Turbulence was measured through a multiple choice menu which identified the perceived existence of the pace and disruption of change when compared to the past five years (American Management Association, 2006, McCann et al., 2009; McCann & Selsky, 2012). The pace of change was measured through identification of a respondent's choice among options which identify the pace of change as (sic), " slower… with briefer periods of significant change,…about the same and still predictable…faster but still predictable…very much faster and increasingly unpredictable, or…extremely fast –it is impossible to predict what will happen next" (McCann et al., 2009, p. 47). Disruptive change was measured through a respondent's choice of one of five conditions experienced over the past five years which included (sic), " fewer and less frequent shocks and surprises than before… about the same number and frequency of shocks and surprises…more shocks and surprises…many more shocks and surprises…or very many more shocks and surprises" (McCann et al., 2009, p. 47). Five questions followed which requested perceptions of disruptive change experiences and organizational impact, the effectiveness of the management of disruption, organizational concerns aligned with the pace and

disruptiveness of change, and organizational responses and views of change (American Management Association, 2006; McCann et al., 2009). Perceptions of organizational agility and resilience were identified through the questions identified within Table 2.on a six point Likert scale which ranged from not at all or (1) to completely or (5) or not certain (0).

Existing Instrument: Application to the Current Study

Permitted use. I received permission to utilize the survey questionnaire that originated within the American Management Association (2006) survey on agility and resilience in the face of continuous change from Mr. William Smith, Marketing Strategist for the American Management Association, verbally through a telephone conversation and through an email dated on October 8, 2015 (Smith, 2015). The email which was received granting permission to utilize this survey is duplicated within Appendix B, Email from Mr. William Smith Granting Survey Use Permission. I also verified the survey content and format through telephone conversation and through an email from Jay Jamrog on October 9, 2015, who served as the project leader for the American Management Association (2006) study and was the Executive Director of Human Resources Institute at the time of the study (American Management Association, 2006; Jamrog, 2015).

Prior use, validity, and reliability. The survey instrument that I utilized for this study was originally commissioned by the American Management Association (2006) in cooperation with the Human Resource Institute to measure the extent to which higher performing companies view and manage change differently from lower performing

companies. This study was conducted through surveys completed by (sic), "1,472 (leaders employed within) a North American sub-sample of 471 firms operating in Canada, Mexico, and the United States" (McCann et al., 2009, p. 47). Leadership titles held by those completing the survey included the categories of president, chief executive officer, chairman, director, executive vice president or senior vice president, vice president, manager, supervisor, or other job category (McCann et al., 2009, p. 47). A similarly formatted survey has subsequently been utilized by McCann and Selsky (2012) to measure adaptive capacity at the individual, team, and organizational levels.

McCann et al. (2009) contended that survey items were identified through extensive literature review and large group work with expert human resources professionals representing human resources, organizational development, and change management fields within the United States and Canada thus demonstrated theoretical and expert validity. Further, McCann et al. (2009) emphasized that the design and deployment of the survey questionnaire was achieved in collaboration with (sic), "6" (p. 47) researchers from academic and institutional areas of expertise. Items that were specifically related to the constructs of agility and resilience were derived through factor and item correlation resulting in the identification of five items each for the constructs of agility and resilience (McCann et al., 2009). McCann et al.(2009) demonstrated an item-to-item correlation ranging from 0.72 – 0.78 with factors loadings ranging from 0.762-0.831 for agility scale items (p. 48). Concurrently, resiliency item-to-item correlations ranged from 0.39-0.68 with factor loadings ranging from 0.468-0.821 (McCann et al., 2009, p. 48). While two resiliency items cross loaded with the construct of agility,

McCann et al. (2009) retained those items due to significant theoretical and literature based support for these items. The construct of turbulence was similarly validated through literature and expert review processes (American Management Association, 2006; McCann et al., 2009).

Cumulatively, these conclusions supported the proposed validity and reliability of the suggested survey instrument. Content validity achieved through face validity was suggested through research and expert opinion while construct validity was accomplished through consultation with experts in the field who verified theoretical alignment (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). This survey instrument was originally utilized and validated through the American Management Association (2006) survey of general business enterprises within sectors that included consumer goods, chemicals, education, energy and utilities, financial services and banking, food products, government, Hi-tech and telecom, hospital, healthcare, and insurance, manufacturing, mining, agriculture, pharmaceutical, biotechnical, or medical devices, and retail profit and non-profit industries (p. 56). As previously noted, it was subsequently utilized to identify adaptive capacity at individual, team, and organizational levels (McCann & Selsky, 2012). I determined that its application to this research was appropriate given its extensive and validated use.

Researcher Survey Instrument: Basis, Use, Description, Reliability, and Validity

Basis and use. I had not identified an instance of exclusive use of the survey instrument originated by the American Management Association (2006) for research within the health services system setting prior to this study. This study's survey

instrument was utilized for the American Management Association's (2006) survey where (sic), "4.1% " (p. 56) of the respondents indicated they primarily worked within hospitals and health care. As noted, this survey was originally used to identify the correlation between perceptions of agility and resilience and perceptions of profitability and competitiveness within national and international United States and Canadian based companies (American Management Association, 2006; McCann et al., 2009). The instrument I used for this study replicated this instrument in the areas of applicable demographics and survey questions which sought to identify an index for turbulence, agility, and resilience respectively (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). In contrast, this study's survey instrument did not replicate the American Management Association (2006) survey instrument in the identification of international presence, multiple industry perspectives, perceptions of individuals and teams, or perceptions of profitability and competitiveness (American Management Association, 2006; McCann et al., 2009). Rather, I structured the survey instrument to identify the independent variable outcomes of agility, resilience, and turbulence for analysis of relationships consistent with this study's research questions and hypotheses.

Description. The survey instrument for this study included the demographics of title, level of responsibility, gender, age, health system or hospital location, employment timeline and deployment to a system-wide central service center. As I discussed within Chapter 2, Literature review, researchers have found that gender, age, and system size impact outcomes related to leadership perceptions, styles and job progression (Butbuto et

al., 2007; Cuadrado et al., 2012; Dai et al., 2013; NG et al., 2005; Rodriguez-Rubio & Kiser, 2013). Additionally, the identification of title and level of responsibility was requested to ensure that leadership respondents represented targeted survey leadership levels as identified within the sampling frame. Gender, age, title and responsibility were also requested to identify the existence of alignment between the sample population and the general population profile of health care leaders (American College of Healthcare Executives, 2016). Health system or hospital location provided information regarding the number of respondents who functioned within small, medium, and large health systems thus, enabled verification of proportionate sampling. Additionally, dependent variable outcomes were identified and aligned by health system or hospital location with the independent variable sample population by location. A central service center concept and service center which performed centralized transactional system business processes also existed within System X (System X, 2016e). I determined that the existence of a business system may represent a confounding variable due to its possible impact on systems oriented agility and resilience (Erol et al. 2010; Vinodh & Davadasan, 2011). For example, integrated systems behavior and internal systems have been aligned with complex systems approaches (Erol et al., 2010) while the availability of technology and customer service systems have been aligned with differences in agility (Vinodh & Davadasan, 2011). Thus, to promote comparative continuity, organizations that had not yet implemented the system's central business center concept and processes were excluded from this study. The identification of participation in central business center systems within the survey instrument was included to verify this exclusion. Finally, since

dependent data outcomes reflected measures of performance up to December 31, 2015, leaders employed following that date were excluded since their perceptions or practices were not aligned with the timing or occurrence of those variable outcomes.

Reliability and validity. As previously noted, the proposed survey instrument was examined for reliability and validity. Factor analysis and item-to item correlations performed on the survey distributed by the American Management Association (2006) illustrated item-to-item correlations ranging from 0.72-0.78 for agility index survey items and item-to item correlations of 0.60-0.68 for four of the five resiliency index items (McCann et al., 2009, p. 48). One resiliency index item illustrated an item –item correlation of 0.39, however, factor loadings equaled 0.821 while the item was congruent with literature and expert opinion and was therefore retained (McCann et al., 2009, p. 48). As previously noted, factor loadings were also assessed as appropriate given values which included a range of 0.762-0.831 for agility and a range of 0.468-0.821 for resilience (McCann et al., 2009, p. 48). Content and construct validity of the items identified to measure the constructs of agility, resilience, and turbulence were also suggested through the surveying of senior human resources professionals, extensive literature review, data obtained from large group workshops and through control of the survey process by a project team consisting of senior researchers (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). The verification of item-to-item correlations or factor loadings for reliability and the identification of content and construct validity have been noted as acceptable means to illustrate the reliability and validity of a measurement instrument (Akgun et al., 2014; Dai et al., 2012; Edson, 2012;

Kimberlin & Winterstein, 2008; Wieland & Wallenburg, 2012; Wong & Lam. 2012; Yauch, 2011). Thus, this measurement instrument was assessed as reliable and valid (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012).

Researcher Secondary Data Collection Instruments

The collection of dependent variable outcomes through the use of secondary System X data reports was summarized and inputted into Statistical Package of the Social Sciences (SPSS) data listings. The dependent variable outcome definitions are included within Table 3. As previously noted, the use of secondary data sources requires that the researcher ascertain the secondary data collection methods, timing, use, data sets, operational definitions, and inter-rater reliability if aggregated through multiple sources (Kimberlin & Winterstein, 2008; Lockwood, 2006; Rodriguez-Rubio & Kiser, 2013).

In this study, I included, the secondary data dependent variable outcomes of fiscal year recurring operating margin, patient satisfaction as demonstrated through HCAHPS scores, aggregate clinical outcome measures of hospital readmission rates, and total employee turnover. These data were aggregated to demonstrate organizational System X performance outcomes over the period that extended from January 1, 2015 through December 31, 2015. Data was reported by local health system employees to consistent individuals within System X who were responsible for accumulating system-wide performance measures within their areas of expertise (System X, 2016b). Operational definitions were consistently articulated throughout System X as identified within Table 3. Inter-rater reliability was promoted by the interpretation and aggregation of reported

data through consistent health system-wide employees who were primarily qualified as Masters level prepared or PhD researchers (System X, 2016b). To note is the fact that HCAHPS data was randomly collected by an independent source through a telephone survey of patients following discharge from System X facilities (CMS., 2013). In the aggregate, I determined that these observations promoted the legitimacy of this study's use of secondary data sources (Kimberlin & Winterstein, 2008; Lockwood, 2006; Rodriguez-Rubio & Kiser, 2013).

Relationship to Research Questions

The constructs that were measured were aligned with this study's proposed research questions. These constructs included those of agility, resilience, turbulence, and organizational outcomes of financial recurring operating margin, HCAHPS scores of patients' overall ratings of hospitals, composite hospital readmission rates, and employee turnover rates. These constructs and outcomes were congruent with the five research questions posed for this study. Research Questions 1 and 2 sought to identify the strength of the relationship between leadership agility and resilience and the achievement of dependent organizational variable financial performance, patient care satisfaction and quality, and human capital outcomes. Research Question 3 sought to identify the extent to which the independent variables of agility and resilience were predictive of organizational financial performance, patient care satisfaction and quality, and human capital dependent variable outcomes. Finally, Research Questions 4 and 5 sought to identify the mediating or moderating impact of environmental turbulence on the relationships between agility or resilience on the achievement of dependent variable

organizational outcomes respectively. As noted, the constructs identified within these research questions were included as independent and dependent variable measures within this study.

Variables

The variables for this study included the independent variables of agility, resilience, and turbulence and the dependent variables of recurring financial operating margin, patient satisfaction or HCAHPS overall ratings of hospital, patient-care quality or hospital readmission rates, and the human capital outcome measure of total employee turnover. Operational definitions of these variables were derived from the literature and from existing secondary data sources. These definitions are illustrated within Table 3.

As indicated within Table 3, variables were coded and sorted by health system or hospital to examine outcomes aligned with independent and dependent variable groups consistent with this study's research questions. The designation of outcomes by health system was congruent with data reporting processes within System X (2016b) thus, consistent with secondary data source reporting processes and outcomes.

Data Analysis Plan

I collected and analyzed data for this quantitative study through use of SPSS (Martelli & Abels, 2010; Vinodh et al., 2012). This data was screened utilizing the inclusion and exclusion criteria identified within Table 1. The alignment between the data analysis plan and research questions and hypotheses is illustrated within Table 4.

Table 4

Statistical Analyses Conducted per Research Question and Corresponding Null Hypothesis

Research Question	Null Hypothesis	Statistical Procedure
Is there a relationship between leadership agility and the achievement of the dependent variables of financial performance, patient care satisfaction , and quality and human capital organizational outcomes within small, medium, and large health services systems?	There is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance, patient care satisfaction, and quality and human capital outcomes within, small, medium, and large health systems.	Partial Correlation Simple Linear Regression
Is there a relationship between leadership resilience and the achievement of the dependent variables of financial performance, patient care satisfaction and quality and human capital organizational outcomes within small, medium, and large health systems?	There is not a positive correlation between leadership resilience as measured by at resilience index and the achievement of organizational financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems	Partial Correlation Simple Linear Regression
To what extent are the independent variables of agility and resilience where agility is defined by an agility index and resilience is defined by a resilience index predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium and large health systems ? .	In the population, the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined by a resilience index, are not predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes thus, all of the partial regression coefficients equal zero.	Multiple Regression
To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of agility and the achievement of positive financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium and large health systems?	In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable agility is not mediated by environmental turbulence within small, medium and large health systems.	Linear Multiple Regression Hayes PROCESS
	In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is not moderated by environmental turbulence within small, medium, and large . health systems.	Linear Multiple Regression Hayes PROCESS
To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of resilience and the achievement of positive financial, performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems?	In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is not mediated by environmental turbulence in small, medium, and large . health systems.	Linear Multiple Regression Hayes PROCESS
	In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable resilience is not moderated by environmental turbulence within small, medium and large. health systems.	Linear Multiple Regression Hayes PROCESS

I selected statistical tests to align with the intent of this study's research questions, hypotheses and the characterization of variables as either interval or ratio. Evaluation of demographics also required statistical testing procedures that were congruent with categorical measures. Partial correlation was selected to identify the strength of the discrete relationships between the independent variables of agility and resilience and organizational outcomes since both constructs have been individually and mutually related to leadership outcomes within complex environments (Erol et al., 2010; Field, 2013; Hazy & Uhl-Bien, 2012; McCann et al., 2009; McCann & Selsky, 2012; Wieland & Wallenburg, 2013). Tests of simple linear and multiple regression were selected as a statistical test of choice to enable identification of whether practices aligned with organizational agility or resilience are positively related or predictive of dependent variable organizational outcomes (Field, 2013; McCann et al., 2009). Since turbulence has been identified as a variable which influences or creates complex and volatile changing environments and outcomes requiring the use of complexity leadership practices (Akgun et al., 2014; McCann et al., 2009; McCann & Selsky, 2012; Psychogios & Garev, 2012; Yauch, 2011) I also analyzed the relationships, predictability and mediating or moderating influence of turbulence on the constructs of agility, resilience and dependent organizational outcomes through use of linear simple and multiple regression procedures and the Hayes PROCESS model (Dai et al., 2013; Derue et al., 2011; Field, 2013; Walumbwa et al., 2007). Since both positive and negative or inverse relationships were anticipated (McCann et al., 2009) two-tailed tests were used where appropriate (Vinodh et al., 2012). Concurrently, a 95% confidence interval with a

targeted small effect size (NG et al., 2005; Vinodh et al., 2012) was incorporated into the statistical regression analysis of outcomes and predictors.

In addition to the analysis of the aforementioned research questions and hypotheses, I analyzed demographics to determine the relationships between demographics and dependent variable organizational outcomes. A one-way independent analysis of variance was utilized to identify the relationships between title, responsibility level, age, and system size and dependent organizational variable outcomes (Field, 2013; Pallant, 2013). The relationship between the categorical variable of gender and dependent variable organizational outcomes was statistically analyzed through an independent samples *t*-test procedure.

The analytical use of statistics and statistical procedures also required that data and outcomes be evaluated for sources of bias prior to their use to support the outcomes or relationships aligned with research questions and hypotheses (Martelli & Abels, 2010; NG et al., 2005; Wong & Lam, 2012). Statistical procedures included tests for assumptions. As suggested by Field (2013), I performed tests for outliers and linearity to verify partial correlation analytics. Similarly, prior to completing simple and multiple regression analytics, I performed tests for outliers, normality of variables, missing data, linearity, multicolinerarity, and homogeneity of variance (Field, 2013). Finally, linear multiple regression procedures included tests for outliers, normality of variables, multicolinerity, missing data, and homogeneity of variance (Field, 2013; Ismail et al., 2010).

To also note was the potential for Type I or II errors. My analytics were contingent upon an alpha of no greater than 0.05 to ensure that there is a 5% maximum chance of incorrectly rejecting a null hypothesis and a power of 0.90 to represent a 10% chance of missing an associated effect (Benerjee, Chitnis, Jadhav, Bhawalker, & Chaudhury, 2009). Collectively, completion of these tests promoted the credibility of the data and procedures utilized to analyze research outcomes.

Pilot Studies

I initiated a pilot study prior to implementation of data collection to promote reliability of the survey measurement tool and distribution process (Akgun et al., 2014; Pulakus, 2002; Yauch, 2011). Pilot studies have been identified as a means to test the use of a survey instrument and to identify needed changes prior to full implementation (Ismail et al., 2010; Kiimberlin & Winterstein, 2008; Wieland & Wallenburg, 2012). I proportionately selected a total of 20 leaders from Health System Groups 1,2,3 and 4 for a pilot study. Leaders who were solicited for pilot study participation were excluded from consideration for subsequent research to minimize potential threats to internal validity due to history or maturation or external threats which could result from multiple testing processes (Campbell & Stanley, 1963; Guangrong et al., 2013; McCann et al., 2009). Consistent with the procedures anticipated for the primary study, an introduction, invitation to participate in the study and informed consent, and reminder notices distributed 12 days and twenty days following initial pilot survey distribution were emailed to participants within the pilot survey sample group. The survey document that was distributed to pilot survey participants was the same as that anticipated for the

primary survey with the addition of questions which requested feedback regarding the survey process and instrument's use, completion time, clarity, confidentiality and any suggested changes. As with the main survey, a copy of the pilot survey document has been excluded from this writing due to publication and copyright requirements.

Threats to Validity

Potential internal and external threats to validity within this study included those aligned with the research setting, selection of participants, and data collection processes (Campbell & Stanley, 1963; Guangrong et al., 2013; McCann et al., 2009). Internal threats to validity were assessed as minimal for this study. I determined that internal threats resulting from history or maturation due to the influence of the research setting or events on outcomes between measurement periods or from testing resulting from the impact of one test influencing a subsequent test was unlikely since data was collected at a singular point in time and excluded pilot study test participants (Campbell & Stanley, 1963; McCann et al., 2009; McCann & Selsky, 2012; Wieland & Wallenburg, 2012). Similarly, I assessed that threats resulting from changes in instrumentation were unlikely since a singular and unchanging survey instrument was used (Campbell & Stanley, 1963; McCann et al., 2009). Finally, I randomly and proportionately selected participants by small, medium, and large health system groupings without regard to scores thus diminishing the potential for statistical regression or overall selection bias (Anderson et al., 2013; Akgun et al., 2014; Campbell & Stanley, 1963; Guangrong et al., 2013; McCann et al., 2009; Palakos, 2002). Researchers have noted that the potential for common method bias may result when both independent and dependent variable data

originate from the same sources (Akgun et al., 2014; Richtner & Lofsten, 2014; Wieland & Wallenburg, 2012). I diminished this potential threat through the administration of the survey instrument to multiple participants whose responses were aggregated aligned with the collection and oversight of dependent data collection and collation by non-survey participants (Richtner & Lofsten, 2014; System X, 2016b).

