

DISSERTATION

ORGANIZATIONAL LONGEVITY AS A PREDICTOR OF
ORGANIZATIONAL LEARNING, ORGANIZATIONAL IDENTITY,
ORGANIZATIONAL INNOVATION, AND FISCAL CONSERVATISM

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ABSTRACT

ORGANIZATIONAL LONGEVITY AS A PREDICTOR OF ORGANIZATIONAL LEARNING, ORGANIZATIONAL IDENTITY, ORGANIZATIONAL INNOVATION, AND FISCAL CONSERVATISM

The purpose of this study was to investigate the claims in the literature that some organizations have developed mechanisms that have increased their chances of surviving in a changing environment. The literature claimed that organizations are living entities that could learn and adapt to their business environment, have their own identities, be innovative, and exercise fiscal conservatism. The literature claimed that the organizations that could best employ these four mechanisms increased their chances of surviving the changes in the business environment that might otherwise spell their demise (Cefis & Marsili, 2005; de Geus, 2002; Elsbach & Kramer, 1996; Musso & Schiavo, 2008).

This research intended to uncover whether long-lived organizations exhibit higher levels of the four factors described above, and in addition, provide analysis and synthesis of the results in the hope of helping companies live longer. This researcher hoped that a confirmation that these four factors were more pronounced in long-lived organizations than in short-lived organizations would provide both scholars and practitioners with methods to help organizations live longer.

To investigate these claims, a survey instrument was designed that combined a short version of the Dimensions of the Learning Organization Questionnaire-A (Yang, 2003), the organizational identity questionnaire part designed by Albert, Ashforth, and Dutton (2000), and

innovation inventory questions. Fiscal conservatism was measured by analyzing publically available data on current ratios and long-term debt. The study focused on 703 companies that were publically traded and were listed in *Fortune Magazine*'s top 1,000 lists as of 2012. The survey was sent by e-mail to 3,900 directors and senior managers who worked in these 703 Fortune 1,000 companies. Five research hypotheses were tested to understand the relationships between organizational longevity, organizational learning, organizational identity, innovation, and fiscal conservatism.

The lack of statistically significant findings, and nonresponse bias analysis, indicated that the claims that are made in the literature should be considered with caution. Until empirical evidence is found, acting on these claims, although they may have some face validity, could have serious unintended implications. The study offered some alternatives that could better predict organizational learning, organizational identity, innovation, and fiscal conservatism.

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

Companies experience failure in substantial numbers that, by some measures, exceed 55% within 4 years from inception (Knaup, 2005). The death of a company, especially a large company, carries substantial economic and social costs (Probst & Raisch, 2005). The collapse of a large company is often followed by questions attempting to identify the cause of the collapse. The nature of the investigation following the collapse of a large firm is often conducted under the assumption that something must have gone wrong to cause the collapse (Stubbart & Knight, 2006). Stubbart and Knight (2006) found that words such as “‘decline,’ ‘mismanagement,’ ‘poor leadership,’ ‘adaptive failures,’ or ‘competitive blind-spots’” (p. 80) were used to describe some of the reasons for the collapse of a large firm. de Geus (2002) presented alarming statistics and argued that most organizations are short lived. De Geus found that an average life expectancy of a company was between 40 to 50 years, placing even large and successful companies’ longevity somewhere about half the 78 years’ life expectancy of that of a person living in the United States (Central Intelligence Agency, 2012). Four major components were identified as a useful framework for investigating organizational longevity in more detail (De Geus, 2002). These were (a) the organizational sensitivity to their business environment, (b) a sense of organization identity, (c) organizational tolerance, and (d) organizational financial conservatism (pp. 6-7).

Burke (2008) suggested that a company is affected by the external environment through a process by which senior executives’ perceptions of the external environment influence and shape the organizational culture, and in turn, influence organizational performance (pp. 196-197). The perception of senior executives followed a four-step process of receiving, embedding, concluding, and acting (de Geus, 2002, pp. 57-59). The four-step process represented decision

making as a form of learning. Thus, the company's environmental awareness can be viewed as a cyclical learning process starting with awareness that leads to response, learning how this response interacts with the environment, understanding the best possible next action, and ultimately potentially increasing the lifespan of the organization.

Organizational identity is a well-researched topic that various authors have tied to organizational survival (Albert et al., 2000; Elsbach & Kramer, 1996; Haslam, Postmes, & Ellemers, 2003; Ravasi & Schultz, 2006). De Geus (2002) defined *organizational identity* as a concept wherein the organization as a whole is greater than the sum of its components. The link between an individual, team, workgroup, division, company, corporation, and ultimately, society, de Geus argued, flows through the concept of organizational identity (pp. 88-90). Organizational identity was linked to organizational decision making. Organizational membership inclusion and exclusion affected the sense of security that members of the organization experienced during times of mergers and downsizing (de Geus, 2002). Brickson (2007) argued that members' affiliation to a particular organizational identity could be used to explain why individuals act beyond pure self-interest for the betterment of an organization as a whole. The idea that the way members interact with their organization—, specifically if such interaction creates an organization that is greater than the sum of its parts—could be viewed as the core construct in de Geus's view of an organization as a living entity.

Organizational tolerance (which de Geus (2002) defined as acceptance of innovation that occurs at the fringes of the organization) is a strategic process that is linked to long-term organizational survival. Innovation produces new goods and services, which yield new sources of revenue that are critical for organizational survival (Gordon & Narayanan, 1984; Hage & Aiken, 1967; Kalleberg & Moody, 1994). Organizational tolerance was also defined as a process

of diversification through innovation, with the underlying assumption that “tolerant systems survive” (de Geus (2002, p. 146). Hage and Aiken (1967) presented evidence that organizations with a high degree of program change exhibited greater diversification and decentralization in decision making that allowed for greater organizational responsiveness, job satisfaction, and a greater inflow of new information from the fringes of the organization to its center. This view was conducive to de Geus’s (2002) view of organizational tolerance and the link he made between organizational tolerance and organizational longevity.

Fiscal conservatism has been linked to organizational longevity by positioning cash-on-hand as a flexible advantage that allows an organization to become more nimble and increase the options available to decision-makers at any given time (de Geus, 2002, pp. 174-175). The link between fiscal conservatism was investigated as a predictor of organizational longevity, and more specifically, as a precursor to bankruptcy, firm value, and quality of earnings wherein the results suggested a connection between fiscal conservatism and overall organizational longevity (Altman, 1968; Ellinger, Ellinger, Yang, & Howton, 2002; Pae, Thornton, & Welker, 2005; Penman & Zhang, 2002).

The Problem

The economic and social costs of a company’s demise present the need for a better understanding of the factors interacting with organizational longevity. The costs of a company’s demise have driven bailouts of some companies in the United States. In the 1980s, \$400 billion of assets, taking an estimate a \$90 billion loss (Congleton, 2009), served as an example of what organizational failure could mean in terms of financial costs alone. Such bailout efforts demonstrate the importance that the United States government places on saving large industries and companies. Therefore, if increasing an organization’s lifespan carries positive social and

economic outcomes, then understanding the components of organizational longevity could help increase the life expectancy of organizations. Therefore, the problem driving this research is as follows:

The shortening organizational life expectancy carries with it significant economic, social, and political costs.