I also considered threats to external validity or overall representativeness aligned with principles of generalizability (Campbell & Stanley, 1963). Threats to external validity which result from interaction effects, treatment interference, or experimental interference were unlikely since this research design did not include administration of a treatment or multiple testing processes (Campbell & Stanley, 1963; McCann et al, 2012; McCann & Selsky, 2012). Concurrently, since I excluded participants within the pilot survey testing process from the primary survey's independent variable data collection processes, the potential effect of pilot or pretesting on subsequent outcomes was diminished (Akgun et al., 2014; Wieland & Wallenburg, 2012). Participant samples were compared to the general population within the United States as noted within the American College of Healthcare Executives (2016) profile of members as of January 1, 2016 (p.1). It should be noted, however, that since this research design was positioned within the natural health system's environment, data was not collected within a controlled setting. Since I did not manipulate independent variable data, causation was implied through the identification of significant relationships based upon perceptions and outcomes within a discrete time period only (Dai et al., 2013; McCann et al., 2009).

Finally, I considered threats to construct or statistical construct conclusion validity. As previously noted, I conducted tests for assumptions congruent with statistical analyses. These tests included identification of outliers, missing data, linearity, normality of variables, multicolinearity, and homogeneity of variance (Field, 2013; Martelli & Abels, 2010).

Ethical Implications and Procedures

. Ethical implications and procedures aligned with this proposed study included advocacy and protection of survey participants, potential vulnerable populations, and procedural requirements. Ethical and legally compliant research practices required that I assure privacy, confidentially, and participation predicated upon informed consent for survey participants (Protection of Human Subjects Rules, 2009). Risks to survey participants must be minimal and be outweighed by the benefits of the proposed research. Concurrently, equitable selection of subjects who participated only following the provision of voluntary and knowing informed consent without undue pressure or coercion was necessary (Protection of Human Subjects Rules, 2009). Recommended elements of legitimate informed consent have consistently included the opportunity to decline from participation without repercussions, language that can be understood by the participant, a clear statement that the study involved research, the procedures which will be followed, foreseeable risks or discomforts, potential benefits, alternative treatments where applicable, maintenance of confidentiality of records, a contact person and access to information for questions, assurances that participation is voluntary and that refusal to participate at any time will not result in a penalty, additional information as applicable

related to costs, potential circumstances of termination of participation by the researcher without the participant's permission, the availability of study findings to participants where advantageous and approximate number of survey participants (Furrow, Greaney, Johnson, Jost, & Schwartz, 2008; Protection of Human Subjects Rules, 2009, Sec. 46.116). Additionally, informed consent must be documented (Protection of Human Subjects Rules, 2009). To note is that the receipt of informed consent when implementing an internet survey process has historically presented challenges as to whether fully informed consent has been attained prior to survey participation due to the perceived ambiguity of electronic consent processes (Harriman & Patel, 2014).

I sought informed consent from individual leadership employees through an electronic signature or approval process prior to initiating the survey process. With one exception, informed consent procedures incorporated the pre-mentioned elements of legitimate informed consent with an emphasis on confidentiality and rights not to participate within the proposed study (Protection of Human Subjects, 2009; U. S. Department of Health & Human Services, 2015). The opportunity to obtain a summary of research results was not provided at the request of the organizational sponsor and as approved by the Walden University IRB.

I noted that the secondary data that I utilized for this study was collected from individuals for a purpose which differed from this study's purpose thus, consent for the specific use of data for this study was not attained from primary sources such as patients who were interviewed to determine perceptions of hospitals or individuals who provide data for organizational reporting purposes (CMS, 2016; System X, 2016b). Since the

secondary data which was accessed was collected for the articulated purpose of identifying organizational performance measures (System X, 2016b), its use for this study was aligned with that purpose, thus I concluded that consent was implied.

I also considered the potential that the survey process and data collection site could be associated with ethical issues related to vulnerable populations. This study's proposed data collection process could have included the health system that employed me. Concurrently, I held an executive management human resources position in this discrete health system at the time data was collected or solicited. The potential that survey participants could feel coerced or threatened due to a potential risk to job security for non-participation or risk ongoing job security due to answers which were provided to survey questions existed (Protection of Human Subjects, 2009; U.S. Department of Health & Human Services, 2015; Walden University, 2015b). Additionally, as a member of one health system's executive leadership staff I had the potential to influence organizational outcomes. To mitigate this issue, I excluded leaders within my employment site from the primary data collection process aligned with this study. When considering the nature of study variables and data, I also noted that data related to patient satisfaction and quality was based upon patient data that is otherwise protected under health information and patient medical record privacy rules (Furrow et al., 2008). Since patient related data was obtained through secondary data sources (System X, 2016b) without identification of specific patients, I concluded this was not an ethical issue aligned with this study.

I also implemented procedural processes to enable ethical and credible research practices. I followed Internal Review Board processes according to Walden University (2015b) and System X requirements. To meet Walden University (2015b) IRB requirements, an IRB application and data use agreements were executed and approved. The Walden University IRB approval number for this study was 06-30-16-0265743. Though System X did not have a formal system-wide IRB process in place, it was agreed that a courtesy communication would be sent to those health systems where individual IRB processes existed by the System X Senior Vice President for Legal Services. I acquired approval of all research processes, procedures, communications and consents from the Walden University IRB prior to commencement of the survey and secondary data collection processes. Additionally, I stored all collected data in a secure and password protected location as applicable, did not share data unless anonymously incorporated into a final research report or publications, ensured that data was accessed only by me and did not include individual names or identifiers except as necessary for aggregate data analysis (Protection of Human Subjects, 2009). I collected, aggregated and stored independent variable survey data through confidential password protected SurveyMonkey processes and files.. All participants were provided with information to validate that the benefits of the study outweighed individual or collective risks (Protection of Human Subjects, 2009).

Finally, it should be noted that vulnerable populations defined as those who do not own a telephone were excluded from HCAHPS measures thus, equitable representation and influence could have been lacking within patient satisfaction

HCAHPS outcome data (Protection of Human Subjects, 2009). The collection of patient satisfaction HCAHPS data occurred through telephone interviews by design (CMS, 2013). Thus, individuals who did not own an operating telephone were excluded from the study. I determined that sufficiently representative data was available in a manner consistent with the purpose of this study and data needs without inclusion of this group in a manner that did not result in a disproportionate burden to this population.

Potential Limitations

Potential limitations aligned with this study included the use of secondary data sources, implied rather than experimentally proven causation, the assumption that leadership perceptions accurately identified the existence of organizational and leadership agility, resilience and turbulence and the influence of demographic differences on outcomes. As I previously noted, secondary data use assumed applicability to the research for which it was applied and that data collection and interpretation was accurately and validly performed (Cheng & Phillips, 2014; Cross & Kelly, 2015; Kimberlin & Winterstein, 2008). The lack of this concrete validation suggested a limitation. Additionally, since this research was not experimental in nature, causation was presumed and was limited to the point in time during which data was collected (Dai et al., 2013; Ismail et al., 2010; McCann et al., 2009). Additionally, independent variable outcomes were based upon the perceptions of leaders who completed the survey process thus, conclusions could be based upon those perceptions only (Dai et al., 2013; McCann et al., 2009; McCann & Selsky, 2012). Finally, not all respondent characteristics such as culture were controlled thus, the impact of those demographic differences is unknown.

Social Change and Benefits

The previous text identified ethical challenges and limitations aligned with this proposed study. While these circumstances were identified, I posited that they were outweighed by the benefits gained from this study. To the extent that practices which enable positive organizational outcomes were identified, these practices may be applied to individual leadership selection and development processes (Dai et al., 2013; Pipe et al., 2012). Where these practices enabled or may enable future positive organizational performance outcomes and concurrent organizational viability, a benefit may be realized by the populations who access health systems for care during times of vulnerability and need (Junior et al., 2012; Pipe et al., 2012). The interconnected social and organizational responsiveness which results concurrently promotes social value and change within complex and turbulent environments through the promotion and exercise of integrated agile and resilience capabilities (Junior et al., 2012; Stefl, 2008).

Summary and Transition to Chapter 4

Chapter 3 described the methods that I implemented within sections that described the research design and approach, methodology, threats to validity, ethical issues and procedures, and limitations. These methods were congruent with the purpose of this study which was to quantitatively identify the impact of complexity leadership practices within the turbulent health services system and environments. I implemented methods to resolve research questions which sought to identify the relationship and impact of agility and resilience on the achievement of organizational outcomes within a BSC format (Curtis et al., 2011; Inamdar et al., 2002; Jufari et al., 2015). I analyzed the

independent study variables of agility and resilience, potential mediating or moderating variable of turbulence, and dependent variables of organizational financial performance, patient care satisfaction and quality, and human capital secondary data outcomes within a quantitative cross-sectional study accomplished through a probability based systematic random sampling approach that was proportionately congruent with the sample's small, medium, and large health system configuration. While the expected use of secondary data to identify dependent variable outcomes suggested limitations, I determined that its use also ensured consistent data collection processes and data analysis across the wide geographic area of System X within a reasonable period of time (Cross & Kelly, 2015; Lockwood, 2006).

The population for this proposed sampling frame consisted of the finite population of health care leaders within the United States while the sampling frame for this study consisted of leadership employees within System X's (2016b) system-wide, small, medium, and large health systems and hospitals. Proportionate random samples were solicited from each of these groups. Required sample size was estimated to equal 100 through GPower analysis (Faul et al., 2007). I solicited sample participants through an introductory letter from a System X senior executive followed by distribution of an internet based survey questionnaire. I applied designated inclusion and exclusion criteria to enable continuity in timing, impact on outcomes, and control of potential environmental influences such as centralized business system support center availability. The survey instrument which I distributed consisted of demographic questions followed by a mix of multiple choice and a six-point Likert scale items from which indexes for

agility, resilience, and turbulence were derived. The survey instrument I used mirrored the instrument utilized for a prior study sponsored by the American Management Association (2006). Reliability and validity of this instrument was documented through the use of factor analysis, item-to-item correlation analysis, and theoretical and expert opinion to validate constructs by prior researchers (American Management Association, 2006; McCann et al., 2009; McCann & Selsky, 2012). Additionally, I initiated a pilot study to enable survey instrument distribution and design reliability. Statistical procedures aligned with research questions and demographic assessments incorporated the use of partial correlation, simple, multiple and linear regression procedures, the Hayes PROCESS model, one-way independent analysis of variance and independent sample t-test analytics. I also completed testing for statistical assumptions to verify analytic outcomes.

Potential threats to validity existed which were aligned with the process of conducting the proposed research in a natural rather than experimentally controlled environment, the selection of participants, and data collection processes. I assessed internal threats to validity as minimal since I measured independent variables at a discrete point in time through use of a consistent and unchanging survey tool instrument (Campbell & Stanley, 1963; McCann et al., 2009; McCann & Selsky, 2012; Wieland & Wallenburg, 2012). Random sampling selection processes and distribution to multiple survey participants aligned with calculations which reflected average responses similarly minimized the potential for statistical regression, overall selection bias, and common method bias (Anderson et al., 2013; Akgun et al., 2014; Campbell & Stanley, 1963;

Guangrong et al., 2013; McCann et al., 2009; Palakos, 2002; Richtner & Lofsten, 2014; Wieland & Wallenburg, 2012). I also concluded that threats to external validity were minimal since this study did not include the administration of a treatment or multiple testing processes (Campbell & Stanely, 1963; McCann et al., 2009). As previously noted, I addressed potential threats to statistical construct conclusion validity through statistical tests for bias and assumptions aligned with the analytic statistical procedure that was initiated.

I also considered potential ethical implications and procedures. The protection of confidentiality and privacy aligned with proper procedures to enable informed consent were initiated and validated through IRB processes and procedures (Furrow et al., 2008; Walden University, 2015b). Concurrently, I did not conduct survey processes aligned with this study's outcomes and conclusions in my employment site to decrease the potential for coercion, threats or bias by the researcher (Protection of Human Subjects, 2009). In addition to potential ethical issues, limitations existed within this study. These limitations included my use of uncontrolled secondary data sources, , limitations on the extent to which causation could be implied, and the solicitation of individual perceptions to identify the existence of agility, resilience, and turbulence without control of all individual characteristics (Cross & Kelly, 2015; Dai et al., 2013; Kimberlin & Winterstein, 2008; McCann et al., 2009).

While ethical issues and limitations were identified, I posited that this study promoted social value and change. To the extent that adaptive leadership capacity has or will impact positive organizational outcomes that influence patients, employees, and

organizational sustainability, social value may be realized within multiple levels of impact. This value is further exemplified by the results which are articulated within Chapter 4, Results.

Chapter 4: Results

Overview

In the five sections of this chapter, I describe the analysis that I completed to answer this study's five research questions and corresponding null hypotheses. Included is an introduction that provides a brief overview of Chapter 4 and a review of this study's topic, purpose, research questions and hypotheses. Next is a description of the outcomes and impact on the primary study process of a pilot study I conducted. In this chapter's third section, I describe primary data collection processes and outcomes. I then offer an extensive discussion of analytic results organized by research questions, related null hypotheses, and demographics. In this section I include a discussion of assumptions and descriptive statistics are included. Chapter 4 concludes with a summary of findings, a synthesis of my findings, application of my findings to this study's proposed theoretical model and a transition to Chapter 5.

Introduction

Persistent and disruptive changes within the current complex health services environment imply that traditional linear forms of health services leadership no longer position health services leaders for successful achievement of positive organizational outcomes (Geer-Frazier, 2014; Malloch & Melnyk, 2013; Pipe et al., 2012). While the study of leadership effectiveness within this environment is in its early stages (Dinh et al., 2014; Hannah et al., 2009; Hempe, 2014, Junior et al., 2012), continuing research that identifies the leadership practices that enable positive organizational outcomes may prove valuable for individuals and communities within the health services environments (Dai et

al., 2012; Junior et al., 2012; Pipe et al., 2012; Stefl, 2008). In this study, I sought to contribute to this nascent body of research by identifying leadership practices that promote positive organizational outcomes within the turbulent health services environment.

Specifically, my research topic was the impact of adaptive leadership capacity on organizational outcomes in complex adaptive health systems. The purpose of this quantitative cross-sectional survey study was to quantify the impact of complexity leadership approaches within the health services system by identifying the relationship between the independent variables of agility and resilience, and dependent organizational outcome variables of financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems. I also considered the impact of turbulence on the achievement of organizational outcomes. I designed five research questions and corresponding null hypotheses to achieve this purpose.

I used the first three research questions to examine the relationships between the components of adaptive leadership capacity (agility and resilience) and the achievement of organizational outcomes. Research Question 1 asked whether a relationship existed between leadership agility and the achievement of the dependent variables of financial performance,, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems. Null Hypothesis 1 was that there is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance, patient care

satisfaction and quality, and human capital outcomes within small, medium, and large health systems. Research Question 2 asked if there was a relationship between leadership resilience and the achievement of the dependent variables of financial performance, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems. Similarly, Null Hypothesis 2 was that there is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium and large health systems. Research Question 3 asked to what extent are the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined by a resilience index, predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality, and human capital outcomes. The corresponding Null Hypothesis 3 was that in the population, the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined by a resilience index, are not predictive of organizational financial performance, patient care satisfaction and quality, and human capital outcomes thus, all of the partial regression coefficients equaled zero.

With Research Questions 4 and 5 I examined the influence of turbulence on the impact of agility and resilience on organizational outcomes. Research Question 4 queried to what extent environmental turbulence is a mediator or moderator of the relationship between the independent variable of agility and the achievement of positive financial performance, patient care satisfaction and quality, and human capital outcomes within

small, medium and large health systems. I posed two null hypotheses which stated that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is not mediated or moderated by environmental turbulence within small medium and large health systems. Similarly, Research Question 5 asked to what extent environmental turbulence is a mediator or moderator of the relationship between the independent variable of resilience and the achievement of positive financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems. As with Research Question 4, Research Question 5 was accompanied by two null hypotheses which stated that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is not mediated or moderated by environmental turbulence within small, medium and large health systems. I completed a pilot study to test the data collection process and design prior to identifying and analyzing outcomes necessary to evaluate these questions and corresponding null hypotheses.

Pilot Study

Design and Process

Pilot studies are useful tools for preliminary testing of a survey process. Pilot studies provide a means to promote reliability of survey measurement and distribution processes, test an anticipated survey process, and identify needed changes prior to implementation of a study's full survey process (Akgun et al, 2014; Ismail et al., 2010;

Kimberlin & Winterstein, 2008; Pulakus, 2002; Wieland & Wallenburg, 2012;Yauch, 2011). I initiated a pilot study by distributing, via the internet, a survey instrument which replicated the anticipated study's primary survey instrument and included additional questions that were specific to the pilot survey process. In these additional questions, I requested feedback regarding the length of time required to complete the survey, whether directions for taking the survey were easy to understand, and whether the structure and form of the survey and accompanying emails promoted confidence that participant responses would be confidential. I also invited the pilot survey participant to add any suggestions for enhancing the clarity of directions for completing the survey or the survey process.

A total of 20 pilot surveys were initially distributed to randomly and proportionately selected participants employed by System X within small, medium, and large health systems. Two additional surveys were distributed to replace initial survey participants who were on leave of absence thus, unavailable. First, an introductory email was distributed by System X's executive sponsor for this study. I followed up by also distributing an email. This email contained a Walden University IRB approved informed consent form and a link to the survey. Walden University IRB approved reminders containing subsequent requests to complete the survey were distributed 12 and 20 days following initial distribution.

Results

Of the 20 eligible survey participants, two (10%) declined participation and five completed the survey for an overall response rate of seven (35%.). Reminder notices

generated one additional response, or an additional 5.00%. Of those who completed pilot surveys, titles included one (20%) in the category of CEO/president/ chairperson/dean, two (40%) in the category of director/medical director, and two (40%) in the category of section chief/ manager/supervisor/coordinator/program manager/ assistant or associate director. Levels of responsibility by participants included one (20%) at the system-wide level, two (40%) at the local health ministry level, and two (40%) at the departmental level. Forty percent of the respondents were female and 60% were male. Pilot survey participant ages included two (40%) between the ages of 36 and 40, one (20%) between the ages of 41 and 45, one (20%) between the ages of 46 and 50, and one (20%)in the age category of 65 plus. Additionally, two (40%) noted employment within the system office, one (20%) was employed within a large health system, one (20%) was employed within a medium health system, and one (20%) was employed within a small health system. All survey questions were answered by participants with the exception of the comments sections.

In response to questions directed specifically to pilot study participants, one participant (20%) indicated the survey required 0 to 5 minutes to complete, three participants (60%) indicated that survey completion required 6 to 10 minutes to complete, and one participant (20%)noted a completion time of 11 to 15 minutes. All (100%) pilot survey respondents indicated that the directions for taking the survey were clear and easy to understand, and that the structure and form of the survey and accompanying emails promoted confidence that participant responses would be

confidential. No suggestions were offered to enhance the clarity of directions or the survey process.

I also reviewed data to verify that transposition into a form compatible with SPSS analysis was feasible. The transposition of data into the numerical independent variables of agility, resilience, and turbulence was successfully tested. Additionally, I tested and verified alignment of the independent variables of agility, resilience, and turbulence with organizational outcomes.

Conclusions and Impact

I concluded that the survey process could be initiated as planned with two changes. Internet administration of the survey through use of a SurveyMonkey link following emails introducing the survey and including an internet based informed consent was determined to be an effective survey process. Additionally, if similar response rates were achieved, an initial survey completion rate of 20% would equal 400 surveys and a completion rate of 5% following reminders would equal 100 responses for a total of 500 responses or 25%. This far exceeded the required sample size of 100 as calculated by GPower analysis (Faul et al., 2007). However, as noted in Chapter 3, Methods, the main survey sampling frame identified for survey sample distribution was increased through a proportionate systematic sampling process to include an alternates list of participants in anticipation that up to 10% or 200 of initial survey participants would be unavailable due to leave of absence from work and therefore not viable survey participants.

Also, as noted in Chapter 3, Methods, an additional change that was identified by this researcher during the pilot survey process was in response to the potential that large

numbers of emails containing a survey link would be prohibited due to logistic email limitations related to acceptable email distribution processes. Discussion with organizational information technology personnel resulted in the need to obtain clearance to send large numbers of emails containing a link to insure that the emailed survey would not be blocked due to concerns that a phishing attempt was in process. A limit of up to 500 emails was identified thus, the main survey was distributed in six waves.

Data Collection

Process: Participant Recruitment and Data Collection

Independent variable data collection. I collected independent variable survey data as anticipated within Chapter 3, Methods, without discrepancies through a proportionate and systematic random sampling approach within each category of small, medium and large health systems. The survey process included distribution of an introductory and reminder emails which extended over a period of 53 calendar days. Consistent with the process tested within the pilot study, an introductory email was distributed by the System X, organizational sponsor. Also consistent with the pilot study I distributed an email containing informed consent and the survey link to survey participants. This email is identified within Appendix A, Informed Consent and Survey Participation Invitation. I distributed reminder notices to survey participants three to seven days following the initial survey distribution. As previously noted, I communicated with organizational information technology personnel to ensure unhindered internet distribution of materials. Of the surveys that were distributed, email addresses for those no longer employed by System X were identified and a new survey

participant was identified. I used six distribution lists equaling up to 400 participants each to equal a total distribution of 2,000 surveys to actively employed survey participants.

Dependent variable data collection. Parallel to survey distribution, I collected secondary dependent variable outcome data as outlined within Chapter 3, Methods, without noted discrepancies. This data was obtained from System X employees who were responsible for the collection, reporting and analysis of the data that was collected. Outcome data was identified for the time period which extended from January 1, 2015, through and including December 31, 2015, consistent with the methodology identified within Chapter 3, Methods. Outcome data included recurring financial operating margin, HCAHPS overall perception of hospital stay, patient readmission rates within 30 days of discharge for any reason, and total employee turnover rates. Data was collected in a form consistent with the variable descriptions noted in Table 3. All data was securely emailed as approved by the sponsoring organization and Walden University IRB.

Response Rates

A total of 579 responses were received in response to survey distribution for an overall response rate of 28.95%. Of those responding, eight or 0.40% declined participation, 33 or 1.65% surveys only contained responses to demographic questions thus, were excluded, and five or 0.25% were excluded due the respondents identification of employment status within an excluded group. The remaining 533 surveys or 26.65% were retained for statistical analysis. Since GPower analysis suggested a required sample size of 100 (Faul et al., 2007), a sample size of 533 exceeded expectations thus, further

efforts to collect additional survey data were not implemented. No discrepancies from the data collection processes anticipated within Chapter 3, Methods were encountered.

Sample Characteristics and Demographics

The overall composition of respondents (N) is illustrated in Table 5, *Summary of Descriptive Statistics*. Demographics within the sample of 533 respondents were differentiated by groups which included title, responsibility level, gender, age, and health system size.

Title. Respondents were identified within five title groupings. Within the total sample, Group 1 or CEO/president/chairperson/dean equaled 2.25%, Group 2 or senior vice president/executive vice president/chief officer equaled 5.07%, Group 3 or vice president/executive/administrator/executive or administrative director equaled 11.07%., Group 4 or director/medical director equaled 27.02% and Group 5 or section chief/manager/supervisor/coordinator/program manager/assistant or associate director equaled 54.60%..

Responsibility. Survey respondents were also placed into one of five groups based on level of responsibility. Of those responding, 14.45% were in Group 1 or had system-wide responsibility, 9.94% were in Group 2 or had market or state-wide responsibility, 30.96% were in Group 3 or had local system responsibility, 42.96% were in Group 4 or had departmental responsibility and 1.69% indicated they had shift oriented responsibility.

Gender. The sample population was primarily comprised of females. Within a total sample of 530 respondents, 73.40% were female and 26.60% were male. Three respondents chose not to answer the survey question that requested declaration of gender.

Age. Survey respondents were asked to provide their age within one of 10 groupings. Of those groupings, zero fell into the category of 24 or less years old, 2.08% fell into the category of 25-30 years old, 6.23% fell into the category of 31-35 years old, 11.13% fell into the category of 36-40 years old, 15.47% fell into the category of 41-45 years old, 14.72% fell into the category of 46-50 years old, 15.28% fell into the category of 51-55 years old, 20.57% fell into the category of 56-60 years old, 11.89% fell into the category of 61-65 years old and 2.64% fell into the category of 65 years old or greater. Three survey respondents chose not to answer this survey question.

Health system size. Health system size was also identified in categories of national system-wide, large, medium, or small. Within a total sample size of 533, 13.51% noted national system-wide association, 56.66% noted association with large health systems, 14.63% noted association with medium sized health systems, and 15.20% noted association with a small health system.

Sample: Representativeness

The total sampling frame of 5,176 leaders from which the survey sample was randomly selected was comprised of leaders with titles which included 0.66% within Group 1 (CEO/president/chairperson/dean) versus the attained sample comprised of 2.25%, 1.85% within Group 2 (senior vice president/executive vice president/chief officer) versus an attained sample of 5.07%, 9.81% within Group 3 (vice president/

executive / administrator/ executive or administrative director) versus an attained sample of 11.07%, 59.30% within Group 4 (director/ medical director) versus and attained sample of 27.02% and 28.28% within Group 5 (section chief/ manager/ supervisor/ coordinator/ program manager/ assistant or associate director) versus an attained sample of 54.60%. Thus, the attained sample included a higher percentage of leaders within the administrative level categories represented by Groups 1, 2, and 3 and a higher percentage of shift based leaders represented within Group 5. The percentage of leaders identified within Group 4 or departmental level leadership employees was smaller than the percentage present within the population represented by the overall sampling frame. When grouped within broad general categories of administrative versus management level titles, the sampling frame was comprised of 12.32% administrative versus an attained sample of 18.39% while department and shift management level respondents comprised 87.58% of the sampling frame versus an attained sample which was comprised of 81.62%.. When viewing level of responsibility, results indicated additional differences. Those with levels of responsibilities at the departmental or shift level equaled 44.65% versus those with a local or multiple system-wide responsibilities equaled 55.35%. Thus, while there may be evidence of incongruence between titles when considering representativeness of the attained sample against the overall sampling frame, departmental and broader system or organizational perspectives appeared equally represented. Similarly, the mix between administrative and management titles were within 6.0% of the sampling frame.

I also compared respondents' gender and age against the overall population of healthcare executives to identify the extent to which a representative population sample was attained., My comparison of survey sample demographics against the overall population of healthcare executives illustrated that my survey sample contained a higher percent of females than the overall population of healthcare executives since the population of healthcare executives equaled 42.8% (American College of Healthcare Executives, 2016) versus an attained survey sample size of female respondents which equaled 73.4%. I was required to estimate comparisons of age against the United States population of healthcare executives because age categories within the American College of Healthcare Executives database were divided into ten year versus five year increments (American College of Healthcare Executives, 2016). I noted a higher proportion of survey respondents within the ages of 50-59 since my survey respondents equaled an estimated 35.85% against an overall population of 29%. All other survey sample age groups were comparable up to plus or minus 4.1%.

Evaluation of representativeness from the perspective of system size illustrated that from a total population sampling frame of 5,176 and excluding pilot study participants, representation of survey respondents equaled 13.5% for system wide against a sample total population percentage of 7.6%, 56.7% for large systems against a sample total population percentage of 59.4%, 14.6% for medium systems against an overall sample total population of 16.4%, and15.2% against an overall population percentage of 16.6% for small health systems. Thus, the sample I obtained was within 5.0% of the overall population sampling frame with the exception of system-wide representatives.

Analysis

Results of the analyses that I conducted begin with a discussion of the assumptions that were applied to data manipulation and analysis. Descriptive statistic outcomes are then illustrated. Following, statistical tests for assumptions aligned with the SPSS statistical procedures that I utilized are described. Analysis of data is subsequently presented through identification and analysis of this study's five research questions and corresponding null hypotheses. A presentation of outcomes by demographic group and analysis which examines the impact of turbulence as a discrete independent variable concludes this section.

General Assumptions

My manipulation and analysis of data incorporated assumptions related to the survey process, alignment of independent and dependent data, researcher influence, exclusions, secondary data collection processes, and representativeness. I assumed that controls embedded within the survey instrument prohibited respondents from answering the survey more than once. Additionally, I assumed that differences in timing between dependent variable outcomes which occurred during the time period which extended from January 1, 2015 through December 31, 2015 and the independent variable data collection period of September, 2016, through October,2016 did not adversely impact compatibility and alignment of independent and dependent variables. I also assumed that my role as an employee within System X did not influence data outcomes since I did not distribute surveys within my employment site. Consistent with this study's design and methods, exclusions were also implemented. I assumed that these exclusions were

substantially met and if not in a miscellaneous circumstance, that the impact on outcomes was diminimous or zero. Since secondary data was collected and provided by System X employees, I assumed that processes and definitions were consistently applied. Finally, when considering representativeness of the attained sample against the general population, I assumed that the System X employee composition remained substantially similar to the census provided by System X and that the American College of Healthcare Professionals (see 2016) profile provided a reasonable description of the general population of healthcare leaders.

Descriptive Statistics

As previously noted, I obtained a total survey sample size of 571 respondents. Thirty-three surveys were excluded from the sample since they included responses to demographic questions only and five were excluded due to identification within an excluded group. The overall composition of remaining 533 survey respondents (*N*) is illustrated in Table 5. Overall average index scores included means of 3.45 (*SD* = 0.70) for agility, 3.47 (*SD* = 0.71) for resilience and 3.36 (*SD*= .80) for turbulence. Dependent variable average index scores equaled a mean MARGIN of 6.01 (*SD*=3.67), a mean HCAHPS of 75.56 (*SD*= 3.60), a mean READMTS of 8.41 (*SD* = 1.13) and a mean TTURN of 20.05 (*SD*=2.25). Data was differentiated wholly and by groups which included title, responsibility level, gender, age, and health system size.

Table 5.

Summary of Descriptive Statistics Differentiated by Sample Groupings

Variable	*N*	Agility		Resilience		Turbulence	
		Mean	*SD*	Mean	*SD*	Mean	*SD*
Title[a]							
Group 1	12	3.30	.72	3.63	.33	3.46	.69
Group 2	27	3.70	.51	3.76	.50	3.20	.88
Group 3	59	3.53	.66	3.68	.62	3.52	.78
Group 4	144	3.47	.73	3.62	.58	3.43	.76
Group 5	291	3.40	.71	3.31	.78	3.31	.82
Responsibility level[b]							
Group 1	77	3.69	.63	3.71	.56	3.44	.65
Group 2	53	3.42	.71	3.66	.65	3.26	.93
Group 3	165	3.44	.67	3.53	.64	3.42	.79
Group 4	229	3.38	.74	3.31	.78	3.31	.80
Group 5	9	3.31	.54	3.18	.70	3.44	1.47
Gender (Group)							
Female (1)	389	3.46	.72	3.45	.72	3.39	.82
Male (2)	141	3.41	.67	3.51	.68	3.29	.75
Age (Group)							
24 or less (1)	0	---	---	---	---	---	---
25-30 (2)	11	3.53	.52	3.31	.82	3.14	1.19
31-35 (3)	33	3.58	.80	3.43	.66	3.21	.72
36-40 (4)	59	3.47	.73	3.42	.69	3.38	.73
41-45 (5)	82	3.44	.62	3.45	.74	3.32	.80
46-50 (6)	78	3.46	.77	3.47	.77	3.38	.88
51-55 (7)	81	3.44	.71	3.45	.74	3.46	.82
56-60 (8)	109	3.43	.69	3.50	.72	3.32	.82
61-65 (9)	63	3.42	.61	3.59	.50	3.42	.74
65-plus (10)	14	3.27	1.02	3.23	.88	3.39	.76
System Size (Group)							
System (1)	72	3.72	.65	3.69	.66	3.30	.76
Large (2)	302	3.42	.68	3.45	.72	3.32	.81
Medium (3)	78	3.57	.63	3.51	.61	3.37	.91
Small (4)	81	3.21	.81	3.28	.78	3.56	.71

Note. a = Title = Group 1 or CEO/President/Chairperson/Dean, Group 2 or Senior Vice President/Executive Vice President/Chief Officer, Group 3 or Vice President/Executive/ Administrator/Executive or Administrative Director, Group 4 or Director/Medical Director, and Group 5 or Section Chief/Manager/Supervisor/Coordinator/Program Manager/Assistant or Associate Director;
b = Responsibility level = Group 1 or system-wide, Group 2 or Market ministry or state-wide, Group 3 or Local health ministry, Group 4 or Departmental, and Group 5, Shift oriented;
SD = Standard deviation.

Statistical Assumptions

Description. I preceded data analysis with statistical testing to identify issues of bias or violation of statistical assumptions. Data was tested to identify issues related to bias or outliers, missing data, linearity, normality, multicolinearity and homogeneity of variance. The presence of outliers was evaluated through calculation of the inter-quartile range (IQR), multiplication of that value by 1.5 (IQR x 1.5), adding that result to the quartile three value and subtracting it from the quartile one value, then examining data for results that were greater than or less than those values (Bluman, 2010; Field, 2013). Identification of missing data was achieved through visual examination of the independent and dependent variable data. Linearity was evaluated through examination of probability-probability (P-P) plots while normality was evaluated through examination of histograms and identification of the occurrence of Skew and Kurtosis (Field, 2013). Multicollinearity was evaluated through scanning of the correlation matrixes obtained to insure that values did not demonstrate extremely high levels equal to .80 or .90 and through identification of variance inflation factors (VIF) exceeding 10 and tolerance levels less than 0.2 (Field, 2013, p.325). Homogeneity of variance was evaluated through Levene's test where a significance of $p > .05$ suggested that the assumption is not violated (Field, 2013).

Outliers. While the presence of outliers was detected, I did not eliminate values since the number of outliers I identified represented a small percentage of the data collected within a robust sample size. For the independent variable of agility, total

outliers represented eight values out of 533 or 1.50% of the data collected. For the independent variable of resilience, five outliers or 0.94% values out of 533 were identified. Outliers associated with the independent variable of turbulence equaled 10 out of a total sample of 533 or 1.88%.

Dependent variable outcomes demonstrated higher percentages of outliers. Data obtained for the dependent variable, MARGIN, equaled 22 0r 4.13%. HCAHPS dependent variable data illustrated 28 outliers or 5.25%. Additionally, READMTS dependent variable data included one outlier to equal 0.19% of data. In contrast, no outliers were identified within TTURN dependent data outcomes. As with independent data sets, I retained all dependent data set outliers since identification of the relationship of adaptive capacity to extreme performance levels within turbulent environments is consistent with the purpose, intent and theoretical premise of this study and due to the large sample size that was obtained. I also noted that outliers observed for MARGIN and HCAHPS were consistently below the first quartile thus, suggesting lesser performance levels.

Missing data. I visually identified missing survey data for all survey questions excepting demographic data by 33 survey respondents. These 33 surveys were excluded from data sets and analysis as a result. Descriptive SPSS statistics data verified successful exclusion of this data.

Linearity. I visually examined P-P plots for linearity. I identified consistent linearity for the independent variables of agility, resilience, and turbulence. I noted slight deviation from the normal P-P plot line for the dependent variables of MARGIN and

TTURN. I also identified moderate deviation from the P-P plot for the dependent variables of HCAHPS and READMTS where data was linear but not as closely aligned with the normal P-P line.

Normality. When I incorporated data into a histogram, independent variable agility data illustrated a normal curve with a negative skew when including outliers. Skew was identified as -0.68 while kurtosis equaled 2.51. Histogram results for the independent variable resilience illustrated a normal curve with a slight skew of -0.55 and kurtosis of 0.59. Incorporation of the independent variable turbulence data into a histogram demonstrated a normal curve with a skew of -0.35 and kurtosis of 0.39.

Similarly to results obtained to examine outliers and linearity I identified greater variability by dependent variable outcomes. Dependent variable MARGIN data produced a negatively skewed effect that was illustrated through a histogram with a skew of -1.05 and kurtosis of 2.09. Similarly, dependent variable HCAHPS data appeared to be clearly negatively skewed when visually examined in a histogram format. A skew of -1.34 and kurtosis of 1.18 were consistent with this conclusion. The histogram which illustrated independent variable data for READMTS most closely resembled a normal distribution with a slight positive skew of 0.72 and kurtosis of 0.32. As with READMTS, a histogram illustrating dependent variable outcomes for TTURN demonstrated a normal curve with a slightly negative skew of -0.43 and kurtosis of -0.47. While these outcomes did not demonstrate perfect normality for all variable categories data was retained for analysis. I concluded that the majority of data demonstrated substantial normality. Further, the attained sample size far exceeded the required sample size of 100 that was

identified through GPower analysis (Faul et al., 2007). I therefore applied the Central Limit Theorem which assumes normality and suggests that skewness and kurtosis are less effective tools for analysis of normality in large samples (Bluman, 2010; Field, 2013; Pallant, 2013).

Multicollinearity. My visual scan of the correlation matrix illustrated in Table 7.0 did not include values equal to or greater than 0.80. In fact, the highest partial correlation was equal to .60, p= .000, between resilience and agility. Similarly, VIF levels consistently equaled values less than 10 at 1.0 and 1.552 and tolerance levels which exceeded 0.2 at 1.0 and .644 when examined through multiple regression analysis.

Homogeneity of variance. I performed a Levene's test within the one-way ANOVA and independent t-tests analyses that I completed. The results are noted within Table 6.0. Violation of the assumption is indicated by Responsibility Level for values associated with resilience and turbulence and by Title for values associated with resilience. However, robust tests of equality of means by Responsibility Level for resilience indicated a Welch test, $F(4, 53.61) = 7.41$, p=.000 and Brown-Forsythe, $F(4,93.19) = 7.93$, $p = .000$. Robust tests by responsibility level for turbulence indicated a Welch test, $F(4,52.25) = .81$, $p = .523$ and Brown-Forsythe test, $F(4,28.51) = .52$, $p = .723$. Finally, robust tests of equality of means by Title for resilience indicated a Welch test, $F(4,63.57) = 9.00$, $p = .000$ and Brown-Forsythe, F (4,248.16) = 13.30, p= .000. This may have suggested that data illustrating responsibility levels associated with turbulence violated the assumption of homogeneity of variance. However, given the data set attained for this study and the hypotheses being tested, I concluded that the illustration

of the relationship between turbulence and responsibility levels through these tests was not relevant.

Table 6

Levene's Test for Homogeneity of Variance Between Groups by Independent Variable

Variable	*F*	*df1*	*df*	Significance
Agility				
Title	.43	4	528	.785
Responsibility level	.40	4	528	.811
Age	.75	8	521	.644
System Size	.05	3	529	.984
Resilience				
Title	6.64	4	528	.000*
Responsibility level	2.72	4	528	.029*
Age	1.40	8	521	.196
System Size	1.72	3	529	.162
Turbulence				
Title	90	4	528	.467
Responsibility level	3.67	4	528	.006*
Age	.85	8	521	.556
System Size	1.66	3	529	.174

Note. 1 = outcome variable by identified group,
* = $p < .05$,
independent samples t-test outcomes were agility, $F(528) = .86$, $p = .354$, resilience, $F(528) = .60$, $p = .441$, and resilience, $F(528) = .38$, $p = .536$.