The literature provides an overwhelming array of models, hypotheses, and case studies that illuminate the phenomena of organizational longevity (Fortune & Mitchell, 2012; Knaup, 2005; Mellahi & Wilkinson, 2004; Probst & Raisch, 2005; Stubbart & Knight, 2006). However, de Geus (2002) observed that four key factors were common in long-lived companies (2002, pp. 6-7), and he presented an appealing way to try to understand the variables that are common to long-lived organizations.

Significance of the Problem

Organizations spend a significant amount of resources on training and development programs, strategy formulation, innovation programs, team-building activities, and managing by financial ratios (Crossan, Lane, & White, 1999; Hamel & Prahalad, 1994; Musso & Schiavo, 2008). A 2002 industry report found that, in the United States, organizations with more than 100 employees budgeted as much as \$54.2 billion towards training and development (Galvin, 2002). Green and DeSandro (2011) presented evidence that organizations' allocation of funds for training and development had increased to \$171 billion by 2010. Galvin linked the increase in spending on training and development to senior executives' commitment to workplace learning. This increase in spending on training and development also demonstrates that organizations see the value in developing their staff as a way to distinguish them in the marketplace.

Organizations that invest in training and development expect a return on their investment in a form of increased performance from a better-trained workforce. Swanson (2007) defined *performance* as “the valued productive output of a system in a form of goods or services” (p. 27). The implication is that organizations that spend significant amounts of money on training and development expect an increase in their performance in excess of the original investment (de Geus, 2002; Ellinger et al., 2002). Thus, investigating the differences between long-lived organizations and younger organizations by comparing their learning cultures, organizational identity strength, innovation, and fiscal conservatism could help illuminate the phenomenon of organizational longevity (Albert & Whetten, 1985; Pate, Beaumont, & Pryce, 2009).

Purpose of the Research

The purpose of this study is to broadly test the potential of organizational longevity to explain variance in levels of (a) organizational sensitivity to its business environment, (b) a sense of organization identity, (c) organizational tolerance innovation, and (d) organizational financial conservatism.

Research Question

The problem and purpose of this study establish a logical research question that forms the basis of this research:

Can organizational longevity explain variance in levels of organizational learning, identity, innovation, and financial conservatism?

Figure 1 shows the hypothetical relationships between organizational longevity and the four predicted variables that this study seeks to investigate.

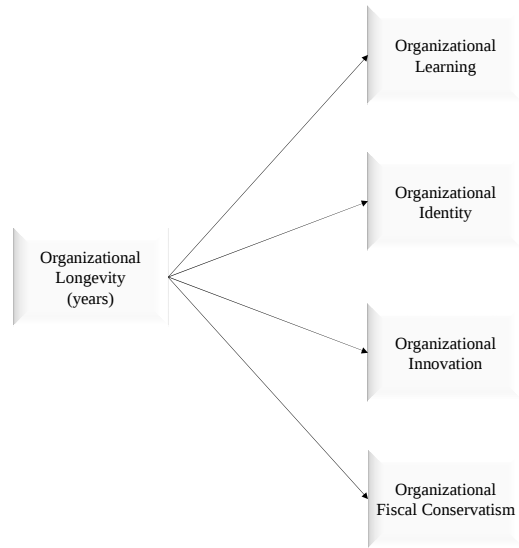


Figure 1: Factors predicted by organizational longevity

Limitations of the Study

The study will focus on *Fortune* Magazine’s list of top 1,000 (by revenue) companies as of 2012, which was an outlier of the over 6 million companies in the United States (Stubbart & Knight, 2006). As a result, the generalizability of the study to smaller organizations that could exhibit different longevity characteristics and the factors that are associated with such longevity is decidedly limited. The study will focus on the four factors identified by de Geus (2002): (a) environmental sensitivity (learning), (b) organizational identity, (c) organizational tolerance (innovation), and (d) fiscal conservatism, and use these factors as a framework for digging deeper into understanding organizational longevity.

Definitions of Key Terms

The key terms used in this study are (a) organizational longevity, (b) organizational learning, (c) organizational identity, (d) innovation, and (e) fiscal conservatism. Each of these terms is defined below.

Organizational longevity. Organizational longevity is defined as the time from incorporation of the company, until the company dissolved, merged, acquired, or bankrupted under Chapter 7 of United States bankruptcy law (US Courts, 2012). When a company files for Chapter 7 bankruptcy:

the company stops all operations and goes completely out of business. A trustee is appointed to “liquidate (sell) the company’s assets and the money is used to pay off the debt, which may include debts to creditors and investors. (2009)

Organizational learning. Argyris and Schon (1996) defined organizational learning as the cumulative of individuals’ learning within an organization (as cited in Mikkelsen & Grønhaug, 1999, p. 96). Further, a learning organization is one that “learns continuously and transforms itself” (Watkins & Golembiewski, 1995, p. 87).

Organizational identity. Organizational identity was defined as “a cognitive link between the definition of the organization and the definition of self” (Jane E Dutton, Janet M Dukerich, & Celia V Harquail, 1994, p. 242). This definition of organizational identity was used by Pate et al. (2009) as the basis for their study in the United Kingdom wherein they found a strong link between individuals, groups, professional identities, and organizational identity.

Innovation. Innovation is defined as “1: the introduction of something new; 2: a new idea, method, or device” (Innovation, n.d.).

Financial conservatism. Financial conservatism is defined as a very low, or nonexistent, long-term debt (de Geus, 2002, p. 174). De Geus described this phenomenon as companies who either do not hold loans or borrowed short term with very specific well-defined agendas in mind.

Summary

This chapter described how the shortening life span of companies carried with it negative economic and social consequences. To help develop a better understanding of this phenomenon,

this chapter introduced organizational learning, organizational identity, innovation, and fiscal conservatism as possible variables that may exist at different levels in long-lived organizations as compared to younger organizations. Understanding how these four variables differ between companies of different ages may provide an insight into methods that could be used to increase organizational longevity.

CHAPTER TWO: REVIEW OF THE LITERATURE

This section will summarize and synthesize what is already known on the subject of organizational longevity and the factors that were associated in the literature with it. This chapter is organized as follows: Organizational longevity is presented first. Next, a learning organization and what is known about the relationship between learning and organizational longevity is presented. Following organizational learning, organizational identity will be presented, and what is known about its relationships to organizational longevity is described. Following organizational identity, organizational innovation will be presented and what is known about its relationship to organizational longevity. Finally, organizational fiscal conservatism is presented and what is known about its relationships to organizational longevity. At the end of each section, a hypothesis is developed based on the finding in the relevant section.

Organizational Longevity

The following section will present evidence that organizational longevity is decreasing. This section will also present the social cost of organizational failure and the lack of consensus around the reasons for organizational failure.

The diminishing life expectancy of organizations. Organizational longevity is a well-documented phenomenon. de Geus (2002) argued that corporations exist for a relatively short period of time, and during their lives, often fail to achieve their full potential. De Geus noted that the average span of a corporation is about 40 years and that the first 10 years of corporate existence are characterized by a high rate of corporate demise (p. 2). De Geus's view was corroborated by others who observed that organizational lifespans have become shorter (Knaup, 2005; Zey & Swenson, 2001). (Knaup and Piazza (2007)) presented findings to

illustrate that only 31% of organizations survived to their 7th year and concluded that the odds of organizational survival from year to year increase as an organization ages. Probst and Raisch (2005) argued that one of the reasons that organizations fail is rapid growth, and the authors subsequently delineated the implications of failure that such growth induces to the overall loss of value for the U.S. economy. Listing just the six top bankruptcies in recent years, Probst and Raisch demonstrated that more than \$300 billion USD were lost and 125,000 jobs were impacted by the failure of WorldCom, Enron, Consec, Global Crossing, United Airlines, and Kmart (p. 91). Zey and Swenson (2001) investigated the association between firm size and acquisition risk. Acquisition means that once a company is acquired, it ceases to exist as a separate organization from its acquirer. Organizations' ability to adequately respond to changes in their environments—and matching their internal structures appropriately to reduce their risk profile—contribute to overall reduced risk of acquisition. Organizations are influenced by external forces such as social, political, and economic factors, which shape an organization's response to its environment. Forces such as these manifest themselves through changes in the sources and concentration of funds and changes in the laws governing corporations (Zey & Swenson, 2001).

Creative destruction was another theme that surfaced as a phenomenon that influences organizational longevity. Diamond Jr. (2004) described Schumpeter's process of creative destruction as a process by which innovation can destroy organizations and create new organizations in their place, while lengthening and improving peoples' lives. Diamond argued that the process of creative destruction is akin to the forces of competition, and that the forces of competition are the engine behind the increase in standard of living under the capitalistic model (Diamond, 2006, p. 121).

Creative destruction and organizational life expectancy. The following section will introduce the concept of creative destruction and its implications to organizational longevity. Creative destruction is discussed in more detail in the section on innovation.

Through the lens of creative destruction, the shorter life expectancy of organizations appears to be an evolutionary necessity. Through the forces of market competition, organizations that are highly adaptable to the environment generally live longer than organizations that are not able to adapt. Organizations that fail to adapt perish and relinquish their resources for a better use by society. Such resources include people, equipment, and material that then become available to other organizations (Diamond, 2006).

Diamond relied on the S&P 500 Index for his analysis of organizational longevity. The S&P 500 Index presented evidence to the significant reduction of corporate tenure on the index. Diamond noted that from the early 20th century to the end of the century, the average tenure of an organization on the S&P 500 Index fell from 65 years to just 10 years (p. 134).

Abernathy (1985) viewed creative destruction as a force that an organization could harness if this force could provide the organization with a first-to-market advantage (pp. 5-6), thus creating a temporary competitive advantage for the organization. Francois and Lloyd-Ellis (2003) proposed a limit on how creative destruction could affect organizations and industries and argued that the innovation cycle sets limits on the longevity of monopolies. According to Francois and Lloyd-Ellis, this limit emerges because of the implementation cycle that generates its own knowledge and leads to additional innovations. These additional innovations, in turn, limit the ability of the original innovator to stay at the top of the industry; thus, any competitive advantage is temporary (p. 531).

The cost of organizational failure. Probst and Raisch (2005) provided evidence of the economic and social cost of organizational failure. The authors argued that between the years 2000 and 2005, the top 100 organizations that failed resulted in a \$2.5 trillion USD loss to the U.S. economy (p. 91). The authors proposed that a *Burnout Syndrome* and a *Premature Aging Syndrome* were at the core of organizational failure. The Burnout Syndrome was described as the uncontrolled growth under autocratic leadership embedded within an organizational *success culture* (p. 91). Such a leadership structure mismanages organizational resources, similar to a runner who used up his energy by running at full speed and then was unable to complete the race. The premature aging syndrome was characterized by stagnation, tentative change in response to the changes in business environment, and weak leadership (p. 96). Probst and Raisch's view contradicted the evolutionary Schumpeterian view presented by Diamond (2006). The implication of Probst and Raisch's view was that there is a greater social benefit that in some cases is more important than the pure *survivalist* view presented by Diamond and that such social good has intrinsic social benefits that are significant.

While organizational longevity was a well-documented phenomenon in the literature, there was no consensus around the reasons that lead to organizational failure. Mellahi and Wilkinson (2004) argued that the literature around organizational longevity claims that industry matters more than any one single organization and that often external forces beyond the control of any one organization provide a more complete picture of organizational failures (p. 22). For these reasons, this researcher chose to position organizational longevity as the independent variable in this study and to construct the dependent variables out of the common explanations provided in the literature for the factors that affect organizational survival.

The Learning Organization

The concept of a learning organization is a well-researched area of study. In the following section, the researcher will define several of the key constructs and address the process by which learning is carried out in organizations and the link between firm performance and longevity. In addition, the researcher will discuss how an instrument for measuring learning is selected.

Learning organization, organizational learning, and implications. de Geus (2002) argued that sensitivity to the environment is an organization's ability to "learn and adapt" (p. 9). Watkins and Marsick (1993) provided a definition of the learning organization as an organization that continuously learns and transform itself, with learning taking place at individual, group, and organizational levels. Learning results in a change of beliefs, behaviors, and knowledge. Further, learning is conducive to innovation and growth and is embedded in systems that captured and shared such learning (p. 87).

Organizational learning and the learning organization are related constructs in the literature. Chermack (2006) argued that a learning organization is one that displays the characteristics discussed by Watkins and Golembiewski (1995). Chermack (2006) argued that not all organizations engaging in learning activities are necessarily learning organizations (p. 770). The discussion around the difference between organizational learning and the learning organization can be summarized as the difference between the process of learning and the systems and methods that capture such learning for the purpose of disseminating and sharing knowledge. Crossan et al. (1999) developed a framework that proposed to capture the learning that occurs at individual, group, and organizational levels. Crossan et al.'s *4I Framework* spanned the continuum between psychological, social, and individual aspects of learning. The 4I

framework includes the following concepts: (a) intuiting, (b) interpreting, (c) integrating, and (d) institutionalizing. Through the 4I framework, organizational learning could be captured, and knowledge could be transferred to other organizational members (p. 523). Knowledge that has been captured and transferred to other organizational members is, in fact, the catalyst of organizational renewal that increases the odds of organizational survival (p. 523), a link that was also made by Ellinger, Ellinger, Yang, and Howton (2002), Marsick and Watkins (2003), and Senge (2006), all of whom presented similar arguments on the value of learning and knowledge sharing between organizational members.

Crossan et al. (1999) described intuiting and interpreting as an individual-level process. Individuals rely on experience, imagery, and metaphors to make sense of what they experience in their environment. Language, cognitive map, and dialogue are the methods by which individuals interpret their sensory inputs and construct a mental model of their environment. Individuals' mental models construct the foundation for decision-making strategy development throughout the organization; however, once established, mental models are very difficult to change (Chermack, 2003b). Changing mental models requires an ongoing learning process wherein information is presented to the individuals, and various methods apply to help individual develop a new meaning or understanding of such information (Glick, Chermack, Luckel, & Gauck, 2012).

Popper and Lipshitz (2000) argued that continuous learning, described as a process of transforming information into knowledge in order to generate a valid and transparent knowledge base, is essential to organizational survival (p. 184). Popper and Lipshitz's effective organizational learning methods included five critical elements: (a) issue orientation, (b) accountability, (c) environmental uncertainty, (d) high cost of potential errors, and (e) high level

of member professionalism. These five elements are similar to the five disciplines structure proposed by Senge (2006).