Conclusions. I concluded that statistical assumptions were met. My assessment was that the presence of outliers was minimal and would not significantly bias results. Assumptions for linearity and normality were substantially met. Concurrently, evidence of muticollinearity was not identified. While missing data existed, issues were resolved through exclusion of surveys which included missing data. I also implemented bootstrapping at a 95% confidence interval for partial correlation and simple regression analyses to further test for violation of assumptions and given the presence of outliers (Field, 2013). With the exception of three instances, the assumption of homogeneity of

variances was met. When not met robust tests illustrated significance for variables directly associated with agility and resilience.

Analysis: Research Question and Null Hypothesis 1

Research Question 1. Is there a relationship between leadership agility and the achievement of the dependent variables of financial performance, patient care satisfaction and quality, and human capital organizational outcomes within small, medium, and large health systems?

Corresponding null hypothesis to Research Question 1. Null Hypothesis 1 stated there is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems.

Results: Partial correlation analysis. I conducted a partial correlation analysis to identify whether a positive correlation between the independent variable of agility as measured by an agility index and the achievement of dependent variable organizational financial performance as measured by net recurring operating margin (MARGIN), patient care satisfaction as measured by patients' overall rating of hospital (HCAHPS) and quality as measured by readmission rates within 30 days of discharge for any reason (READMTS), and human capital outcomes as measured by total turnover (TTURN) within small, medium, and large health systems existed when the effect of the independent variable of resilience as measured by a resilience index is held constant.

A non- significant relationship resulted between Agility and MARGIN, r = -.02, p = .608, HCAHPS, r = .05, p = .288, READMITS, r = -.001, p = .974, and TTURN, r = .02, p = .646, when resilience was held constant. Interesting to note is that a positive relationship was noted upon inspection of the zero order correlation between agility and HCAHPS *(*r = .14, 95% BCa CI [.050-.227], p = .001) when the effect of resilience was not held constant within the partial correlation model. Further, agility and resilience were positively and significantly related, r = 0.60, 95% BCa CI [.524-.664], p = .000. Partial correlations are illustrated within Table 7.

Results: Simple regression analysis. I conducted a simple regression analysis to determine if agility is individually predictive of the variation in dependent variable organizational outcomes. Simple regression analysis illustrated that agility had the highest correlation with HCAHPS *(*r = .14, p = .001) followed by MARGIN (r = .08, p< .05). Similarly, it is likely that agility accounts for 2.0% variation in HCAHPS scores (R^2 = .02) and 1.0% in MARGIN (R^2 = .01). I noted non – significant correlations with READMTS (p = .200) and TTURN (p = .156)..

Table 8 presents a summary of the ANOVA analysis attained through simple regression analysis. ANOVA analysis confirmed that predictions were significantly improved through regression analysis over mean comparisons through demonstration of the correlation of HCAHPS only, F(1,531) = 10.56, p = .001. Prediction were not significantly improved through regression analysis over mean comparisons for MARGIN, F(1,531) = 3.16, p =.076, p> .05,, READMTS, F(1,531) = .71, p = .401, p > .05), and TTURN, F(1,531) = 1.02, p = .312, p>.05.

As illustrated in Table 10 model coefficients further confirmed HCAHPS predictability. A positive relationship between agility and HCAHPS (b = .72) suggests that for each one unit change in agility, a predicted improvement of 0.72 in HCAHPS scores may be achieved. A genuine effect was supported by t-tests which illustrated that agility, t =3.25 p <.01) is a significant predictor of HCAHPS. Bootstrap confidence intervals, 95% BCa CI [.239-1.215], p < .01, two-tailed, further illustrated a genuine positive effect between agility and HCAHPS.

Conclusions. Collectively, these outcomes suggested that sufficient evidence exists to reject the null hypothesis that there is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational patient care satisfaction outcomes as measured through HCAHPS scores within small, medium, and large health systems. However, insufficient evidence exists to reject the null hypothesis that there is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance as measured by MARGIN, patient care quality and measured by READMTS, and human capital outcomes as measured by TTURN within small, medium, and large health systems.

Analysis: Research Question and Null Hypothesis 2

Research Question 2. Is there a relationship between leadership resilience and the achievement of the dependent variables of financial performance, patient satisfaction and quality and human capital organizational outcomes within small, medium and large health systems?

Corresponding null hypothesis to Research Question 2. Null Hypothesis 2 stated that there is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small, medium, and large health systems.

Results: Partial correlation analysis. I conducted a partial correlation analysis to identify whether a positive correlation between the independent variable of resilience as measured by a resilience index and the achievement of dependent variable organizational financial performance as measured by net recurring operating margin (MARGIN), patient care satisfaction as measured by patients' overall rating of hospital (HCAHPS) and quality as measured by readmission rates within 30 days of discharge for any reason (READMTS), and human capital outcomes as measured by total turnover (TTURN) within small, medium, and large health systems existed when the effect of the independent variable of agility as measured by an agility index is held constant. Partial correlation results are illustrated within Table 7.

I noted a non-significant relationship between resilience and READMTS, $r = -.05$, $p = .282$, and TTURN, $r = .03$, $p = .555$, when the effect of agility was held constant. A positive and significant relationship was found between resilience and MARGIN, $r = .14$, 95% BCa CI [.038- .238], $p < .01$, and HCAHPS, $r = .11$, 95% BCa CI [.024-.201], $p = < .01$ when the effect of agility was held constant. An inspection of zero order correlations for MARGIN ($r = .16$, 95% BCa [.068-.243], $p = .000$) and HCAHPS ($r = .17$, 95% BCa

[.081-.252], p = .000) suggested that controlling for agility diminished the strength of the relationship between resilience and these dependent variables.

Results: Simple regression analysis. I also conducted a simple regression analysis to determine if resilience is individually predictive of the variation in dependent variable organizational outcomes. Simple regression analysis confirmed partial correlation outcomes. Resilience had the highest correlation with HCAHPS (r = .17, p = .000) followed by MARGIN *(*r = .16, p = .000). Non-significant correlations with READMTS (p=.086) and TTURN (p=.141) were noted. Similarly, it is likely that resilience positively accounted for 3.0% variation in HCAHPS scores (R^2 = .03) and 3.0% in MARGIN (R^2 = .03).

As illustrated in Table 9, ANOVA analysis confirmed that predictions were significantly improved through regression analysis over mean comparisons through demonstration of the correlation of HCAHPS, $F(1, 531) = 16.36$, p = .000, and MARGIN, $F(1, 531) = 13.68$, p = .000. Predictions were not significantly improved through regression analysis over mean comparisons for READMTS,,$F(1,531) = 1.87$, p= .172, p>.05, and TTURN, $F(1,531) = 1.16$, p = .28, p >.05.

Table 10 illustrates confirmation of predictability through model coefficients. A positive relationship between resilience and HCAHPS (b = .88) suggested that for each unit change in resilience, an increase of 0.88 in HCAHPS scores may be achieved. Similarly, a positive relationship between resilience and MARGIN (b= .82) suggested that for each unit change in resilience, an increase of 0.82 % in MARGIN may be achieved. These observations are supported by t-tests which illustrated that resilience is a

significant predictor of HCAHPS, $t = 4.05$, $p = .000$) and MARGIN, $t = 3.70$, $p = .000$) thus suggested genuine effects. Bootstrap confidence intervals for HCAHPS, 95% BCa CI [.448-1.323], $p < .01$, and for MARGIN, 95% BCa CI [.384-1.280], $p < .01$, further displayed a genuine positive effect between resilience and the dependent variables of HCAHPS and MARGIN.

Conclusion. Collectively these outcomes suggested that sufficient evidence exists to reject the null hypothesis that there is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational financial performance as measured by MARGIN and patient care satisfaction as measured by HCAHPS outcomes within small, medium, and large health systems. However, insufficient evidence exists to reject the null hypothesis that there is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational patient care quality as measured by READMTS and human capital outcomes as measured by TTURN outcomes in small, medium and large health systems.

Tables. The following Table 7, Table 8, Table 9 and Table 10 summarize the results that were identified through the data analysis that I initiated to answer Research Questions 1 and 2. Correlations between predictor variables are summarized with multiple regression outcomes that are identified in Table 11.

Table 7

Partial Correlation Analysis Between Agility, Resilience and Organizational Outcomes.

	Variables					
Variables	Agility[1]	Margin (%)	HCAHPS[1]	READMTS[1]	TTURN (%)	Resilience[1,2]
Agility[1]	1.00	-.02*	.05*	-.001*	.02*	.60***
Margin (%)	-.02*	1.00	----	----	----	.14**
HCAHPS[1]	.05*	----	1.00	----	----	.11**
READMTS	-.001*	----	----	1.00	----	.05*
TTURN (%)	.02*	----	----	----	1.00	.03*
Resilience[1]	.60***	.14**	.11**	- .05*	.03*	1.00

Note. [1] = variable units measured numerically, 2= denotes correlation between Agility and Resilience without control variables (zero order),
* $p > 0.05$, *ns*, ** $p < .01$, ***$p = .000$, two-tailed

Table 8

One-Way ANOVA Summary for Agility versus Organizational Outcome Variables

Variable		*df*	*F*
MARGIN	Regression	1	3.16*
	Residual	531	
	Total	532	
HCAHPS	Regression	1	10.56**
	Residual	531	
	Total	532	
READMTS	Regression	1	.71*
	Residual	531	
	Total	532	
TTURN	Regression	1	1.02*
	Residual	531	
	Total	532	

Note. * = p >.05, **=p<.01

Table 9.

One-Way ANOVA Summary for Resilience versus Organizational Outcome Variables

Variable		*df*	*F*
MARGIN	Regression	1	13.68*
	Residual	531	
	Total	532	
HCAHPS	Regression	1	16.36*
	Residual	531	
	Total	532	
READMTS	Regression	1	1.87**
	Residual	531	
	Total	532	
TTURN	Regression	1	1.16**
	Residual	531	
	Total	532	

Note. * = p = .000, **= p> .05

Table 10

Simple Regression Model Coefficients for Agility and Resilience versus Organizational Outcome Variables

Variable		Unstandardized Coefficient (*B*)	*SE B*	Standardized Coefficient (β)	*t*-statistic
1	Constant	4.63	.79		5.83**
	Agility	.40	.23	.08	1.78*
	Constant	3.18	.78		4.07**
	Resilience	.82	.22	.16	3.70**
2	Constant	73.09	.77		94.41**
	Agility	.72	.22	.14	3.25***
	Constant	72.52	.77		94.71**
	Resilience	.88	.22	.17	4.05**
3	Constant	8.61	.25		35.03**
	Agility	-.06	.07	-.04	-.84*
	Constant	8.74	.24		35.78**
	Resilience	-.09	.07	-.06	-1.37*
4	Constant	19.57	.49		40.07**
	Agility	.14	.14	.04	1.01*
	Constant	19.54	.49		40.24**
	Resilience	.15	.14	.05	1.08*

Note. 1 =Dependent variable: MARGIN, 2 = Dependent variable HCAHPS, 3 = Dependent variable READMTS, 4 = Dependent variable READMTS,
* = p >.05, ** = p = .000, ***= p <.01

Analysis: Research Question and Null Hypothesis 3

Research Question 3. To what extent are the independent variables of agility and resilience where agility is defined by an agility index and resilience is defined by a resilience index predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems?

Corresponding null hypothesis to Research Question 3. Null Hypothesis 3 stated that in the population, the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined by a resilience index, are not predictive of organizational outcomes or the dependent variables of organizational financial performance, patient satisfaction and quality and human capital outcomes thus, all of the partial regression coefficients equal zero.

Results: Multiple Regression Analysis. I conducted a forced entry multiple regression analysis to determine which, if any, of the factors or independent variables of agility, as defined by an agility index, and resilience as defined by a resilience index, are predictive of financial performance as defined by MARGIN, patient care satisfaction, as defined by HCAHPS, patient care quality, as defined by READMTS, and human capital outcomes as defined by TTURN outcomes within small, medium and large health systems. Outcomes which resulted from multiple regression analysis were congruent with those noted through partial correlation and simple regression analysis.

Similarly to simple regression analysis, within the total sample size of 533, it is likely that both agility and resilience are significant predictors of HCAHPS while both

are significant predictors of MARGIN when simultaneously entered into the regression equation. Also congruent with prior analysis, neither agility nor resilience were found to be significant predictors of READMTS or TTURN as evidenced by non-significant values (p>.05) within model summaries, ANOVA and model coefficients. Correlations between variables are illustrated in Table 11. Consistent with partial correlation and simple regression outcomes, resilience had the highest correlation with HCAHPS (r = .17, p = .000) followed by agility (r = .14, p = .001). The model summary illustrated that agility accounted for 2.0% of the variation in HCAHPS. Variation increased to 3.0% when resilience was considered. Variation in adjusted R^2 was small equaling .032-.028 or 0.4% thus, the expected variance in outcome would be small when viewed from the general population. Change statistics confirmed the variance explained by agility (R^2 = .02, p = <.01) and the inclusion of resilience in the model (R^2 = .01, p<.01). As noted in Table 12, AVOVA analysis further confirmed that predictions were significantly improved through regression analysis over mean comparison for the predictor of agility, $F(1,531) = 10.56$, $p < .01$ and for the predictors of agility and resilience, $F(2, 530) = 8.75$, $p = .000$.

Model coefficients partially confirmed predictability. As noted in Table 13, a positive relationship between the predictor of resilience (b= .70) and HCAHPS suggested that as resilience increases by one unit, HCAHPS increases by .70 units assuming the effects of agility are held constant. T-statistics were congruent with this conclusion indicating that Resilience is a significant predictor of HCAHPS, $t(530) = 2.61$, $p < .01$. However, while a positive relationship existed between the predictor of agility and

HCAHPS suggesting that as agility increased by one unit, HCAHPS increased by .29 assuming the effects of resilience are held constant, *t*-statistics were non-significant, $t(530) = 1.06$, $p = .288$, $p > .05$. The difference in magnitude of *t*-statistics may further suggest that the magnitude of impact achieved through resilience was approximately double that of agility at a significant level. Standardized values also illustrated predicted changes. Outcomes suggested that as agility (standardized $\beta = .06$) increases by one standard deviation HCAHPS increases by .06 standard deviations. Concurrently, as resilience (standardized $\beta = .14$) increases by one standard deviation, HCAHPS increases by .14 standard deviations. Since the standard deviation of HCAHPS was 3.60, if the agility index is increased by one standard deviation, HCAHPS scores are predicted to increase 3.60 x .06 or by 0.22. Similarly, if the resilience index is increased by one standard deviation, HCAHPS scores are predicted to increase by .14 x 3.60 or by 0.50. Congruently, if both indexes increase, the cumulative potential improvement in HCAHPS scores is predicted to equal 0.72 per standard deviation of improvement.

I also noted positive predictions for MARGIN. Table 11 illustrates that resilience had the highest correlation with MARGIN ($r = .16$, $p = .000$) followed by agility ($r = .08$, $p < .05$). While the model summary showed that agility accounted for 1.0% of the variation in MARGIN, change statistics illustrated a non-significant relationship ($p = .076$, $p > .05$). When resilience was entered into the model however, variation increased to 3.0% with confirmation of the variance through change statistics ($R^2 = .02$, $p < .01$). Variation in adjusted R^2 was small equaling .03 -.02 or 1.0% thus, the expected variance in outcome would be small when viewed from the general population.

ANOVA analysis revealed consistent outcomes as noted in Table 12. Though significant improvement could not be conclusively noted through demonstration of agility, $F(1,531) = 3.16$, $p = .076$, $p > .05$, entering resilience into the model confirmed significant improvement through regression analysis over mean comparisons, $F(2, 530) = 6.96$, $p < .01$.

Model coefficients were also consistent with these results. As indicated in Table 13, a positive relationship between the predictor of resilience ($b = .90$) and MARGIN suggested that as resilience is increased by one unit, MARGIN increases by .90 units assuming the effects of agility are held constant. T- statistics, congruent with this conclusion, illustrated that resilience is a significant predictor of MARGIN, $t(530) = 3.27$, $p < .01$. Conversely, a negative relationship between the predictor of agility ($b = -.14$), standardized coefficients ($\beta = -.03$) and MARGIN was identified while *t*-statistics indicated a non-significant relationship, $t(530) = -.51$, $p = .608$, $p > .05$, when the effects of resilience were held constant. Standardized values also illustrated these predicted changes. As resilience (standardized $\beta = .18$) increases by one standard deviation, MARGIN was predicted to increase by .18.standard deviations. Since the standard deviation of MARGIN was, 3.67, as resilience increases by one standard deviation or by .18, MARGIN is predicted to increase by 3.67 x .18 or by 0.66%.

As noted through simple regression analysis,, agility and resilience were not found to be significant predictors of READMTS or TTURN when entered into the multiple regression model. Non-significant correlations were noted between agility ($r = -.04$, $p = .20$, $p > .05$), resilience ($r = -.06$, $p = .086$, $p > .05$) and READMTS. Similarly,

non-significant correlations were noted between agility (r = .04, p = .156, p> .05), resilience (r = .05, p = .141, p> .05) and TTURN. These correlations are identified in Table 11. ANOVA analysis was also non-significant with READMTS for predictors of agility, $F(1, 531) = .71$, p=.401, p>.05, and agility and resilience, $F(2, 530) = .94$, p = .393, p>.05. Additionally, ANOVA analysis was non-significant for TTURN for the predictors of agility, $F(1,531) = 1.02$, p = .312, p>.05, and predictors of agility plus resilience, $F(2,530) = .69$, p = .505, p>.05. Table 12 illustrates these findings. Model coefficients similarly illustrated negative relationships between agility (b = .-.003), resilience (b=.-.09) and READMTS and negative predictability values for agility (standardized β = -.002) and resilience (standardized β = -.06) and READMTS. *T*-statistics were also non-significant when evaluating impact on READMTS for both agility, $t(530) = -.03$, p = 97, **p** > .05 and resilience, $t(530) = -1.08$, p = .282, p > .05. My evaluation through multiple regression analysis between independent variables and TTURN resulted in similar outcomes. Model coefficients for TTURN indicated positive relationships between agility (b = .08) and resilience (b = .10) and positive predictability values for agility (standardized β = .03) and resilience (standardized β = .03). However, *t*-statistics illustrated non-significant change for TTURN as a result of agility, $t(530) = .46$, p = .646, p > .05 and resilience, $t(530) = .59$, p= .555, p > .05. Table 13 notes these outcomes.

Conclusion. Null Hypothesis 3 is partially rejected and partially accepted. Collective results demonstrated that sufficient evidence existed to reject the null hypothesis that in the population, the independent variables of agility and resilience,

where agility is defined by an agility index and resilience is defined by a resilience index are not predictive of organizational patient satisfaction, as defined by HCAHPS thus all of the partial regression coefficients do not equal zero. Further, sufficient evident existed to reject the null hypothesis that in the population, the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined by a resilience index are not predictive of organizational financial outcomes, as defined by MARGIN, when considered in the aggregate thus all of the partial regression coefficients do not equal zero. However, sufficient evidence did not exist to reject the null hypothesis that in the population, the independent variables of agility and resilience where agility is defined by an agility index and resilience is defined as a resilience index, are not predictive of organizational financial performance outcomes as defined by MARGIN as to agility only. Further, insufficient evidence existed to reject the null hypothesis that in the population, the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined as a resilience index, are not predictive of organizational outcomes or the dependent variables of organizational patient care quality as defined by READMTS or human capital outcomes as defined by TTURN.