Popper and Lipshitz described *issue orientation* as a process by which rigid hierarchical systems are suspended in order to increase the odds of honest opinions being voiced. *Accountability* was described as a related construct to a double-loop learning (Argyris, 1991) that reduces the strength of an individual's defense mechanism so one can learn from the consequences of one's actions. *Environmental uncertainty* simply implies that organizations that do not learn will not survive, a theme that has been well supported in the literature (Burt & Chermack, 2008; de Geus, 2002; Senge, 2006; van der Heijden, Bradfield, Burt, Cairns, & Wright, 2002; van der Merwe, 2008).

Costly potential errors was linked by Popper and Lipshitz (2000) to a higher rate of diagnostic-type learning (p. 191). In a high-risk environment wherein potential errors can be extremely costly, either in monetary terms or in human lives, organizations are more likely to engage in *risk seeking and mitigation* types of learning. High level of *members professionalism*, a construct that was related to Senge's (2006) personal mastery concept, is linked to the way professionals identify with their standard of learning. Popper and Lipshitz argued that in an organization that prompts high degrees of professionalism, professionals who are generally more committed to their profession than to their organizations, tend to stay with such organizations. The lower attrition of professionals was thought to contribute to the organizational ability to continuously learn and transform itself (p. 192).

The learning organization and firm's performance. The concept of the learning organization was shown to be positively related to the organization's financial performance (Ellinger et al., 2002). Financial performance was well understood to be the critical element that

contributes to overall organizational longevity (de Geus, 2002). De Geus (1988) argued that strategy planning and development are essentially a learning process. A strategy that is in alignment with an organization's environment increases the chances for organizational survival in a changing and dynamic environment. De Geus argued that "the ability to learn faster than your competitors may be the only sustainable competitive advantage." (p. 71). Ellinger et al. (2002) argued that the learning organization creates value that is both financial and nonfinancial, such as intellectual capital.

Argyris (1991) added that learning is not simply a process of problem solving or correcting errors. Rather, introspection and reflection combined create a framework of learning that Argyris described as "single loop" and "double loop" learning (p. 99). Single-loop learning is attributed to fixing problems, while double-loop learning is based on creating an understanding of rules through reasoning (p. 100). Argyris (1991) argued that single-loop learning leads to defensive behavior when the "fix" does not solve the problem, thereby shutting down the process of learning exactly when it is most needed. An example of such behavior was given as leadership styles where control, minimization of loss, avoidance of negative feelings, and the maintenance of a pseudo-rational behavior mask the desire of organizational leaders to avoid embarrassment or show vulnerabilities. Such defensive behavior limits double-loop learning capabilities (p. 103).

The learning organization and strategy formulation. Strategy formulation can be a complex process. Young organizations often develop simple strategies that serve them well in the early years. Lumpkin and Dess (1995) argued that simple strategies that are effective early on in an organization become a limitation as the organization matures. Lumpkin and Dess explained how an oversimplified strategy development subdues environmental scanning

mechanisms, such as the ability to ask questions that may not be aligned with the organization's "official agenda" (p. 1386). Simplicity in strategy development enforces a common set of singular values that results in an organization's blind spot when scanning and seeking to understand its changing environment (p. 1390). The authors argued that a culture of learning, by which existing mental models are continuously challenged, compensates for the disadvantages of an earlier simplified strategy.

Miller (1988) argued that the alignment between strategy and the environment influence performance and organizational structure. According to Miller, organizations that exist in highly dynamic environments develop high degrees of innovative differentiation through active learning and scanning of the environment, as they do not solely rely on cost leadership and conservative, oversimplified strategies. Overreliance on past strategies to navigate a changing dynamic and fast-changing environment is an ineffective and dangerous strategy that decreases organizational performance (Cefis & Marsili, 2005; Eveleens, 2010; Prahalad & Mashelkar, 2010; Rogers, 1995).

Organizational adaptation to a highly dynamic environment requires a balance between short-term operational efficiency and long-term integration of innovation (Raisch & Birkinshaw, 2008). Raisch and Birkinshaw developed the concept of organizational ambidexterity, and they argued that exploitation of knowledge is closely related to organizational learning when the knowledge that has been acquired is repurposed and used throughout the organization. On the other hand, exploration of knowledge is an outcome of innovation, and innovation is the source of new knowledge (p. 379). Organizational design that supports efficiency is hierarchical in nature, while organic organizational structures with decentralization in decision making are more

conducive to exploration and innovation (p. 379). This is similar to the tolerance argument made by de Geus (2002).

Organizational structure and learning. Burke's (2008) view of organizational performance and change aligned well with Raisch and Birkinshaw's (2008) view of the dual-purpose organizational design. Burke developed a model wherein transformational factors, such as leadership, organizational culture, and strategy development, are optimal if they are linked with the external environment. Burke's two-tier model positions organizational leaders in direct interaction with the external environment, similar to how Drucker (2001) described the process by which organizations learn about their environment.

The second tier of Burke's model depicted structure, systems, tasks, work unit climate, motivation, and individual needs and values. Burke's description of a two-tier organization provides for short-term efficiencies, and through external environmental interaction, provides for transformational leadership (pp. 189-196). The ambidextrous organizational design proposed by Raisch and Birkinshaw (2008) resembles a matrix organizational design that, according to Cummings and Worley (2008), can minimize some of the weaknesses of the traditional functional and divisional structures typically found in organizations (p. 319). Cummings and Worley argued that a matrix design provides for a unique insight into environmental changes to its ability to deemphasize, as needed, project views and functional aspects of the organization. From the perspective of organizational learning, the matrix organization allows access to specialized knowledge across functions and projects (p. 321).

Swanson (2007) provided a theoretical foundation for the ambidextrous organization in his discussion of economic theory. Swanson aligned scarce resource theory closer to the short-term hierarchical decision-making portion of the organization and the sustainable resource

theory closer to the long-term organizational strategy. Swanson proposed a system of performance improvement methods that was closely linked to the environment in which the organization operated. Swanson then proposed a method by which human resources development would align to the outputs that benefited the organization (pp. 25- 28). Swanson's view on sustainability was aligned with Raisch and Birkinshaw (2008), who argued that organizations with a strong market orientation are less likely to develop an unbalanced position between exploitation of the knowledge and exploration for new knowledge (p. 359).

The process of learning through interaction with the external environment is often best understood through measurements. Measures, especially performance measures, are traditionally used to guide decision-making processes (Kennerley & Neely, 2003). Kennerley and Neely argued that financial performance measures are developed to measure organizational return on investment, and this is considered one of the most critical performance measures. However, the authors noted that as complexity and ambiguity of the business environment increases, such lagging metrics are no longer effective on their own. More than 50% of U.S. companies have adopted a version of the balanced scorecard in an effort to develop better measurements of their performance, and they have sought to achieve a better understanding of what is important to measure (p. 215). While the balanced scorecard provides useful information, it also results in information overload. The information overload has made many of the scorecards ineffective, a problem that is compounded by stale and irrelevant information since many organizations have not kept their scorecards up to date. This has led to diminished organizational capability to support critical decision making as the environmental change outpaces the information that the scorecards are able to provide.