Tables. Table 11, Table 12 and Table 13 follow with a display of multiple regression analysis findings.

Table 11

Simple and Multiple Regression Correlations Between Predictor and Organizational Outcome Variables

	Variables					
Variables	Agility	Resilience	MARGIN	HCAHPS	READMTS	TTURN
Agility	1.00	---	.08**	.14***	-.04****	.04****
Resilience	---	1.00	.16*	.17*	-.06****	.05****
MARGIN	.08**	.16*	1.00	---	---	---
HCAHPS	.14***	.17*	---	1.00	---	---
READMT	-.04****	-.06****	---	---	1.00	---
TTURN	.04****	.05****	---	---	---	1.00

Note. *= p =.000, **= p < .05, ***= p<.01, **** p > .05,*ns*

Table 12

Multiple Regression One-Way ANOVA for Predictors versus Organizational Outcome Variables

Variable		*df*	*F*
MARGIN			
	Regression	1	3.16*
1	Residual	531	
	Total	532	
	Regression	2	6.96**
2	Residual	530	
	Total	532	
HCAHPS			
	Regression	1	10.56**
1	Residual	531	
	Total	532	
	Regression	2	8.75***
2	Residual	530	
	Total	532	
READMTS			
	Regression	1	.71*
1	Residual	531	
	Total	532	
	Regression	2	.94*
2	Residual	530	
	Total	532	
TTURN			
	Regression	1	1.02*
1	Residual	531	
	Total	532	
	Regression	2	.69*
2	Residual	530	
	Total	532	

Note. 1 = predictors: (Constant), Agility (index), 2 = predictors (Constant) Agility (index), Resilience (index), * = $p > .05$, ** = $p < .01$, *** = $p = .000$.

Table 13

Multiple Regression Model Coefficients for Agility and Resilience versus Organizational Outcome Variables

	Variable	Unstandardized Coefficient (*B*)	*SE B*	Standardized Coefficient (β)	*t*-statistic
1	Constant	3.38	.87		3.87*
	Agility	-.14	.28	-.03	-.51***
	Resilience	.90	.28	.18	3.27**
2	Constant	72.12	.86		84.26*
	Agility	.29	.27	.06	1.06***
	Resilience	.70	.27	.14	2.61**
3	Constant	8.74	.27		31.99*
	Agility	-.003	.09	-.002	-.03***
	Resilience	-.09	.09	-. .06	-1.08***
4	Constant	19.43	.54		35.77*
	Agility	.08	- .17	.03	.46***
	Resilience	.10	.17	.03	.59***

Note. 1 = dependent variable, MARGIN, 2 = dependent variable HCAHPS, 3 = dependent variable READMTS, 4 = dependent variable TTURN,
*p=.000, **p < .01, ***p > .05, one-tailed.

Analysis: Research Questions and Null Hypotheses 4a, 4b and 5a, 5b

I answered Research Questions 4 and 5 though a process of statistical analysis that tested the moderation and mediation effects of turbulence on the relationship between the independent variables of agility and resilience and dependent organizational outcomes. Following articulation of these questions and hypotheses, the analytical findings which resulted through use of the Andrew H. Hayes PROCESS model (Field, 2013) and through multiple linear regression are presented.

Research Question 4. To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of agility and the achievement of positive financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems?

Corresponding null hypotheses to Research Question 4. Null Hypothesis 4a states that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is not mediated by environmental turbulence within small, medium and large health systems. Null Hypothesis 4b states that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable agility is not moderated by environmental turbulence within small, medium and large health systems.

Research Question 5. To what extent is environmental Turbulence a mediator or moderator of the relationship between the independent variable of Resilience and the achievement of positive financial, patient care satisfaction and quality and human capital outcomes within small medium and large health systems?

Corresponding null hypotheses to research question 5. Null Hypothesis 5a states that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is not mediated by environmental turbulence within small, medium and large health systems. Null Hypothesis 5b states that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is not moderated by environmental turbulence within small, medium and large health systems.

Agility PROCESS Mediation Analysis. I conducted mediation analysis through use of the PROCESS model to determine whether turbulence mediates the relationship between the independent predictor variable of agility and the dependent organizational variable outcomes of MARGIN, HCAHPS, READMTS, and TTURN. In this model, agility was entered as the predictor variable and turbulence as the mediator variable against dependent organizational outcome variables. When evaluated for effect on MARGIN, a genuine and significant indirect effect of agility on MARGIN through turbulence, $b = 0.67$, BCa CI [0.0062, 0.1763] resulted. The regression model summaries predicted from both agility and turbulence illustrated that as turbulence decreases ($b = -0.42$, $p<.05$), MARGIN increases. Additionally, the regression model for MARGIN predicted from both agility and turbulence, illustrated that agility was not a significant predictor ($b = 0.33$, $t = 1.46$, $p = .1442$, $p > .05$, while turbulence was, $b = -0.42$, $t = -2.13$, $p < .05$.

A significant indirect effect of agility on READMTS through turbulence was also noted, $b = -0.02$, BCa CI [-0.0572, -0.0048]. Model summaries illustrated that as turbulence increases, $b = 0.15$, $t = 2.43$, $p <.05$, READMTS increase. As with MARGIN, when viewing the regression model for READMTS predicted from both agility and turbulence, agility was not a significant predictor, $b=-0.03$, $t = -0.49$, $p = .62$, $p >.05$, while turbulence was, $b = 0.15$, $t = 2.43$, $p <.05$.

When evaluated for effect on HCAHPS, a significant indirect effect of agility on HCAHPS through turbulence did not result, $b = 0.03$, BCa CI [-0.0299, 0.1167].

Similarly, a significant indirect effect of agility on TTURN through turbulence was not identified, $b = 0.01$, BCa CI [-0.0225, 0.0568].

Resilience PROCESS mediation analysis. I also conducted mediation analysis through use of the PROCESS model to determine whether turbulence mediates the relationship between the independent predictor variable of resilience and the dependent organizational variable outcomes of MARGIN, HCAHPS, READMTS, and TTURN. In this model, resilience was entered as the predictor variable and turbulence as the mediator variable against organizational outcome variables. When evaluated, a significant indirect effect of resilience through turbulence was not identified in relationship to MARGIN, $b = 0.06$, BCa CI [-0.0005, 0.1510], HCAHPS, $b = 0.02$, BCa CI [-0.0346, 0.0988], and TTURN, $b = 0.01$, BCa CI [-0.0239, 0.0568].

In contrast, a significant indirect effect of resilience on READMTS through turbulence was identified, $b = -0.02$, BCa CI [-0.0519, -0.0043]. Congruent regression model summaries illustrated an inverse relationship suggesting that as resilience increases ($b = -0.15$, $p < .01$), turbulence decreases. As with agility, resilience was not a significant predictor, $b = -0.07$, $t = -1.04$, $p = .2973$, $p > .05$, while Turbulence was, $b = 0.15$, $t = 2.36$, $p < .05$.

Agility PROCESS Moderation Analysis. I analyzed the possible moderating impact of turbulence on the relationship between the independent predictor variable of agility and the dependent organizational outcome variables of MARGIN, HCAHPS, READMTS, and TTURN, in part, through the Andrew H. Hayes PROCESS model

(Field, 2013). The results of these analyses are illustrated in Table 14, Table 15, Table 16, and Table 17.

I found a non-significant interaction effect when evaluating the potential moderating effect of turbulence on the relationship between agility and MARGIN , *b*=. 0.09, 95% CI [-0.4750, 0.6537], $t = 0.31$, $p = .7560$, $p > .05$. The lack of moderation effect was verified by simple slopes analysis. A non-significant relationship between agility and MARGIN was found when turbulence was low, $b = 0.27$, 95% CI [-0.4222, 0.9537], t = 0.76, $p = .4482$, $p>.05$, at the mean value of turbulence, $b = 0.34$, 95% CI [-0.1102, 0.7854], $t = 1.48$, $p = .1392$, $p> .05$, and when turbulence was high, $b = 0.41$, 95% CI [-0.1735, 0.9924], $t = 1.38$, $p= .1682$, $p>.05$.

As with MARGIN, I identified a non-significant interaction effect when evaluating the moderating effect of turbulence between agility and HCAHPS, $b = -0.11$, 95% CI [-0.8500, 0.6366], $t = -0.28$, $p = .7780$, $p> .05$. Simple slopes analysis substantially verified the lack of moderating effect. A non-significant relationship between agility and HCAHPS was noted when turbulence was low, $b = 0.77$, 95% CI [-0.0837, 1.6208], $t = 1.77$, $p = .0770$, $p> .05$, and when turbulence was high, $b = 0.60$, 95%CI [-0.1631, 1.3569, $t = 1.54$, $p = .1234$, $p> .05$.. At the mean value of turbulence, or when the mean value of turbulence was zero, a significant relationship was noted, $b = 0.68$, 95% CI [0.1400, 1.2255], $t = 2.47$, $p = .0138$, $p < .05$.

Similarly, I found a non-significant effect when I analyzed the moderating effect of turbulence on the relationship between agility and READMTS, $b = -0.08$, 95% CI [-0.2222, 0.0595], $t = -1.13$, $p = .2569$, $p>.05$. Simple slopes analysis concurrently

illustrated a non-significant relationship when turbulence is low, *b* = 0.03, 95% CI [-0.1080, 0.1598],*t* = 0.3800 *p* = .7041, *p*> .05, at the mean value of turbulence, *b* = -0.04, 95% CI [-0.1679, 0.888], *t* = -0.61, *p* = .5454, p > .05, and when turbulence is high, b = -0.11, 95% CI [-0.3066, 0.0967], *t* = -1.0225, *p* = .3070, *p* > .05.

Finally, I found a non-significant effect when conducted analysis to identify whether turbulence has a moderating effect on the relationship between agility and TTURN, *b*= 0.04, 95% CI [-0.3271, 0.4215], *t* = 0.25, *p* = 0.8044, *p* > .05. Consistent with this outcome, simple slopes analysis illustrated non-significant relationships when turbulence is low, *b* = 0.09, 95% CI [-0.2837, 0.4685], *t* = 0.48, *p* = .6295, *p*>.05, at the mean value of turbulence, *b* = 0.13, 95% CI [-0.1702, 0.4310], *t* = 0.85, *p* = .3946, *p*>.05, and when turbulence is high, *b* = 0.17, 95% CI [-0.3012, 0.6379], *t* = 0.70, *p* = .4816, *p*>.05.

Resilience PROCESS moderation analysis. I analyzed the possible moderating impact of turbulence on the relationship between the independent predictor variable of resilience and the dependent organizational outcome variables of MARGIN, HCAHPS, READMTS, and TTURN in part, through the Andrew H. Hayes PROCESS model (Field, 2013). As with agility, the results of these analyses are illustrated in Table 14,Table 15, Table 16 and Table 17.

Turbulence had a non-significant moderating effect on the relationship between resilience and MARGIN, *b* = 0.02, 95% CI [-0.5980, 0.6383], *t* = 0.06, *p* = .9489, *p*>.05. However, a simple slopes analysis conversely illustrated a significant relationship between resilience as a predictor of MARGIN when turbulence is low, *b* = 0.74, 95% CI

[0.0163, 1.4730], $t = 2.00$, $p < .05$, at the mean value of turbulence, $b = 0.76$, 95% CI [0.2733, 1.2483], $t = 3.07$, $p < .01$, and when turbulence is high, $b = 0.77$, 95% CI [0.1144, 1.4397], $t = 2.30$, $p < .05$.

Turbulence also had a non-significant effect on the relationship between resilience and HCAHPS, $b = -0.23$, 95% CI [-0.8765, 0.4159], $t = -0.70$, $p = .4842$, $p>.05$. A simple slopes analysis identified a significant relationship between resilience and HCAHPS when turbulence is low, $b = 1.03$, CI [0.3025, 1.7567], $t = 2.78$, $p < .01$, and when turbulence is at mean levels, $b = 0.84$, 95% CI [0.3570, 1.3318], $t = 3.40$, $p < .001$, but not when turbulence is high, $b = 0.66$, CI [-0.0385, 1.3568], $t = 1.86$, $p = .06$, $p>.05$.

Similarly, Turbulence had a non-significant effect on the relationship between resilience and READMTS, $b = -0.01$, 95% CI [-0.1636, 0.1473], $t = -0.10$, $p = .9179$, $p>.05$, and on the relationship between Resilience and TTURN, $b = -0.21$, 95% CI [-0.5581, 0.1405], $t = -1.17$, $p = .2409$, $p>.05$. Simple slopes analysis concurrently identified a non-significant relationship between resilience and READMTS when turbulence is low, $b = -0.07$, 95% CI [-0.2398, 0.1075], $t = -0.75$, $p = .4547$, $p>.05$, at the mean value of turbulence, $b = .07$, 95% CI [-0.2138, 0.0684], $t = -1.01$, $p = .3120$, $p>.05$, and when turbulence is high, $b = -0.08$, 95% CI [-0.2816, 0.1231], $t = -0.77$, $p = .4419$, $p > .05$. As with READMTS, simple slopes analysis also illustrated a non-significant relationship between resilience and TTURN when turbulence is low, $b = 0.30$, 95% CI [-0.0694, 0.6597], $t = 1.59$, $p = .1123$, $p>.05$, at the mean valued of turbulence, $b = 0.13$, 95% CI [-0.1545, 0.4090], $t = 0.89$, $p = .3753$, $p>.05$, and when turbulence is high, $b = -0.04$, 95% CI [-0.4693, 0.3880], $t = -0.1863$, $p = .8523$, $p > .05$.

Tables. The tables which follow illustrate the statistical outcomes of the moderation analysis I completed through use of the PROCESS model. These tables include Table 14, Table 15, Table 16 and Table 17.

Table 14

Moderation PROCESS Model Predictors: Turbulence versus Agility, Resilience and MARGIN

	b	*SE B*	*t*	*p*
Agility[a]				
Constant	6.02 [5.7012, 6.3342]	0.16	37.35	.0000
Turbulence (centered)	-0.42 [-0.8207,-0.0169]	0.20	-2.05	.0411**
Agility (centered)	0.34 [-0.1102, 0.7854]	0.23	1.48	.1392***
Agility x Turbulence	0.09 [-0.4750, 0.6537]	0.29	0.31	.7560***
Resilience[b]				
Constant	6.01 [5.6940, 6.3301]	0.16	37.13	.0000
Turbulence (centered)	-0.37 [-0.7608, 0.0157]	0.20	-1.89	.0600***
Resilience (centered)	0.76 [0.2733, 1.2483]	0.25	3.07	.0023*
Resilience x Turbulence	0.02 [-0.5980, 0.6383]	0.31	0.06	.9489***

*Not*e. a= R^2 = .014, b = R^2 = .03,
* = p < .01, **p< .05, ***= p > .05,*ns*

Table 15

Moderation PROCESS Model Predictors: Turbulence versus Agility, Resilience and HCAHPS

	b	*SE B*	*t*	*p*
Agility[a]				
Constant	75.55 [75.2314,75.8652]	0.16	468.39	.0000
Turbulence (centered)	-0.16 [-0.5397, 0.2116]	0.19	-0.86	.3914***
Agility (centered)	0.68 [0.1400, 1.2255]	0.28	2.47	.0138**
Agility x Turbulence	-0.11 [-0.8500, 0.6366]	0.38	-0.28	.7780***
Resilience[b]				
Constant	75.54 [75.2275, 75.8508]	0.16	476.10	.0000
Turbulence (centered)	-0.16 [-0.5247, 0.1966]	0.18	-0.89	.3719***
Resilience (centered)	0.84 [0.3570, 1.3318]	0.25	3.40	.0007*
Resilience x Turbulence	-0.23 [-0.8765, 0.4159]	0.33	-0.70	.4842***

Note. a = R^2 = .02, b = R^2 = .03,
* = p < .001, ** = p <.05,*** = P > .05,*ns*

Table 16

Moderation PROCESS Model Predictors: Turbulence versus Agility, Resilience and READMTS

	b	*SE B*	*t*	*p*
Agility[a]				
Constant	8.40 [8.3082, 8.4999]	0.05	172.27	.0000
Turbulence (centered)	0.15 [0.0335, 0.2571]	0.06	2.55	.0109*
Agility (centered)	-0.04 [-0.1679, 0.0888]	0.07	-0.61	.5454**
Agility x Turbulence	-0.08 [-0.2222, 0.0595]	0.07	-1.13	.2569**
Resilience[b]				
Constant	8.41 [8.3125, 8.5074]	0.05	169.55	.0000
Turbulence (centered)	0.14 [0.0322 ,0.2571]	0.06	2.53	.0118*
Resilience	-0.07 [-0.2138, 0.0684]	0.07	-1.01	.3120**
Resilience x Turbulence	-0.01 [-0.1636, 0.1473]	0.08	-0.10	.9179**

Note. a = R^2 = .01, b = R^2 = .01,
* = p <.05, ** = p>.05,*ns*.

Table 17

Moderation PROCESS Model Predictors: Turbulence versus Agility, Resilience and TTURN

	b	*SE B*	*t*	*p*
Agility[a]				
Constant	20.05 [19.8594, 20.2472]	0.10	203.17	.0000
Turbulence (centered)	-0.08 [-0.3092, 0.1559]	0.12	-0.65	.5175*
Agility (centered)	0.13 [-0.1702, 0.4310]	0.15	0.85	.3946*
Agility x Turbulence	0.05 [-0.3271, 0.4215]	0.19	0.25	.8044*
Resilience[b]				
Constant	20.03 [19.8378, 20.2292]	0.10	201.12	.0000
Turbulence (centered)	-0.10 [-0.3327, 0.1351]	0.12	-0.83	.4071*
Resilience (centered)	0.13 [-0.1545, 0.4090]	0.14	0.89	.3753*
Resilience x Turbulence	-0.21 [-0.5581, 0.1405]	0.18	-1.17	.2409*

Note. a = R^2 = .003 , b = R^2 = .01
* = p>.05,*ns*.

Linear multiple regression analysis. I conducted a linear multiple regression analysis to further test whether turbulence is a moderator or mediator of the relationship between the independent predictor variable agility and dependent organizational variable outcomes of MARGIN, HCAHPS, READMT and TTURN. Linear multiple regression analysis demonstrated that turbulence is likely a mediator of the relationship between agility and the dependent organizational outcomes of MARGIN and READMTS. Analysis by linear multiple regression also illustrated the possibility that turbulence may mediate the relationship between agility and HCAHPs. Turbulence was found to be neither a moderator nor a mediator of the relationship between agility and TTURN.

Within the multiple regression model the impact of agility on the variation in MARGIN was 1.0% and non-significant (R = 0.77, R^2 =0.01, Adj. R^2 = 0.004, p = .076,

p>.05). However, variation became significant with the addition of turbulence (*R*= 0.12, R^2 = 0.01, Adj. R^2 = 0.01, p<.05) with an equal variation of 1.0% suggesting a mediating effect. The impact of agility on the variation in HCAHPS was 2.0% and significant (*R* = 0.14, R^2 =0.02, Adj. R^2 =0.02, p <.01). Variation remained the same with the addition of turbulence and became non-significant (*R* = 0.14, R^2 = 0.02, Adj. R^2 = 0.02, *p* = .417, *p*>.05.. Turbulence may have therefore had a mediating impact on the relationship between agility and HCAHPS. The impact of agility on the variation in READMTS was 0.1% and non-significant (*R* = 0.36, R^2 = 0.001, Adj. R^2 = -0.001, *p* =.401, *p*>.05. Conversely, when Turbulence was entered into the model, variation significantly increased by 1.0% (*R* = 0.11, R^2 = 0.01, Adj. R^2 = 0.01, *p*<.05) to equal an additive or joint variation of 1.0%, thus also suggesting a mediating effect. Finally, evaluation of the impact of agility on the variation in TTURN was non-significant (*R* = 0.044, R^2 = 0.002, Adj.R^2 =0.000, *p* = .312, *p*>.05). Variation remained non-significant with the addition of turbulence to the model (*R* = 0.05, R^2 = 0.003, Adj. R^2 =-0.001, *p* = .519, *p*>.05) thus illustrating that turbulence neither mediates nor moderates the relationship between agility and TTURN.

As with agility, I also completed a linear multiple regression analysis to test whether turbulence is a moderator or mediator of the relationship between the independent predictor variable resilience and dependent organizational variable outcomes of MARGIN, HCAHPS, READMT and TTURN. Turbulence did not modere the relationship between the predictor variable of resilience and the dependent organizational variables of MARGIN, HCAHPS, READMTS and TTURN. Turbulence was found to

have a mediating effect on the relationship between resilience and MARGIN, HCAHPS, and READMTS.

Analysis of the effect of turbulence on the relationship between resilience and MARGIN suggested that turbulence had a mediating effect on the relationship. Individually, resilience significantly accounted for 3.0% of the variation in MARGIN (R = 0.16, R^2 =0.03, Adj. R^2 =0.02, p = .000). However, when turbulence was entered into the equation, the relationship became non-significant (R = 0.18, R^2 = 0.03, Adj. R^2 = 0.03, p = 0.058, p>.05). A similar outcome was noted when analyzing of the effect of turbulence on the relationship between resilience and the dependent organizational outcome variables of HCAHPS and READMTS. A highly significant variation of 3.0% resulting from the relationship between resilience and HCAHPS (R = 0.17, R^2 = 0.03, Adj. R^2 = 0.03, p =.000) became non-significant when turbulence was entered into the model *(*R = 0.18, R^2 = 0.03, Adj. R^2 = 0.03, p = .463, p>.05). Congruently, a non-significant variation between resilience and READMTS (R = 0.059, R^2 = 0.004, Adj. R^2 = 0.002, p =0.172, p>.05) increased to a significant additive or joint variation of 1.0% (R = 0.118, R^2 =0.01, Adj. R^2 = 0.01, p < .05) with the addition of turbulence into the regression model. These changes in the relationship between the predictor variable of resilience and organizational outcomes which were noted when the variable of turbulence was entered into the equation demonstrated a mediating effect. The relationship between resilience and TTURN was non-significant before (R = 0.05, R^2 =0.002, Adj. R^2 = 0.000, p = .282, p>.05) and following the inclusion of turbulence (R = 0.05, R^2 = 0.003, Adj.R^2 = -0.001, p = .520, p>.05) into the model.

Conclusions: Null Hypotheses 4a and 4b. I did not identify a mediating effect by turbulence on the relationship between the independent variable of agility and the dependent organizational outcome variables of HCAHPS and TTURN through PROCESS model analysis. Similarly, I did not note a mediating effect on the relationship between agility and the dependent organizational variable of TTURN tthrough linear multiple regression analysis. While a mediating effect was demonstrated through linear multiple regression analysis on the relationship between agility and HCAHPS, the effect appeared weak and may have been congruent with the significant effect noted within slopes analysis when the mean value of turbulence was held constant ($p = 0.0138$). Conversely, I identified a mediating effect through the PROCESS model analysis and through linear multiple regression analysis by turbulence on the relationship between agility and MARGIN and agility and READMTS.

These outcomes suggested that insufficient evidence existed to reject the null hypothesis that in the population, the variance of the dependent variables of patient care satisfaction and human capital outcomes explained by the independent variable agility is not mediated by environmental turbulence within small, medium and large health systems. However, sufficient evidence exists to reject the null hypothesis that in the population, the variance of the dependent variables of positive financial performance and patient care quality outcomes explained by the independent variable agility is not mediated by environmental turbulence within small, medium and large health systems.

I did not identify a moderating effect through either the PROCEES model or linear multiple regression analysis to determine if turbulence has a moderating effect on

the relationship between the independent variable of agility and the dependent organizational outcome variables of MARGIN, HCAHPS, READMTS and TTURN. Thus, insufficient evidence existed to reject the null hypothesis that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable agility is not moderated by environmental turbulence within small, medium and large health systems.

Conclusions: Null hypotheses 5a and 5b. I did not identify a mediating effect by turbulence on the relationship between the independent variable of resilience and the dependent organizational outcome variables of MARGIN, HCAHPS and TTURN through PROCESS model analysis. However, I did identify a mediating effect by turbulence on the relationship between the independent variable of resilience and the dependent organizational outcome variable of READMTS through PROCESS model analysis. I also identified a mediating effect on the relationship between the independent variable of Resilience and MARGIN, HCAHPS and READMTS by turbulence through linear multiple regression analysis. I did not identify a mediating effect by turbulence on the relationship between the independent variable resilience and TTURN through either PROCESS model or multiple regression analysis. Thus, insufficient evidence may or may not have existed to reject the null hypothesis that in the population, the variance of the dependent variables of positive financial performance and patient care satisfaction outcomes explained by the independent variable resilience is not mediated by environmental turbulence within small, medium and large health systems. Further,

sufficient evidence existed to reject the null hypothesis that in the population, the variance of the dependent variable of positive patient care quality outcomes explained by the independent variable resilience is not mediated by environmental turbulence within small, medium and large health systems. Finally, sufficient evidence existed to accept the null hypothesis that in the population, the variance of the dependent organization human capital outcomes explained by the independent variable resilience is not mediated by environmental turbulence in small, medium and large health systems.

I did not find a moderating effect by turbulence on the relationship between the independent variable of resilience and the dependent organizational outcome variables of MARGIN, HCAHPS, READMITS and TTURN through either PROCESS model or multiple regression analysis. Thus, insufficient evidence existed to reject the null hypothesis that in the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality, and human capital outcomes explained by the independent variable resilience is not moderated by environmental turbulence within small, medium and large health systems.

Analysis: Demographics

I analyzed group variances by title, responsibility level, gender, age, and health system size through one – way ANOVA and through an Independent-samples *t*-test where only the two categorical variables of gender were examined.

Title. I conducted a one-way ANOVA to explore differences by title on perceptions of agility, resilience, and turbulence. Participants were divided into five groups according to their title (Group 1:CEO/president/chairperson; Group 2: senior vice

president/executive vice president/chief officer; Group 3: vice president/ executive/ administrator/ executive or administrative director; Group 4: director/ medical director; Group 5: section chief/manager/ supervisor/ coordinator/ program manager/ assistant or associate director). The results of this analysis are illustrated in Table 18. I did not find the existence of a statistically significant difference in scores for agility, $F(4,528) = 1.52$, $p = .194$, $p > .05$, or turbulence, $F(4,528) = 1.50$, $p = .201$, $p > .05$. I did find a statistically significant difference in scores for resilience, $F(4, 528) = 8.30$, $p = .000$.

Actual mean resilience scores between groups were lowest for Group 5 at 3.31 ($SD = .78$) followed by Group 4 ($M = 3.62$, $SD = .58$), Group 1 ($M = 3.63$, $SD = .33$) and Group 3 ($M = 3.68$, $SD = .62$). Group 2 demonstrated the highest mean Resilience score ($M = 3.76$, $SD = .50$). The effect size, calculated through eta squared was .06 thus, demonstrated a moderate effect (Pallant, 2013, p. 251). Post – hoc comparisons achieved through the Tukey HSD test illustrated that the mean score for Group 5 differed significantly from Group 2 with a mean difference of .44, $p < .05$, Group 3 with a mean difference of .37, $p < .01$, and Group 4 with a mean difference of .31, $p = .000$. No other significant differences were noted through Tukey HSD.

Responsibility level. I identified the impact of responsibility levels on levels of agility, resilience and turbulence through ANOVA analysis. Survey participant respondents were divided into five groups according to their self-reported assignment to job duties (Group 1: system wide; Group 2: market ministry or state wide; Group 3: local health ministry; Group 4: departmental; Group 5: shift oriented). Table 19 displays the findings from this analysis. I did not identify a significant difference in

scores for Turbulence, $F(4,528) = .81$, $p = .520$, $p > .05$. I did identify statistically significant scores for agility, $F(4,528) = 2.90$, $p < .05$, and resilience, $F(4,528) = 7.19$, $p = .000$..

Actual mean agility scores between groups illustrated highest scores at the Group 1 or system-wide level ($M = 3.69$, $SD = .63$) and lowest scores at the Group 5 or shift oriented level ($M = 3.31$, $SD = .54$). Agility scores for Group 2, market – ministry or state-wide ($M = 3.42$, $SD = .71$), Group 3 or local health ministry ($M = 3.44$, $SD = .67$) and Group 4, departmental ($M = 3.38$, $SD = .74$) were more closely congruent with those noted for Group 5. The effect size, calculated through eta squared was .02 suggested a small effect (Pallant, 2013). Tukey HSD post-hoc comparisons illustrated significant differences in mean scores between Group 1, system-wide and Group 3, departmental, with a mean difference of .31, $p < .01$. No other significant differences were identified through Tukey HSD testing.

As with agility, mean resilience scores between groups illustrated highest scores at the Group 1 or system-wide level (M=3.71, $SD = .56$) and lowest scores at the Group 5 or shift oriented level (M= 3.18, $SD = .70$). Group 2 or respondents at the market ministry or state-wide level ($M = 3.66$, $SD = .65$) expressed the second highest resilience scores followed by Group 3, local health ministry level (M= 3.53, $SD = .64$) and Group 4, departmental ($M = 3.31$, $SD = .78$) level respondents. Etta squared was calculated to equal .05 thus, demonstrated a moderate effect (Pallant, 2013). Tukey post-hoc comparisons illustrated significant differences between Group 4, departmental and Group 1, system –wide with a mean difference of .41, $p = .000$, Group 2, market ministry or

state-wide with a mean difference of .35, $p < .01$, and group 3, local health ministry with a mean difference of .22, $p < .05$. No other significant differences for resilience were noted through Tukey post-hoc comparisons. I did note that Group 5, shift oriented responsibility, was comprised of only nine respondents. Thus, I questioned representativeness of this group when considered against a larger population..

Gender. I analyzed the impact of gender differences on levels of agility, resilience and turbulence through an independent-samples *t*-test. Equal variances were assumed based upon significance levels for Levene's test for equality of variances for agility ($F = .86$, $p > .05$), resilience ($F = .60$, $p>.05$) and turbulence ($F = .38$, $p>.05$). Table 22 illustrates the outcomes from this analysis.

I did not find significant differences in perceptions of agility between females and males, t (528) = .69, p = .491, p>.05,two-tailed. Consistent with this non-significant result the magnitude of the differences in means (mean difference = .05, 95% CI = -0.08830 - 0.18385) demonstrated an extremely small effect size (eta squared = .0009) (Pallant, 2013).

As with agility, I did not identify significant differences in perceptions of resilience between females and males, t(528) = -.93, p = .351, p>.05, two tailed. The magnitude of the differences in means (mean difference = -.07, 95% CI = -.20269 - .07215) demonstrated an extremely small effect size (eta squared = .0017) (Pallant, 2013).

Differences noted in perceptions of turbulence were similarly non – significant for females when compared to males, t (528) = 1.28, p = .203, p>.05, two – tailed. The

magnitude of differences in means for turbulence (mean difference = .1009, 95% CI = -.05459 - .25647) demonstrated an extremely small effect size (eta squared = .0031), (Pallant, 2013).

Age. A one-way analysis of variance was conducted to explore the impact of age on levels of agility, resilience, and turbulence. Survey respondents were sorted into 10 groups by age by years (Group 1, 24 or younger (no respondents); Group 2, 25 – 30; Group 3, 31-35; Group 4, 36-40; Group 5, 41-45, Group 6, 46-50, Group 7, 51-55, Group 8, 56-60; Group 9, 61-65, and Group 10, 65-plus). Table 20 illustrates the results of this analysis. A significant difference in scores was not obtained for agility, $F(8,521) = .31$, $p = .964$, $p > .05$, resilience, $F(8, 521) = .56$, $p = .808$, $p > .05$, or turbulence, $F(8, 521) = .54$, $p = .829$, $p > .05$.

Health system size. I also analyzed the impact of system-size on levels of agility, resilience and turbulence through ANOVA. Survey respondents were sorted into four groups (Group 1, system wide; Group 2, large, Group 3, medium, and Group 4, small). The results of this analysis are identified within Table 21. I found significant differences by system size in perceptions of agility, $F,(3,529) = 7.80$, $p = .000$, and resilience, $F(3,529) = 4.43$, $p < .01$. I did not identify significant differences in perceptions of turbulence by system size, $F(3,529) = 2.07$, $p = .104$, $p > .05$.

Mean scores for agility were highest within Group 1 ($M = 3.72$, $SD = .65$) followed by Group3 ($M = 3.57$, $SD = .63$) and Group 2 ($M = 3.42$, $SD = .68$). Group 4 ($M = 3.21$, $SD = .81$) demonstrated the lowest mean scores for agility. The effect size, calculated through eta squared was .04 demonstrating a small to moderate effect (Pallant,

2013). Post-hoc comparisons through Tukey HSD illustrated a significant mean difference of .30, $p<.01$ between Group 1 and Group 2, a significant mean difference of .50, $p = .000$, between Group 1 and Group 4, and a significant mean difference of .36, $p < .01$, between Group 3 and Group 4.. No other significant differences through Tukey HSD analysis were noted,

Mean scores for resilience were highest within Group 1 ($M = 3.69$, $SD = .66$) followed by Group 3 ($M = 3.51$, $SD = .61$) and Group 2 ($M = 3.45$, $SD = .72$). Group 4 ($M = 3.28$, $SD = .78$) demonstrated the lowest mean resilience score. The effect size calculated through eta squared was .02 demonstrating a small effect (Pallant, 2013). Post hoc comparisons through Tukey HSD demonstrated a significant mean difference of .41, $p < .01$, between Group 1 and Group 4. No other significant mean differences were noted through Tukey HSD Post hoc comparisons.

Summary. I did not identify differences in perceptions of turbulence within any of the demographic categories that were measured. I identified differences in perceptions of agility between levels of responsibility with the most significant difference found between system –wide and department based levels of authority. Similarly, I found differences in perception of agility by system size with the most significant differences being between system –wide and small and large health systems and between medium and small health systems. I also identified significant differences in perceptions of resilience within groups sorted by title, level of responsibility, and system size. When viewed by title, the most significant differences were between section chiefs, managers, supervisors, coordinators, and program managers, and senior executives, chief officers,

vice presidents, executives, administrators, administrative or executive directors, medical directors, and directors. I identified differences in perceptions of resilience based on level of responsibility between departmental and system-wide, market ministry or state – wide and local health system levels. I similarly noted significant mean differences in perceptions of resilience based on Size between overall system and small system respondents. When viewed in the aggregate, I concluded that assigned level of responsibility and system size may be the most significant determinants of differences in adaptive capacity or of agility and resilience.

Tables. The following tables illustrate my findings on the perceptions of agility, resilience, and turbulence by the categories of title, level of responsibility, age, system size and gender. To note is that I reclassified survey respondents who selected a title of other. This resulted in the reclassification of one survey into category 1, one survey into category 2, one survey into category 3 and all remaining surveys into category 6.

Table 18

One-Way Independent ANOVA: Title versus Agility, Resilience and Turbulence

Source	Sum of Squares	*df*	Mean Square	*F*	Significance	Eta Squared
Agility:						
Between Groups	3.01	4	.75	1.53	.194**	.01
Within Groups	260.70	528	.49			
Total	263.71	532				
Resilience						
Between Groups	15.96	4	3.99	8.30	.000*	.06
Within Groups	253.72	528	.48			
Total	269.68	532				
Turbulence						
Between Groups	3.87	4	.97	1.50	.201**	.01
Within Groups	340.25	528	.64			
Total	344.11	532				

Note.: * = p = .000; **=p>.05, *ns.*

Table 19

One-Way Independent ANOVA: Responsibility Level versus Agility, Resilience and Turbulence

Source	Sum of Squares	*df*	Mean Square	*F*	Significance	Eta Squared
Agility						
Between Groups	5.66	4	1.42	2.90	.022*	.02
Within Groups	258.05	528	.49			
Total	263.71	532				
Resilience						
Between Groups	13.93	4	3.48	7.19	.000**	.05
Within Groups	255.75	528	.48			
Total	269.68	532				
Turbulence						
Between Groups	2.10	4	.52	.81	.520***	.01
Within Groups	342.02	528	.65			
Total	344.11	532				

Note. *= p <.05, **= p = .000; ***=p>.05,*ns*.

Table 20

One-Way Independent ANOVA: Age versus Agility, Resilience and Turbulence

Source	Sum of Squares	*df*	Mean Square	*F*	Significance	Eta Squared
Agility						
Between Groups	1.23	8	.15	.31	.964*	.00
Within Groups	260.40	521	.50			
Total	261.63	529				
Resilience						
Between Groups	2.29	8	.29	.56	.808*	.01
Within Groups	265.31	521	.51			
Total	267.61	529				
Turbulence						
Between Groups	2.81	8	.35	.54	.829*	.01
Within Groups	340.36	521	.65			
Total	343.17	529				

Note. *=p>.05,*ns*

Table 21

One-Way Independent ANOVA: System Size versus Agility, Resilience and Turbulence

Source	Sum of Squares	*df*	Mean Square	*F*	Significance	Eta Squared
Agility						
Between Groups	11.17	3	3.72	7.80	.000*	.04
Within Groups	252.54	529	.48			
Total	263.71	532				
Resilience						
Between Groups	6.60	3	2.20	4.43	.004**	.02
Within Groups	263.07	529	.50			
Total	269.68	532				
Turbulence						
Between Groups	3.98	3	1.33	2.07	.104***	.01
Within Groups	340.13	529	.64			
Total	344.11	532				

Note. * = p = .000, ** = p<.01, ***=p>.05,*ns*

Table 22

Independent Samples T- Test: Gender versus Agility, Resilience and Turbulence

Variable	*t*	*df*	Significance[1]	Eta Squared
Agility	.69	528	.491*	.001
Resilience	-.93	528	.351*	.002
Turbulence	1.28	528	.203*	.003

Note. 1 = two-tailed, Levene's test for equality of variance = p > .05 thus, equal variances assumed,
*= p>.05, *ns*

Turbulence

Description. While conducting analyses to answer my research questions I noted relationships between the independent variable of turbulence and dependent and independent study variables. Thus, I conducted an additional simple regression analysis to identify whether turbulence was individually predictive of the variation in agility, resilience and the dependent organizational outcomes of MARGIN, HCAHPS,

READMITS, and TTURN. The results of this analysis are illustrated within Table 23 and Table 24.

Turbulence had the highest correlation with agility (r =-.14, p < .01), followed by resilience (r = -.13, p < .01), READMTS (r = .11, p < .01) and MARGIN (r = -.10, p < .01). I found Non – significant correlations with HCAHPS (r = -.05, p = .105, p>.05) and TTURN (r = -.03, p = ,217, p>.05). It is likely that turbulence accounted for 2.0% of the variation in agility scores (R^2 = .02), 2.0% of the variation in resilience scores (R^2 = .02), 1.0% of the variation in READMTS (R^2 = .01) and 1.0% of the variation in MARGIN (R^2 = .01).

ANOVA analysis confirmed that predictions were significantly improved through regression analysis over mean comparisons through demonstration of the correlation of agility, F(1,531) = 10.89, p <.01, resilience, F(1,531) = 9.77, p < .01, READMTS, F(1,531) = 6.41, p < .05, and MARGIN, F(1,531) = 5.57, p < .05. Predictions were not significantly improved through regression analysis over mean comparisons for HCAHPS, F(1,531) = 1.58, p = .210, p>.05, and TTURN, F(1,531) = .61, p = .434, p>.05.