The learning organization instrument. Previously, a link was made between the learning organization, financial performance, and organizational performance. This link provided the theoretical foundation for adopting The Dimensions of the Learning Organization Questionnaire (DLOQ), which was developed by Yang, Watkins, and Marsick (2004). This theoretical foundation established the first hypothesis for this study:

H1: There will be a positive relationship between organizational longevity and the Dimensions of The Learning Organization Questionnaire scores.

Higher scores on the DLOQ would indicate a better developed organizational learning culture (Yang et al., 2004). Yang et al. (2004) supported the development of the DLOQ based on four perspectives: (a) systems thinking, (b) learning perspective, (c) strategic perspective, and (d) integrative perspective. A short description of each perspective is provided below.

The first perspective, *systems thinking*, is attributed to a shared vision, changing mental models, employing personal mastery, and systems thinking. However, valuable inputs have not been clearly defined, and as such, have not been useful as a research instrument (p. 32). The second framework, *the learning perspective*, failed to deliver the framework that could support the learning construct. Plagued by overlapping concepts, it was argued that the learning framework is consultative in nature but not suitable to serve as a research tool (p. 32). The third framework, *the strategic perspective*, is a framework of constructs that are too high-level and do not clearly identify the attributes of a learning organization. The inconsistency in the five strategic building blocks was described in this approach, and the authors pointed out that such inconsistencies fail to align with a singular construct that could be useful to measure the learning organization (p. 33). The integrative perspective that was developed by Watkins and Marsick (1993, 1996) was chosen as the foundation for the DLOQ, and it should be noted that Watkins

was one of the researchers who developed the DLOQ. The authors adopted the definition of the learning organization as “one that learns continuously transforms itself ... [where] learning is [a] continuous, strategically used process – integrated and running parallel to work” (Watkins & Marsick, 1996, as cited in Yang et al., 2004, p. 33). The seven dimensions identified by Watkins and Marsick (1993, 1996) positioned both people and structure as two interactive components of organizational change and development (p. 34). The seven dimensions were described as: (1) continuous learning, (2) inquiry and dialogue, (3) collaboration and team learning (4) empowerment, (5) embedded system, (6) system connection, and (7) strategic leadership. The authors argued that the appropriate view of the learning organization is as an integrative framework of people and structures that enable an organization to continuously evolve (p. 34).

Organizational Identity

Organizational identity, which is largely based on organizational psychology theory, is presented in this section. The following will describe what is known about the connection between organizational identity, members’ identification with their organizations, and the implications to organizational longevity. At the end of this section, a method for measuring organizational identity is selected.

The challenge of defining organizational identity. Organizational identity is a well-researched field of study. Albert and Whetten (1985) have often been credited for introducing the concept of organizational identity. Specifically, these researchers identified the usefulness of organizational identity as a concept that helps social scientists characterize measurable aspects of the organization (p. 265). According to Albert and Whetten, an adequate foundation for the construct of organizational identity includes (a) claim of central character, (b) claim of distinctiveness, and (c) temporal continuity. These three criteria have subsequently

been cited and referenced in the literature as the foundational constructs by which organizational identity is defined (Cole & Bruch, 2006; Fiol, 2001; Gioia, Schultz, & Corley, 2000; Hatch & Schultz, 2002). Albert and Whetten (1985) described the central character construct as a statement of identity distinguishing the organization based on something that is important and essential to the organization (p. 266). However, the context in which identity is discussed amongst organizational members has changed over time, together with the social context in which such identity is viewed. This highly circumstantial perception of organizational identity led the authors to position organizational identity as an answer to the question of “who are we” (p. 269)? It was argued that the discrepancy between how members perceive their organizational identity and how it is perceived by outsiders is the critical perception gap that the bigger it is, the less healthy the organization is (p. 269). Images and organizational cultural artifacts, including slogans, symbols, and even the CEO’s persona, are all methods of conveying organizational identity (p. 270).

The authors presented holographic identity and ideographic identity as two forms of organizational identity. Holographic identity is the blending of the larger organization identity throughout every department and segment of the organization by the prevailing management styles and values. Ideographic identity was described as a form of specialization by organizational members that shielded them from the overall organizational identity (p. 270). It was argued that ideographic identity is more conducive to environmental adaptation through the diverse skill sets possessed by the specialized and diverse organizational subgroups. These diverse skills are well suited for the monitoring and understanding the changing environment and conditions and better equipped for the formulation of an appropriate set of recommendations for organizational adaptation strategies (p. 272).

Albert and Whetten argued that holographic identity, while more rigid, is more advantageous for the proliferation of decisions throughout the organization because it utilizes the common characteristics of the organizational identity and is better at achieving a high degree of compliance with top-down-driven initiatives (p. 272). The implication to organizational survival is that an organization would need both the ideographic and the holographic components to maintain environmental awareness, develop adaptation strategies, and then carry out such strategies by capitalizing on holographic structure.

The authors suggested that organizational identity is inextricably linked to the organizational lifecycle. Critical times for organizational identity were described as (a) at the time of formation of the organization; (b) at a time that sustaining element of organizational identity is lost; (c) when an organization has fulfilled its mission, especially when the mission was the sole purpose of the organization's existence; (d) at times of extremely rapid growth; (e) at times of mergers and acquisitions; and (f) at times of retrenchment (i.e., when organizations are more likely to develop dual identities by trying to keep its previous values while developing a second set of value that match its current strategy; pp. 274-275).

Albert and Whetten separated normative and utilitarian organizations, specifying that the latter is for business purpose organizations, and the former is for social organizations such as churches. The authors argued that matching an organization's complexity to its environment's complexity is critical for the harmonious existence of an organization and its environment (p. 276). In a follow-up article, Whetten (2006) further distinguished the construct of organizational identity by positioning individual identity as the foundation for organizational identity. This modified the original question at the core of organizational identity from "who are we" (Albert & Whetten, 1985)? To, "Who are we as an organization" (Whetten, 2006)? This modification

identified the construct of organizational identity as a product of organizational identification (p. 220).

The formation of organizational identity. Albert et al. (2000) proposed that organizational identity and identification are related but not identical constructs. The dynamic nature of organizational identity has two levels: a micro level and a macro level. Albert et al. (2000) argued that organizational identity is much more dynamic at the micro level than it is at the macro level. The matrix organization structure discussed earlier, evolved, according to the authors, as a result of globalization that introduced an increasingly dynamic environment, further blurring the already abstract organizational boundaries. Albert et al. (2000) argued that the abstract organizational boundaries that result from external influences increase the need for members' identification with the organization. Organizational identity was described as the glue that holds the organization together.

Albert et al. commented that the increasingly strained relationships that develop between employers and employees at the macro level result in a shift in the terms of employment. The shift away from long-term employment in which people could expect to work for one organization for most of their careers to an environment in which employees could no longer have such expectations created *transactional* relationships between employees and the organization (p. 14). It was argued that in an environment wherein employment contracts have become transactional, understanding the collective behaviors of employees and how these behaviors interact with ambiguous organizational frameworks is critical for organizational identity definition.