Model coefficients further confirmed predictability of significant outcomes. A negative relationship between turbulence and agility (b = -.12) suggested that for each unit decrease in turbulence, agility will increase by .12 units or conversely, will decrease by .12 units for each unit increase in turbulence. This observation is supported by t-tests which illustrate that turbulence, t = -3.30, p < .01, is a significant predictor of agility thus, illustrating a genuine effect. Bootstrap confidence intervals, 95% BCa CI [-.212, -.040], p < .01, two –tailed further displayed a genuine effect between turbulence and agility. As

to resilience, A significantly negative relationship between turbulence and resilience (b = -.12) suggested that for each unit decrease in turbulence, resilience will increase by 0.12 units or conversely, will decrease by 0.12 units for each unit increase in turbulence. *T*-tests congruently illustrated that turbulence, t= -3.13, $p < .01$, is a significant predictor of resilience thus, demonstrated a genuine effect. Bootstrap confidence intervals, 95% BCa CI [-.202, -.035], p <.01, two-tailed, also illustrated a genuine effect between turbulence and resilience. Model coefficients similarly illustrated a positive relationship between turbulence and READMTS (b = .15) which suggested that for each one unit increase in turbulence, an increase of .15 in READMTS may result. This conclusion was supported by *t*-tests which illustrated that turbulence, t = 2.53, $p < .05$, is a significant predictor of READMTS thus also suggesting a genuine effect. Bootstrap confidence intervals, 95% BCa CI [.043, .268], $p < .01$, further verified the existence of a genuine positive effect between turbulence and READMTS. Finally, model coefficients illustrated a negative relationship between turbulence and MARGIN (b = -.47), suggesting that for each one unit increase in turbulence, a .47 decrease in Margin may result or conversely, for each one unit decrease in Turbulence, a .47 increase in MARGIN may result. As with agility, resilience and READMTS, *t*-tests illustrated that turbulence, t = -2.36, p <.05, was a significant predictor of MARGIN, thus demonstrated a genuine effect. A genuine effect was further reinforced through bootstrap confidence intervals, 95% BCa CI [-.888, -.057], $p < .05$.

Conclusions. Turbulence was significantly related and was a significant predictor of agility, resilience, and organizational outcomes of MARGIN and

READMTS. I concluded that this outcome was consistent with my theoretical premise that turbulence significantly impacts health services behaviors and outcomes which include agility and resilience, organizational financial performance outcomes or MARGIN and patient care quality outcomes or READMTS. Further, to the extent that agility and resilience are evaluated within the total concept of adaptive leadership capacity (McCann & Selsky, 2012) the cumulative impact of turbulence requires consideration. As previously noted, results from the simple regression analysis that I completed are illustrated in Table 23 and Table 24.

Table 23

One-way ANOVA: Turbulence versus Agility, Resilience and Dependent Organizational Outcomes

Variable	*df*	*F*
Agility		
Regression	1	10.89*
Residual	531	
Total	532	
Resilience		
Regression	1	9.77*
Residual	531	
Total	532	
MARGIN		
Regression	1	5.57**
Residual	531	
Total	532	
HCAHPS		
Regression	1	1.58***
Residual	531	
Total	532	
READMTS		
Regression	1	6.41**
Residual	531	
Total	532	
TTURN		
Regression	1	.61***
Residual	531	
Total	532	

Note. *= p <.01, **=p<.05, ***=p>.05,*ns*.

Table 24

Simple Regression Model Coefficients for Turbulence versus Agility, Resilience and Dependent Organizational Outcome Variables

Variable	Unstandardized Coefficient (*B*)	*SE B*	Standardized Coefficient (β)	*t*-statistic
Agility				
Constant	3.87	.13		29.73*
Turbulence	-.12	.04	-.14	-3.30**
Resilience				
Constant	3.87	.13		29.38*
Turbulence	-.12	.04	-.13	-3.13**
MARGIN				
Constant	7.57	.68		11.12*
Turbulence	-.47	.20	-.10	2.36***
HCAHPS				
Constant	76.38	.67		113.76*
Turbulence	-.24	.19	-.05	-1.26****
READMTS				
Constant	7.89	.21		37.52*
Turbulence	.15	.06	.11	2.53***
TTURN				
Constant	20.37	. 42		48.49*
Turbulence	-.10	.12	-.03	-.78****

Note. *=*p*=.000, **=*p*<.01, ***=*p*<.05, ****= *p* > .05,*ns*.

Summary

The summary which follows includes three focus areas. First, I present a summary of findings associated with each of the five research questions and associated null hypotheses, demographic and additional significant findings. Following I synthesize my findings and their application to the theoretical model posed for this study. I conclude this chapter with a transition to Chapter 5.

Research Question and Null Hypothesis 1.

Research Question 1. Is there a relationship between leadership agility and the achievement of the dependent variables of financial performance, patient care satisfaction

and quality and human capital organizational outcomes within small, medium, and large health systems?

Null Hypothesis 1. There is not a positive correlation between leadership agility as measured by an agility index and the achievement of organizational financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems.

Findings. A positive correlation and relationship between leadership agility and the achievement of patient care satisfaction outcomes as measured by HCAHPS was noted. However, a positive correlation and relationship between agility and the achievement of organizational financial performance, as measured by MARGIN, patient care quality, as measured by READMTS, and human capital outcomes, as measured by TTURN was not identified. Therefore, Null Hypothesis 1 is rejected as to patient csre satisfaction or HCAHPS and accepted as to financial performance or MARGIN, patient care quality or READMTS and human capital or TTURN outcomes.

Research Question and Null Hypothesis 2.

Research Question 2. Is there a relationship between leadership resilience and the achievement of the dependent variables of financial performance, patient care satisfaction and quality and human capital organizational outcomes within small, medium, and large health systems?

Null Hypothesis 2. There is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational

financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems.

Findings. A positive correlation and relationship between leadership resilience and financial performance as measured by MARGIN and patient care satisfaction as measured through HCAHPS was identified. A positive correlation and therefore relationship between leadership resilience and patient care quality, as measured by READMTS, and human capital outcomes, as measured by TTURN, was not noted. Therefore, Null Hypothesis 2 is rejected as to financial performance or MARGIN and patient satisfaction or HCAHPS outcomes and accepted as to patient care quality or READMTS, and human capital or TTURN outcomes.

Research Question and Null Hypothesis 3.

Research Question 3. To what extent are the independent variables of agility and resilience, where agility is defined by an agility index and resilience is defined by a resilience index predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems?

Null Hypothesis 3. In the population, the independent variables of agility and resilience, where agility is defined by an agility index, and resilience is defined by a resilience index, are not predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes thus, all of the partial regression coefficients equal zero.

Findings. Both agility and resilience were found to be individually and collectively predictive of patient care satisfaction outcomes or HCAHPS. Further, agility and resilience were found to be collectively predictive of financial performance outcomes or MARGIN. However, agility and resilience were not found to be significantly predictive of patient quality or READMTS and human capital or TTURN outcomes. Thus, Null Hypothesis 3 is rejected as to patient care satisfaction or HCAHPS outcomes and rejected as to financial performance outcomes or MARGIN when both variables are collectively entered into the equation and accepted as to patient care quality or READMTS and human capital or TTURN outcomes.

Research Question 4 and Null Hypotheses 4a and 4b.

Research Question 4. To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of agility and the achievement of positive financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems?

Null Hypothesis 4a. In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable agility, is not mediated by environmental turbulence in small, medium and large health systems.

Null Hypothesis 4b. In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable agility, is not moderated by environmental turbulence in small, medium and large health systems.

Findings. Turbulence was found to mediate the effect of agility on the organizational financial performance or MARGIN and patient care quality or READMTS outcomes. A mediation effect by turbulence on the effect of agility on patient care satisfaction or HCAHPS and human capital outcomes or TTURN was not consistently noted. Thus, Null Hypothesis 4a is rejected as to financial performance or MARGIN and patient care quality or READMTS outcomes and accepted as to patient care satisfaction or HCAHPS and human capital or TTURN outcomes. Turbulence was not found to moderate the effects of agility on organizational financial performance or MARGIN, patient care satisfaction or HCAHPS, patient care quality or READMTS, and human capital or TTURN outcomes. Thus, Null Hypothesis 4b is accepted.

Research Question 5 and Null Hypotheses 5a and 5b.

Research Question 5. To what extent is environmental turbulence a mediator or moderator of the relationship between the independent variable of resilience and the achievement of positive financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems?

Null Hypothesis 5a. In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable resilience, is not mediated by environmental turbulence in small, medium and large health systems.

Null Hypothesis 5b. In the population, the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital

outcomes explained by the independent variable resilience, is not moderated by environmental turbulence in small, medium and large health systems.

Findings. A mediating effect by turbulence on the variance explained by resilience was definitively noted as to patient care quality or READMTS. Some evidence may also exist to suggest a mediating effect by turbulence on the variance explained by resilience as to financial performance or MARGIN and patient satisfaction or HCAHPS. Turbulence was not found to have a mediating effect on the variance explained by resilience as to human capital outcomes or TTURN. Additionally, turbulence was not found to have a moderating effect on the variances explained by resilience as to the organizational financial performance or MARGIN, patient care satisfaction or HCAHPS and quality or READMTS and human capital or TTURN outcomes. Thus, Null Hypothesis 5a is rejected as to patient care quality or READMTS, conditionally accepted as to financial performance or MARGIN and patient care satisfaction or HCAHPS, and accepted as to human capital outcomes or TTURN. Null Hypothesis 5b is accepted as to all tested dependent organizational outcomes.

Demographics

The sample I accessed for this study was generally representative with a range of plus or minus 10% when compared to the overall sampling frame population by title. When compared to the sampling frame's general administrative and management categories, the acquired sample was within 6.0% of sampling frame characteristics. Further, a higher proportion of system level respondents were represented within the acquired sample than proportionately represented within the overall sampling frame.

When compared to the overall population of United States health care executives (American College of Healthcare Executives, 2016) the acquired survey sample included a higher proportion of females and a higher proportion of leaders within the age 50-59 category.

Differences in outcomes by groups were not apparent by gender or age. Significant differences in perceptions of agility by groups were noted by responsibility level and system size. Similarly, significant differences in perceptions of resilience were noted by title, responsibility level and system size. These differences may suggest that where proportions of survey respondents differed from the organizational survey sampling frame differing results might result if this study were replicated.

Synthesis

The independent variables of agility, resilience, and turbulence demonstrated unique and congruent relationships. These relationships varied as to agility and resilience based on the level of responsibility and system size represented by survey respondents and as to resilience as to survey respondents' title. My overall findings illustrated that the independent variable of agility was not found to partially correlate independently with the dependent variables of financial performance or MARGIN, patient care satisfaction or HCAHPS, patient care quality or READMTS and human capital outcomes or TTURN. However, agility correlated with and was predictive of patient care satisfaction or HCAHPS when entered into the simple regression model. Agility was also shown to be a significant predictor of financial performance or MARGIN when the additive contribution of resilience was included in the regression model. The independent

variable of resilience was significantly correlated with and predictive of financial performance or MARGIN and patient care satisfaction or HCAHPS outcomes. The correlation between resilience and MARGIN was diminished when the affect of agility was controlled when compared to zero ordered correlations. These observations suggested that though individually correlated and predictive of outcomes agility and resilience must also be evaluated collectively as well as individually. Neither agility nor resilience were significantly correlated with or predictive of patient care quality or READMTS or human capital or TTURN outcomes. Since turbulence was found to mediate the impact of the variances in READMTS explained by the independent variables of agility and resilience, turbulence may have significantly influenced this patient care quality outcome.

My evaluation of the relationships between turbulence and dependent and independent variables provided additional context from which to evaluate the impact of adaptive leadership capacity within the health services environment. Turbulence was found to be correlated with and a significant predictor of the independent variables of agility and resilience and of the dependent organizational financial performance or MARGIN and patient care quality or READMTS outcomes. Additionally, turbulence was found to have a definitive mediating effect on relationship between agility and organizational financial performance or MARGIN and patient care quality or READMTS outcomes. Similarly, Turbulence was found to have a definitive mediating effect on the relationship between resilience and organizational patient care quality or READMTS

outcomes. These observations can be applied to the theoretical model that was posed for this study.

Theoretical Application

The theoretical model that I posed for this study is illustrated within Figure 1. This model proposed that the health services environment is turbulent resulting in issues which include those of cost, quality, satisfaction, and workforce demands. This model further proposed that adaptive leadership capacity realized through the exercise of agility and resilience provides a means to effectively achieve organizational outcomes within this complex and turbulent environment. The findings from this study partially demonstrated this impact. Specifically, both agility and resilience were found to be significantly related and predictive of financial performance outcomes when considered together and were individually predictive of patient care satisfaction outcomes thus, demonstrating organizational outcomes effectiveness within two of the four researched categories of organizational effectiveness within the adaptive leadership capacity model. To note is the observation that while agility was individually and collectively predictive of patient care satisfaction or HCAHPS, it was not individually predictive of financial performance or MARGIN without the inclusion of resilience. Resilience was individually correlated with and predictive of financial performance or MARGIN and patient care satisfaction or HCAHPS outcomes within both the partial correlation and simple regression models. Thus, while aligned with agility within the adaptive leadership capacity theoretical model, resilience was found to be the most significantly influencing variable when tested against financial, patient care satisfaction and quality and human

capital organizational outcome variables. Finally, findings suggested that turbulence influences agility, resilience, and organizational financial and patient care quality outcomes. These outcomes were consistent with the proposed model's focus on the influence of turbulence on leadership effectiveness and organizational issues and outcomes.

Transition to Chapter 5.

The alignment of this study's findings with research questions and the proposed theoretical model suggested implications for health services organizations and leaders. Similarly, opportunities for continued study are apparent as one considers questions which remain unresolved. The findings from this study's may also be directly applied to opportunities to enable social change. Within this context, I present an interpretation of findings, implications, opportunities, study limitations and recommendations in Chapter 5 which follows.

Chapter 5: Discussion

Overview

This chapter contains five sections. First, I provide an introduction to chapter contents in which I review the purpose and nature of this study, and provide a summary of key findings. Next is my interpretation of the findings I discussed in Chapter 4 which is aligned with current knowledge in the field and with the theoretical model I used for this study. I continue the interpretation of findings via discussions of study limitations, recommendations for further study, implications for health services leadership in the context of positive social change, theoretical and methodological implications, and implications for health services leadership. A section summarizing study conclusions completes the chapter.

Introduction

The health services environment is characterized by turbulent chaotic and continuous changes that require nontraditional and nonlinear leadership approaches and capabilities (Geer-Frazier, 2014; Malloch & Melnyk, 2013; Pipe et al., 2012). The nature and character of this change is consistent with complex adaptive system dynamics (Uhl-Bien et al., 2007, Hazy & Uhl-Bien, 2012). Administrative, adaptive, and enabling leadership approaches have been proposed as effective leadership practices within CAS (Uhl-Bien et al., 2007; Hazy & Uhl-Bien, 2012). Adaptive leadership comprised of agile and resilient leadership practices has effectively enabled positive outcomes within turbulent systems (Junior et al., 2012; McCann et al., 2009; McCann & Selsky, 2012; Pipe et al., 2012; Vinodh et al., 2012). In this study, I examined the impact of the

adaptive leadership practices of agility and resilience as within a multistate complex health system in the United States, as illustrated in Figure 1. I measured the impact of agile and resilient leadership practices on organizational outcomes within a balanced scorecard format (Aidemark & Funck, 2009; Curtis et al., 2011; Emani & Doolen, 2015; Inamdar et al., 2002; Jafari et al., 2015) by administering an internet survey to health systems leaders and analyzing survey outcomes against secondary organizational financial performance, patient care satisfaction and quality, and human capital outcome data. Financial performance outcomes were measured through recurring operating margin (MARGIN), patient care satisfaction outcomes were measured through patient perceptions of hospital (HCAHPS), patient care quality was measured through readmission rates within 30 days of discharge for any reason (READMTS), and human capital outcomes were measured through total turnover (TTURN). I examined five research questions and corresponding null hypotheses to test the theoretical model illustrated in Figure 1. Additionally, I examined the influence of demographics and turbulence.

Summary of Key Findings

Research questions. Research Question 1 asked if there was a relationship between leadership agility and the achievement of the dependent variables of financial performance, patient care satisfaction and quality and human capital organizational outcomes within small, medium and large health systems. The null hypothesis corresponding to Research Question 1 stated that there is not a positive correlation between leadership agility as measured by an agility index and the achievement of

organizational financial performance, patient care satisfaction and quality, and human capital outcomes within small medium and large health systems. Partial correlation and simple regression analysis showed a positive prediction and correlation between agility and HCAHPS when the effects of resilience were not held constant. Thus, Null Hypothesis 1 was rejected, in part, but accepted as to MARGIN, READMTS, and TTURN.

Research Question 2 asked if there was a relationship between leadership resilience and the achievement of the dependent variables of financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems.. Corresponding Null Hypothesis 2 stated that there is not a positive correlation between leadership resilience as measured by a resilience index and the achievement of organizational financial performance, patient care satisfaction and quality and human capital outcomes within small, medium and large health systems. Partial correlation and simple regression analysis showed a positive relationship between resilience, MARGIN, and HCAHPS, but not between resilience, READMTS, and TTURN. Thus, Null Hypothesis 2 was rejected as to MARGIN and HCAHPS, and accepted as to READMTS and TTURN.

Research Question 3 queried to what extent the independent variables of agility and resilience (where agility is defined by an agility index and resilience is defined by a resilience index) are predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes. Null Hypothesis 3 stated that the independent variables of agility

(defined by an agility index) and resilience (defined by a resilience index) are not predictive of organizational outcomes or the dependent variables of organizational financial performance, patient care satisfaction and quality and human capital outcomes, and thus that all of the partial correlation regression coefficients equal 0. As with similar findings, agility and resilience were found to be individually predictive of HCAHPS outcomes and collectively predictive of MARGIN. Thus, Null Hypothesis 3 was partially accepted and partially rejected. It is worth noting that while agility accounted for 2% of the variation in HCAHPS, adding resilience to the equation increased variation to 3%. Analysis indicated that for each one-unit increase in resilience, an increase of .70 HCAHPS units was predicted when agility is held constant. For each one-unit increase in agility, an increase of .29 HCAHPS units was predicted. However, non-significant *t*-tests found through multiple regression analysis and partial correlation outcomes which illustrated a significant relationship between agility and HCAHPS only when resilience was entered into the equation suggested that the impact of agility on HCAHPS was dependent upon the exercise of resilience. When considering these findings collectively, I found that the potential cumulative improvement in HCAHPS scores was predicted to equal an increase of 0.72 per standard deviation increase in agility and resilience. Both agility and resilience were also significant predictors of MARGIN. Analysis indicated that as resilience is increased by one unit, MARGIN will increase by .90 units or .18 standard deviations, holding the effects of agility constant. While a negative relationship between agility and MARGIN indicated that as agility increases by one unit, MARGIN will decrease by 0.14 units or 0.03 standard deviations, non-significant *t* tests indicated

that these effects are only significant when aligned with resilience. Thus, when considering the impact of agility and resilience on MARGIN, while the exercise of agility may result in a decrease in MARGIN by 0.03 standard deviations, findings indicated that a comparable standard deviation increase in resilience will counter effects resulting in a net gain in MARGIN of 0.15 standard deviations.