Scott and Lane (2000) argued that organizational identity emerged from the complex interactions between managers, stakeholders, and organizational members. This view was in

alignment with Albert et al.'s (2000) view that organizational identity is in a state of flux, but Scott and Lane attributed this dynamic to the influence of stakeholders (p. 45). Scott and Lane described organizational identity as a balancing point between desired organizational images and reflective stakeholder appraisals. The process by which organizational identity is developed and then changes over time positions it on a continuum between how managers construct a desired state, the image of the organization, how accurate such images are, and how well such images of the organization promote the status of the organization and its members (Scott & Lane, 2000, pp. 46-48).

Extending the view on the construction of organizational identity, Hogg and Terry (2000) considered the structural view of organizational identity. Hogg and Terry argued that the structural definition of an organization is constructed of sets of groups that interact in complex networks characterized by power status, prestige, and other critical differentiators that influence how organizational identity emerges. Organizational identity is a reflection of a social process that is geared to reduce uncertainty and creates levels of depersonalization among members. For members to join an organization, a degree of depersonalization is required, which then allows its members to deemphasize some of their individualistic traits in order to join a larger organization (pp. 121-122).

The implications from Hogg and Terry were that any changes in the interorganizational comparative perceptions affects organizational identity prototypes in that members' identification with their cohesive organizational unit increases in the face of uncertainty. Further, social attraction may foster organizational cohesion and increase identification in adherence to organizational norms (p.126). Organizational structure has to do with the strength of organizational identity, with the implication that leadership and structure define organizational

identity. The relevance of this view to organizational longevity has two parts. On the one hand, stronger group affiliation within an organization leads to lower turnover and increases continuity, which is associated with retention of knowledge and increased performance (Burt & Chermack, 2008; Chermack, Lynham, & van der Merwe, 2006; De Geus, 1988, 2002; Senge, 2006). On the other hand, stronger identities create blind spots following from overreliance on past experiences, which degrade environmental awareness and organizational performance (Brown & Starkey, 2000; Elsbach & Kramer, 1996; Hatch & Schultz, 2002).

Organizational identity and the environment. de Geus (2002) claimed that organizational identity is a key component of the organization as a living organism. de Geus (2002) argued that organizational identity and the ability to learn are inextricably linked through a process by which identity informs action, and action is learning (pp. 77-90). De Geus's view of organizational identity and the critical match between how it is perceived by its members and the external environment are in line with Albert and Whetten's (1985, p. 269) view on organizational "health" and the degree to which it is impaired if such gap is too big.

de Geus (2002) described the conflict that could occur when organizational identity does not match the external environmental reality and how organizations respond to such divergences, a construct that was supported by the earlier work of Elsbach and Kramer (1996). Elsbach and Kramer argued that members respond in two primary ways to such a mismatch. The external perception of an organization, such as the popular annual ranking of business schools published in various magazines, could result in conflicts with the members' perception of their organization. Members may feel that some positive aspects of their organization are being neglected in such rankings, or members try to make sense and explain why their organization's ranking is disappointing (Elsbach & Kramer, 1996, pp. 456-457). de Geus (2002) argued that

organizational identity has boundaries that help define group membership based on a set of common values. Members are those who share a set of common values and join the organization; others who may have had similar shared values but did not join the organization are considered to be outsiders. De Geus proposed that understanding these variables can help organizations enhance their identity, which he linked to lower attrition and increased ability to learn. De Geus linked organizational identity and organizational longevity by arguing that the connection between reduced turnover, which helps maintain organizational knowledge, and increased organizational learning capabilities are true competitive advantages that help organizations survive (De Geus, 1988).

When the environment and organizational identity do not match. Scott and Lane (2000) argued that where a dissonance exists between organizational identity and how members respond to perceived threats to such identity, it weakens the organization. De Geus (2002), Elsbach and Kramer (1996), and Ravasi and Schultz (2006) have all argued that when an organization is perceived differently by outsiders from how an organization is perceived by its members, members' reactions are both introspective and extrospective. Elsbach and Kramer (1996) described how members react to an external ranking of their organization when such ranking is unfavorable to their organization. Elsbach and Kramer argued that lower rankings devalue what some organizational members believe to be distinctive and enduring organizational traits that differentiate their organization from other organizations.

Elsbach and Kramer argued that the link between self-identity and organizational identity work well when such links raise the social status of organizational members. However, when organizations are ranked lower than other organizations, it threatens this positive connection between self-identity and organizational identity, and the status uplifts that members'

self-identity got through affiliation with a higher-ranking organization. Elsbach and Kramer argued that members react in two ways: (a) Members perceive the ranking as inaccurate by asserting that some critical aspects of their organization's attributes have been neglected in the ranking process, or (b) members try to rationalize the lower-perceived ranking of their organization through a sense-making process that would explain why they themselves may be disappointed with such rankings. The implication of members' reactions to such perceptions to organizational longevity, according to de Geus (1988), is the retention of membership in the lower-ranking organizations. Lower-retention rates of memberships eventually erodes organizational capability to learn; thus, the organization eventually loses its competitive advantage, and its chances of survival are reduced.

Ravasi and Schultz (2006) elaborated on the sense-making process described by Elsbach and Kramer (1996). The authors argued that changes in the organizational environment challenges members' beliefs of the attributes they consider to be distinctive and unique to their organization (p. 433). Culture is the source for the key sense-making process as well as the source of sustained organizational identity that influences how members respond to changes in the environment. The authors described an equilibrium that could exist between the aspirational view that members have of their organization on one hand, and the environmental reality of how their organization is perceived, on the other hand. This equilibrium between these two factors forms an ongoing exchange between the processes by which members learn about how their organization is perceived and how they themselves perceive their organization. The authors described the process of organizational learning as how members adapt their perceptions of their organization's images, distinctiveness, and values as changes in the environment occur is (pp. 436-437). The authors identified these external challenges to organizational identity as including

(a) destructive external changes and (b) discrepant external claims. Such threats are followed by a process of sense-making, which includes an evaluation of how an organization is perceived and represented externally and what distinguishes the members' organization from other organizations. This process of sense-making leads to revised identity claims that are cast as the desired organizational image and induce a process that seeks to maintain a collective sense of organizational identity amid changes in the environment.

According to Ravasi and Schultz, a revised organizational identity results from the process of reconciling internal and external views of organizational identities (2006, p. 441). Ravasi and Schultz's study described organizational identity's continuity as a way of maintaining organizational cohesion amid environmental changes that induce organizational identity division. Continuity allows an organization to maintain a cultural link to its heritage, connecting the sense-making process to understanding environmental changes, thus allowing for a conceptualization process resulting in a sense-giving process that creates a collective understanding of the new organizational reality (p. 454).

The dynamic nature of organizational identity was described by Hatch and Schultz (2002) as a process of constant comparison and reflection on the way organizational identity is expressed through symbolism. Ravasi and Schultz's (2006) described the social comparison process by which organizational members make sense of their organization's identity as a series of social comparisons between organizational members and outsiders, a process that the authors described as conversations that affect how organizational members define themselves (p. 992). According to Hatch and Schultz, culture and identity are closely connected, an observation that Fiol (2001) had made 5 years earlier. Hatch and Schultz linked organizational longevity to well-functioning organizational identity.

Hatch and Schultz argued that if an organizational image drifts too far from reality, an organizational identity crisis ensues. This crisis manifests itself through two behaviors: narcissism and hyperadaptation. Narcissism blocks environmental scanning through the belief that the organizational identity is somehow perfect (pp. 1006-1010). And hyperadaptation behavior is equivalent to an organization having “low self-esteem,” which causes the organization to attach itself to every fleeting fad in an effort to redeem itself (pp. 1010-1013). The authors argued that one can also create blind spots in the an organization’s ability to scan the environment and adapt (p. 1006).

Dynamic organizational identity and adaptation to the environment. The process of adaptation to changes in the environment described by Ravasi and Schultz (2006) was corroborated by Gioia et al. (2000). Gioia et al. relied on Albert and Whetten’s (1985) definition of organizational identity as having core, distinctive, and unique attributes that separate an organization from others. Gioia et al. took the concept a step further, indicating that identity adapts and changes together with the changes in the environment (p. 64). The authors argued that what is stable over time are the *labels* attributed to organizational identity; however, the meaning of such labels changes over time and is itself inherently unstable. Gioia et al. presented a compelling argument that portrays the instability in organizational identity as a key component in organizational adaptability, despite the prevailing view that organizational identity is a rigid attribute of the organizational culture (p. 65). The authors argued that external influences from the media, markets, and external stakeholders influence organizational identity, and consequently, constantly change how organizations are perceived. Therefore, the concept of organizational identity being rigid is unfounded (p. 71). In fact, the inherent instability of organizational identity is advantageous as the organization must continually adapt to its changing

environment. One possible management approach to help organizations adapt to their environments is to deliberately destabilize identities through revision of their meaning in the organizational historical context, using this method to drive effective change within the organization (p. 77).

Organizational identity preservation and implications. Brown and Starkey (2000) offered a unique perspective on the connection between organizational learning and organizational identity. Organizational learning, a method by which knowledge is captured and disseminated throughout the organization, serves as a conduit for preserving organizational identity. Organizational identity is maintained through a variety of defense mechanisms, such as denial, rationalization, idealization, fantasy, and symbolization (p. 105). In some cases, these defense mechanisms develop into a dysfunctional organizational identity that, in an effort to preserve itself, damages long-term organizational prospects. Denial and rationalization are related terms wherein the first is analogous to failure to admit that something is wrong, thus shifting the blame, and the second simply explains away the problems in a way that is devoid of responsibility for the issues (p. 106). Brown and Starkey described idealization, fantasy, and symbolization as related constructs wherein departure from a sense of reality is common to these elements. *Idealization* means overvaluing something that is less valuable in reality; for example, idealizing an organizational leader (p.106). *Fantasy* was described as a coping mechanism employed by organizational members to help soften some of the harsh realities of organizational life by inventing “facts” and stringing them into imaginary organizational history (p. 107). *Symbolization* was described by the authors as the process by which external artifact or image becomes laden with meaning, which then helps the organization’s members to respond to external threats to their organization’s identity (pp.107-109). Such response mechanisms create

a form of dysfunctional organizational learning that perpetuates a warped sense of organizational identity and greatly undermines organizational performance.

Underpinning the five defense mechanisms described by Brown and Starkey (2000) are the ways in which organizational members learn about threats and respond to such threats as a group. The process of learning about threats to organizational identity was described by Bartel (2001) as a process of social comparisons through which people understand organizational identities and are able to make sense of their organization's identity (p. 379). Bartel viewed organizational identity as an expanded version of individual identity, and as such, organizations seek to accentuate what makes them unique, which helps their members to differentiate between their organization and other organizations and affiliate themselves with organizations that give their members higher social status through affiliation (p. 379). Such affiliation could be simply explained as the desire of individuals to associate themselves with organizations that rank higher on the S&P 500 list, which means that the ranking on the list becomes a way through which members re-examine their own affiliation with their organizations (p. 404). Brickson (2007) referred to such re-examination of affiliation as individualistic orientation, which is separate from collectivistic orientation. Individualistic orientation is, according to Brickson, closely related to organizational identity, as described by Albert and Whetten (1985). Brickson argued that organizations, and their identities, have an innate need to survive, even if the organizational aspirations are altruistic in nature. Brickson referred to a "hedonistic calculus" (p. 868) wherein all organizations compute an intuitive quantification of self-harm that would befall them by helping others. Organizational identity is the filter through which common good and self-harm are reconciled to ensure that by serving altruistic goals, organizational self-preservation is not compromised.

Organizational identity and members' organizational commitment. Organizational identity, member's identification, and commitment to the organization lead to the fundamental question with respect to turnover or attrition of an organization's members. de Geus (2002) made the connection between a learning organization, the organizational competitive advantage, and organizational longevity. In this context, members' commitment to an organization is critical to organizational continuity. Cole and Bruch (2006) argued that turnover intentions could change depending on the individual's hierarchical position within an organization. Cole and Bruch defined organizational dedication as a process by which an individual's identity within the organization is psychologically inextricable from the organization's identity.

Organizational commitment was defined by the authors as a series of social exchanges that, over time, yield the pattern of obligation between parties, in this case employer and employee (pp. 585-586). Organizational identification tends to increase as an individual's management responsibilities increase, and increasing management responsibilities tend to decrease turnover intentions. Cole and Bruch found that individuals are able to distinguish between organizational identity strength, organizational commitment, and organizational identification, which means that these constructs are conducive to empirical measurements of members' identification with their organizations (p. 596). At the highest level of the organization, the officers group, organizational identification strength and commitment are negatively correlated with turnover intentions.

Similar findings were reported at the midtier management level, and only the lower levels were found to have lower levels of commitment that were minimally correlated with turnover intentions (p. 598). The findings by Cole and Bruch suggest that the strength of organizational identification, which is generally correlated with stronger organizational identity, is correlated to

turnover intentions. The implication to organizational longevity is the erosion of organizational knowledge, which could have been the result of a high turnover rate, and the erosion of such knowledge would have reduced organizational performance, ultimately impacting organizational longevity.

Fiol (2001) proposed that competitive advantage is best achieved through strong identity, which is correlated with higher organizational learning. Fiol argued that organizational identity's importance to organizational performance varies depending on the stage of the organizational lifecycle. He described the advantages of a unitary identity as a defense mechanism against external threats and one that provides a strong positive influence on organizational performance in the early stages of the organizational lifecycle (p. 693). However, in the later stages of organizational lifecycle, the same strong identity becomes a limitation that affects organizational adaptability to its environment. This paradoxical influence of strong organizational identity is reconciled, according to Fiol, if organizational members identify with the fundamental values and desired outcome (p. 697). These advantages include high adaptability of temporary organizational identities to the needs of the organization resulting from changes in their dynamic environment. This concept was supported by Gioia et al. (2000) idea of adaptive instability of organizational identity and images.

The relationship between employees and employers has undergone a series of changes over time. Pate et al. (2009) argued that external influences from consumers, shareholders, and competitors have resulted in organizations downsizing and engaging in other forms of efficiencies that has eroded the relationship between employees and employers. In essence, this relationship has shifted away from offering employees job security in exchange for their commitment to the organization, to a more transactional relationship wherein employees' loyalty

is replaced with comparative compensation measures. The authors correlated this erosion to a fundamental shift in organizational identity with dire consequences to organizational performance, thus affecting overall organizational longevity.