Research Questions 4 and 5 asked to what extent environmental turbulence is a mediator or moderator of the relationship between the independent variables of agility and resilience individually, and the achievement of positive financial perfromance, patient care satisfaction and quality, and human capital outcomes in small, medium, and large health systems. Null hypotheses corresponding to Research Question 4 stated that the variance of the dependent variables of positive financial performance, patient care satisfaction or quality and human capital outcomes explained by the independent variable of agility are not mediated or moderated by environmental turbulence within small, medium, and large health systems. Similarly, in Null Hypotheses 5 I posited that the variance of the dependent variables of positive financial performance, patient care satisfaction and quality and human capital outcomes explained by the independent variable of resilience were not mediated or moderated by environmental turbulence within small, medium and large health systems.

Turbulence was found to mediate the effects of agility on financial performance (MARGIN) and patient care quality (READMTS), and to mediate the effects of resilience on READMTS. Turbulence may also mediate the effects of resilience on MARGIN and HCAHPS; however, further validation is needed given the lack of consistent statistical

outcomes congruent with this conclusion. Turbulence was not found to moderate the effects of agility or resilience on the dependent organizational financial performance, patient care quality or satisfaction and human capital outcomes. Given these outcomes, the null hypotheses were partially rejected as to the mediating effect of turbulence, and accepted as to the moderating effect of turbulence.

Turbulence. An analysis of turbulence as a discrete independent variable indicated that turbulence is significantly related and is a significant predictor of agility, resilience, MARGIN, and READMTS. Simple regression analysis showed correlation and a negative relationship between turbulence and agility, resilience, and MARGIN, and a correlation and positive relationship between turbulence and READMTS. These findings were congruent with the impact of turbulence as a mediator on the effects of agility on MARGIN and READMTS, and as a mediator on the effects of resilience on READMTS.

Demographics. I made demographic comparisons based on survey respondents' title, responsibility level, gender, age, and health system size. Significant differences in outcomes associated with agility were noted between groups based upon responsibility level and system size. I also noted significant differences in outcomes associated with resilience between groups based upon title, responsibility level, and system size. Agility and resilience scores were highest for those identified with system-wide responsibility, and lowest for those with shift-oriented responsibilities. When viewed from the perspective of system size, agility and resilience scores were highest for system-wide

respondents, and lowest for small health systems respondents. No differences were noted based upon gender or age.

Interpretation of Findings

The findings of this study are aligned with current literature in the field and my proposed theoretical model. The findings of this study which illustrated the existence of turbulence within the health systems are aligned with literature and research which suggested that environmental chaos or disruption exists as turbulence within the health services environment (Clarke, 2013; Ford, 2009; Tan et al., 2005; Wong & Lam, 2012; Yach, 2011). Similarly, my findings are congruent with the suggested impact of turbulence on adaptive leadership capacity in the form of agility and resilience. Turbulence was found to significantly and inversely impact practices of agility and resilience and organizational financial performance outcomes. Concurrently, increased turbulence was related to increased patient readmissions thus, negatively impacting patient care quality. These relationships are consistent with findings by The American Management Association (2006) and McCann et al, (2009) that turbulence negatively impacted organizational performance outcomes associated with profitability and competitiveness. Contrary to this study's outcomes, McCann et al.(2009) noted that turbulence moderated rather than mediated the relationship between agility, resilience, and organizational outcomes.

The necessity of leadership approaches which incorporate both agility and resilience in the form of adaptive leadership capacity was also evidenced by my findings. Agility was most significantly related to financial performance or MARGIN and patient

satisfaction or HCAHPS outcomes when aligned with resilience. Collectively, agility and resilience predicted a 0.72 per standard deviation increase in HCAHPs for each standard deviation increase in agility and resilience. The collective impact of agility and resilience on MARGIN was congruently 0.15 per standard deviation increase.. Further, agility increased the strength of the correlation between resilience and MARGIN and HCAHPS. In addition to a collective impact, my findings illustrated that agility and resilience individually impact organizational outcomes.

As I previously noted, agility was related to patient satisfaction or HCAHPS. Similarly, I found that resilience individually impacted the relationship and predictability of financial performance or MARGIN and patient satisfaction or HCAHPS organizational outcomes. These outcomes contribute to prior research outcomes which found that agility was related to financial outcomes such as cost management and competitiveness (McCann et al., 2009; Vinidh & Davadason, 2011; Vinidh et al, 2012), resource allocation (Raney, 2014), increased revenue and gross margin (Yauch, 2011), flexibility (Erol et al., 2010) increased productivity (Pipe et al., 2012) innovation (Vinodh & Davadason, 2011; Vinodh et al, 2012) , manufacturing turns (Yauch, 2011), service and customer responsiveness (Pipe et al.2012; Vinodh & Davadason, 2011; Vinodh et al., 2012), and human capital measures of employee satisfaction, reduced turnover, and empowerment (Breu et al., 2001; Pipe et al., 2012; Raney, 2014; Vinodh & Davadason, 2011; Vinodh et al, 2012). Similarly, researchers have positively related resilience to financial measures of profitability, competitiveness, visioning and financial performance (McCann et al., 2009; Richtner & Lofsten, 2014). Additionally, studies have linked

resilience to positive quality outcomes such as robustness and creative customer service practices (Richtner & Lofsten, 2014; Wieland & Wallenberg, 2012) and communications and cooperation practices which enhanced customer satisfaction (Wieland & Wallenberg, 2012) . Finally, researchers have aligned resilience with human capital outcomes through research which noted evidence of enhanced trust and sensitivity and employee engagement (Huber et al., 2012; Pellissier, 2012; Richtner & Lofsten, 2014; Wieland & Wallenberg, 2012). While prior research existed which identified the discrete impact of agility and resilience on outcomes that were congruent with this study's dependent organizational outcome variables, the outcomes attained from this study reinforce incorporation of these capabilities into collective adaptive leadership rather than singular leadership practices that were similarly endorsed by the McCann et al. (2009), McCann and Selsky (2012) and the American Management Association (2006) studies.

The collective impact of agility and resilience in the form of adaptive leadership capacity can be interpreted further within the context of the theoretical model proposed for this study and illustrated within Figure 1. This model illustrates that changes within the health systems environment result in turbulence and the formation of dissipative far from equilibrium states which require leadership interventions to enable reformation or emergence in the form of organizational outcomes articulated within a balanced scorecard context. As complexity leadership enabling actions, agility and resilience impact financial and patient satisfaction outcomes through the actions of leaders as tags who act on aggregates or ensembles through dissipative structures alignment to promote change and subsequent emergence, reformation, redesign, self-organization, and re-

stabilization of disrupted structures (Akgun et al., 2014; Clark, 2013; Hazy & Uhl-Bien, 2012; Metcalf & Benn. 2013; Tan et al., 2005). While significant relationships between agility or resilience and patient care quality in the form of patient readmissions within 30 days of discharge or human capital outcomes in the form of total employee turnover were not conclusively identified, a positive and significant relationship between turbulence and readmissions was noted. Thus, to the extent that agility and resilience or adaptive leadership capacity (McCann & Selsky, 2012) impact turbulence, an indirect impact on patient care quality in the form of readmissions may exist. In the aggregate therefore, this study supports the proposed theoretical model as to the related and discrete impact of turbulence, agility and resilience on organizational outcomes within the health services system.

My findings on demographic differences may also be aligned with level of responsibility and system size. The highest mean scores for agility and resilience were attained from leaders with system – wide responsibility and scope in size. Conversely, lowest mean scores for agility and resilience and the highest mean turbulence scores were noted for leaders who identified shift level or small system size associations. These differences may illustrate a relationship between these demographics and the effectiveness of adaptive leadership practices within turbulent environments.

Finally, the implications of non-significant analytic outcomes merit consideration. My findings showed that adaptive leadership practices did not significantly influence organizational patient care quality and human capital outcomes when measured by readmission rates and employee turnover rates respectively. However, turbulence,

agility, and resilience cumulatively impacted organizational financial, patient care satisfaction and patient care quality outcomes.. Given the differences in means for agility, resilience and turbulence that I noted between demographic groups, I question whether the lack of correlation and relationship with these outcomes was influenced by group composition rather than the discreet relationship between independent and dependent variables.. As I discuss within sections which follow, this question presents an opportunity for future study. Thus, while my findings supported the proposed theoretical model for this study, validation through further study which expands on outcome measures for patient care quality and human capital outcomes is merited. The sections which follow indentify opportunities for future study with consideration of study limitations.

Study Limitations

As I discussed in prior text, this study's limitations included assumptions that were related to the association between leadership perceptions and the influence of cultural differences between study participants, the use of secondary and lagging indicator outcomes data, implied causation, the interpretation of outcomes based upon leadership perceptions and alignment with the conceptual framework of complexity theory. Participant cultural and personal characteristics were unknown. Researchers have found that culture impacts perceptions (Rodriquez-Rubio & Kiser, 2013; Walumbwa et al., 2007; Yuksel & Durna, 2015). The impact of these differences was uncontrolled in my study (Anhern, 2005; McCann et al., 2009). Secondary dependent outcomes data that was used in this study represented calendar year outcomes which

proceeded independent variable outcomes by approximately nine months thus, data outcome variables were not precisely matched (CMS, 2013; Guangrong et al., 2013). Additionally, since secondary data collected or aggregated by System X employees was unitized, precise control over secondary data collection processes and controls did not occur (Cheng & Phillips, 2014; Cross & Kelly, 2015; Kimberlin & Winterstein, 2008). I also implied causation limited to the point in time during which date was collected since this study was not experimental in nature (Dai et al., 2013; Ismail et al., 2010; McCann et al., 2009). When evaluating causation, a limitation also included the alignment of outcomes with leadership perceptions thus, outcomes are a reflection of those perceptions rather than the result of my observations of actual practices (Dai et al., 2013; McCann et al., 2009; McCann & Selsky, 2012). I could not precisely know whether these perceptions were inflated, deflated or accurate (Yauch, 2011). Finally, since the nature of complex systems demonstrates environments of continuous nonlinear change, my study of health systems during a given point in time may only be representative of that discrete point in time thus influencing generalizabiltiy and application of outcomes to nonlinear events (Jordon et al., 2010).

Recommendations

This study provided an empirical quantitative analysis of adaptive leadership capacity as a complex enabling leadership practice within the complex adaptive health systems environment. As such, it contributed quantitative justification for the pursuit and development of adaptive leadership practices within health services. While literature and research may exist which articulated discrete relationships and the influence of leadership

practices within the conceptual frameworks and theories of complexity, chaos, complex adaptive systems, complexity leadership, agility, resilience, linear and nonlinear leadership approaches and adaptive leadership, the theoretical model proposed by this study begins to synthesize these conceptual frameworks into a broader integrated theoretical framework. Researchers have posited that research which aligns leadership practices within these frameworks in the health services field has been lacking (Dinh et al., 2014; Hannah et al., 2009; Hempe, 2013; Junior et al., 2012). This study begins to fill this gap. Additional research that examines and validates the effectiveness of complexity leadership practices in turbulent health services environments can fill this gap. .

First, since concepts aligned with complex adaptive systems and complexity leadership suggest nonlinear phenomena and practices, completion of longitudinal studies to further validate outcomes over time could promote conceptual continuity (Clark, 2013; Dinh et al., 2014; Haynes, 2008; Uhl-Bien & Marion, 2009). Second, while I quantified the relationships between agility and resilience and dependent organizational financial and patient satisfaction outcome variables, research which tests the impact of agility and resilience on additional outcome variables within a BSC framework would enhance the relationship between this study's proposed theoretical model and organizational outcomes.. For example, while an impact or relationship was not identified between agility or resilience and total turnover, testing of those concepts against human capital outcomes which measure learning or developmental outcomes may provide further insights into the impact of adaptive leadership practices on human capital outcomes.

Experimental research models might also be considered. For example, one could conduct educational and development leadership activities which enable adaptive leadership capacities, then measure outcomes before and following those activities. Finally, since agility and resilience were found to produce outcomes collectively, research which identifys possible mediating and moderating effects between these variables could illustrate interactive relationships. Actions which are initiated to build adaptive leadership capabilities could be prioritized accordingly. To the extent that positive outcomes are identified through additional research, these outcomes may be characterized in the context of the implications for positive changes that result from this study.

Implications

Positive Social Change

The outcomes of this study have implications for positive social change on societal, organizational and individual levels. From a societal perspective organizational systems, processes and practices that demonstrate effective health services responsiveness to environmental changes and conditions enable positive health outcomes for and within impacted communities. For example,, if the findings from this study that identified the impact of turbulence, agility and resilience on financial, patient care satisfaction and patient care quality outcomes were translated into intervention strategies improvements in organizational financial status, enhanced satisfaction and improved quality could result. Additionally, if outcomes predicted through regression analysis were achieved, the cumulative impact on recurring operating margin for each standard deviation increase in agility and resilience within System X would equal 0.55%..

Similarly, for each standard deviation change in agility and resilience, patient satisfaction scores within System X are predicted to increase by 0.72. If these outcomes were duplicated within all health systems the potential impact could be significant within the total health services system.

On an organizational level, as organizational performance is enhanced, organizational viability may be increased thus ensuring continuous availability of health services resources to individuals and populations in need. As I noted previously, the achievement of organizational financial performance and patient satisfaction outcomes impacts reimbursement for services (CMS 2013, 2015a; Malloch & Melnyk, 2013) and organizational reputation thus directly impacting organizational viability. The identification of the impact of agility and turbulence on these outcomes provides insights on actions which may enable actions that promote these outcomes. Since organizational issues and challenges have been seldom characterized by theorists and researchers as singular in nature (Curtis et al., 2011; Edward et al., 2011; Emani & Doolen, 2015; Inamder et al., 2002; Jefari et al., 2015), I posit that a synthesis of the actions which cumulatively influence multiple and related factors will likely positively impact organizational performance and therefore viability.

On an individual level, the identification of the impact of adaptive leadership capacity on organizational outcomes promotes changes which benefit patients and organizational leadership employees. Where outcomes such as patient satisfaction are enhanced, patients benefit from a positive experience within the health services system. Similarly, the application of the outcomes of this study to leadership selection,

development and educational processes promotes opportunities for skill development and positive reinforcement of behaviors.

Theoretical and Methodological Implications

Since the complex adaptive systems and leadership theories are non-linear theories the application of a linear process of measurement may not be theoretically or practically aligned (Dinh et al., 2014; Lichtenstein & Plowman, 2009; Uhl-Bien & Marion, 2009; Vesterby, 2008). However, researchers have noted that complex adaptive systems seek emergent order over time (Clarke, 2013) thus, suggesting that importance of completing repetitious or longitudinal studies to validate outcomes.

Health Services Leadership

The identified impact of adaptive leadership capacity from this study suggested that agility and resilience are significant leadership capabilities that must be exercised individually and interdependently. Further, while agility or responding quickly to change is a significant component of adaptive leadership capacity (McCann et al., 2009, McCann & Selsky, 2012), I found that the effective exercise of resilience was the most significant variable associated with positive organizational outcomes. Leadership selection processes, competency reviews, educational and development processes should emphasize these leadership capabilities as an integral change leadership skill. As my findings demonstrated, effectiveness requires aligned and integrated processes for evaluation of effectiveness given the impact of agility, resilience and turbulence on multiple organizational outcomes.

Conclusions

The contemporary health services environment is subject to multiple discrete and interconnected strategic, structural, political, financial, demographic, technological, population, and consumer oriented changes. While the objective analysis of the impact of health services leadership practices and variables on these changes is recommended, the most significant outcome to be sought is that which impacts individuals and the broader populations that rely upon the health system and health services leaders during significant life events. The impact of health services systems, processes and practices which influence individual outcomes therefore has personal and ethical significance which extends beyond objective outcomes. Research that identifies practices such as those aligned with this study provides insights into practices which are aligned with these aims. As such, health services leaders must continuously identify and measure leadership practices that promote the well being of individuals, populations, and communities as a first and on-going priority. This study provides a platform from which these ongoing efforts may be actualized in a meaningful way on behalf of societies, communities, organizations, leaders and most importantly, health services consumers and patients.

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Appendix A: Informed Consent and Survey Participation Invitation

Dear (System X) Leader,

Recently you received an email from (System X Executive Sponsor) communicating that you would be invited to participate in research that is being conducted to identify the impact of agility and resilience on organizational outcomes. You have been randomly chosen to receive this invitation to participate in this study due to your classification as an (System X) leader. This email is being sent to you to request your consent and participation in this study by completing a survey that is available through the link below. Please review the information provided within this email. By clicking the link below you are providing your consent to participate in this study.

The topic of this study is *The Impact of Adaptive Leadership Capacity on Organizational Outcomes in Complex Adaptive Health Systems*. Specifically, the purpose of this study is to identify the impact of adaptive capacity or agility and resilience on the achievement of identified financial, patient satisfaction and quality, and human capital outcomes. This topic was chosen for research due to its potential to provide helpful insights into the leadership behaviors that promote positive organizational outcomes within our current complex and changing health services environment.

As you decide whether or not you consent to participate in this study please consider the following:

1. Some of you may have previously known or know me as an associate employed within the (System X health system) Human Resources division. This study is not associated with that role. My role in this research is that of a PhD in Health Services doctoral student with Walden University. This study is aligned with my PhD dissertation requirements.

2. To avoid a potential conflict of interest, (health system) leadership associates will be excluded from this study.

3. Also excluded from participation in this study are leadership associates who participate in this study's pilot study, those employed following December 31, 2015, and those employed within (systems) that have not yet deployed to (Business Center). These exclusions align participants with the outcomes that are being measured.

4. If you consent, you are requested to complete the attached survey through the link provided below. It is expected that completion of this survey will take 10 minutes or less of your time.

5. You are not required to participate in this study. Your participation in this study is voluntary and confidential. Participant answers will be linked to the participant's health ministry outcomes in aggregate form. In addition, individual names of participants who choose to participate or not participate in this study will not be identified.

6. You may refuse or discontinue participation in this research at any time without penalty. Your decision not to participate will be respected and confidential.

7. All data from this study will be kept in a secure and password protected location for a period of 5 years as required by Walden University.

8. Foreseeable risks or discomforts experienced as a result of your participation in this study include the use of your time. As noted above, individual survey responses will be sorted by health system.

9. Anticipated benefits of this study include identification of the impact of agility and resilience on discrete organizational financial, patient satisfaction and quality, and human capital outcomes.

10. No gifts or additional compensation will be provided for participation in this study.

11. If you have questions related to this study, please feel free to contact me at laura.lentenbrink@waldenu.edu

12. Questions related to participant rights may be directed to Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 612-312-1210. Walden University's approval number for this study is 06-30-16-0265743 and it expires on June 29, 2017.

If you feel you understand this study well enough to make a decision about it please indicate your consent by clicking the link below. Print and keep a copy of this email for your records.

Survey Link: https://www.surveymonkey.com/r/XDSSM7D

I would be grateful for your willingness to share a few brief minutes of your time to support this study. Many thanks in advance for your consideration.

Sincerely,

Laura Lentenbrink

Graduate Student / Researcher, Walden University

Appendix B: Email from Mr. William Smith Granting Survey Use Permission

AMA Agility & Resilience Study

Smith, William <wismith@amanet.org> 10/8/15

to me

Dear Laura:

It was a pleasure speaking to you on the phone. As I mentioned, you do have full permission to use the survey and results from the AMA Agility & Resilience Research for the study you are currently working on, citing AMA as the source for the particular research survey and results being used.

Unfortunately, I do not have a hard copy to send to you, but can provide you with the following link:

http://www.amanet.org/training/articles/Agility-and-Resilience-01.aspx

Wishing you much success with your study,

William

William D. Smith

Marketing Strategist

1601 Broadway, New York, NY 10019