The literature supported an overall proposition that organizational identity can be linked to organizational longevity. Therefore, a second hypothesis for the study can be structured as follows:

H2: There will be a positive relationship between organizational longevity and the level organizational identity.

Pate et al. (2009) found that organizational identity is related to members' professional level and their identification with their workgroups. There is an ambiguous relationship between organizational identity and distance from corporate headquarters as well as internal identity and organizational identity. Further, there is evidence that contradicts the view that seniority with the organization and organizational identity are related (Pate et al., 2009). The implications are that organizational identity should be measured with careful positioning of the target population because hierarchy, professional levels, and departmental variables may interact with members' identification with their organization.

Organizational Innovation

The following section will present a discussion on the connection between organizational longevity and innovation. Innovation, whether it brings with it a form of creative destruction or whether innovation is incremental, will be presented in the context of long-lived organizations. Innovation is a highly related construct to organizational density, organizational learning, and it also has a clear connection to organizational financial performance.

Innovation as a survival engine. Innovation was closely correlated in the literature with organizational learning. de Geus (2002) observed that long-lived organizations are more tolerant towards decentralization in decision making and innovation, which de Geus referred to as activities that occur at the fringe of the organization (pp. 145-146). However, de Geus believed that companies could survive for long periods of time if they have a marked degree of influence on their environments, an argument that contradicts the need for innovation as a survival strategy. Highly regulated industries, such as banking and insurance companies supported by governmental entities, tend to exhibit a degree of influence over their environment, especially in a highly regulated environment, which then decreases their need for innovation (pp. 150-151). De Geus argued that there is a paradoxical relationship between management control and the reality of a dynamic environment. Control, according to de Geus, leads to stagnation of innovation, and the more dynamic the environment becomes, the greater the tendency of management to centralize control. This phenomenon, in essence, trumps the power of innovation as an adaptive organizational engine to a highly dynamic environment (pp. 152-158).

Innovation occurs when the right climate is in place to foster group collaboration through sharing of common perceptions of the organization (Anderson & West, 1998, p. 236). Anderson and West argued that organizational members sense their work climate through a cognitive schema that is used as a sense-making mechanism of the common work environment. Chermack (2003b) referred to this sense-making mechanism as a mental model (p. 409). Chermack linked mental models to the process of decision making and learning, and he argued that it is difficult to change mental models once they have been established (p. 236). The implication of this view is that learning, a process by which mental models are continuously challenged and changed, is

inextricably linked with innovation, which Raisch and Birkinshaw (2008) viewed as both an outcome of learning and the source of new knowledge exploration.

The innovation process. West (1990) defined innovation as “the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, which are designed to benefit the role performance, the group, the organization or the wider society” (p. 16). West also described innovation as an improvement process, which encompasses knowledge of the current environment, understanding the perceptions of groups interacting in that environment, and proposing improvements to the organizational processes that reside within the environment.

Chermack (2003b) described the innovation process as a decision-making process that is subsumed within a system. Problems are inputs into this system and a feedback loop is in place to ensure that the problem is solved. Chermack argued that mental models are at the foundation of the decision-making process, which is nested in the contextual understanding of the environment (pp. 414-416). Burt and Chermack (2008) argued that scenario planning can help recognize environmental uncertainty and help develop strategic paths to cope with the consequences by helping organizations adapt to a changing environment (pp. 286-287). The process of learning, decision making, and innovation is mutually reinforcing and makes it possible for the internal organizational environment to adapt. In the scenario planning case, learning to recognize possible future changes to the environment is a high-level cognitive process. Thus, the innovation process is also a learning process (Burt & Chermack, 2008; Chermack, 2003b; West, 1990).

Prahalad and Mashelkar (2010) described organizational adaptability to a dynamic environment as the source of learning and the need for organizations to innovate to meet the

changes in their business environments. An uncertain environment, such as the business environment in India, presents opportunities to disrupt business models, modify organizational capabilities, and create or source new capabilities (Prahalad & Mashelkar, 2010, p. 135). Through a process that shifts organizational leaders' mental models, whole organizations learn to refocus their attention on previously neglected critical consumer needs. Prahalad and Mashelkar argued that it is the external environment, and its highly dynamic nature, that force business leaders to rethink their business models, as opposed to internal and deliberate efforts to innovate. When faced with the realization that an organization must innovate or die, a mental shift occurs, resulting in a renewed organizational mission followed by new sources of profitability (pp. 136-137). The authors demonstrated the link between learning, changing mental models, and innovation by presenting cases from several unrelated Indian industries. Anderson and West (1998), Burt and Chermack (2008), Chermack (2003), and West (1990) also supported the link between learning, changing mental models, and innovation as a contributing factor to organizational survival.

Prahalad and Mashelkar's (2010) discussion lacked necessary details on how the process of innovation management helps in implementing the insights and strategies that the business leaders and their respective organizations gain. However, van de Ven (1986) identified the foundations of the innovative process as people, organizational context, transactions, and influx of new ideas (van de Ven, 1986, p. 591). Van de Ven (1986) defined innovation as "the development and implementation of new ideas by people who over time engage in transactions with others within an institutional order" (p. 591). Van de Ven recognized several operational vulnerabilities that negatively affect the innovation implementation process, namely, people's limited capability to stay focused for a long period time on any particular task and people's

limitations in handling the complexity of new ideas and converting good ideas into tangible benefits. Knowledge retention and transfer through the implementation cycle (similar to what Chermack (2006)] and Crossan et al. (1999) described as organizational learning) and the difficulties that organizations exhibit in sustaining the infrastructures that are conducive to innovation are the structural challenges in managing innovations (van de Ven, 1986, pp. 521-522). Van de Ven argued that these limitations influence how inertia, organizational structures, learning, and ultimately the success of the innovative process are captured within organizational networks (pp. 600-601). Van de Ven described the idea lifecycle from generation to implementation as a learning process. This process involves single-loop and double-loop learning. Single-loop learning is limited to corrective actions that address deviation from some established norm. Double-loop learning is more desirable because it allows detection and correction of the operating norms themselves. Van de Ven argued that by correcting the operating norms themselves, tangible benefits are more likely to occur (p. 603). The construct of single-loop and double-loop learning was later supported by Argyris (1991) who argued that double-loop learning is critical to a successful organizational learning process. Both Van de Ven (1986) and Argyris (1991) in their discussions of double-loop learning linked organizational learning to the innovative process.

Cormican and O'Sullivan (2004) laid out a five-step model in which the management of the innovation process could be conceptualized. In their model, an analysis of the environment and the identification of opportunities lead to the generation of innovations, followed by a process of planning, prioritization, and implementation of innovations (p. 820). They identified several critical failures in the practice of innovation management. The authors claimed that the lack of customer focus and lack of shared understanding, portfolio management, communication,

and knowledge transfer are all potentially critical failures for innovation management programs (pp. 821-822). Furthermore, the authors proposed that the innovation process should be managed as a portfolio of innovations, with a balanced approach to low-risk, short-term implementation horizons, and high-risk, long-term implementation horizons, thus balancing investment risk against continuity of income to the organization (p. 820). The implication of this argument is that the innovation process is continuous and could take some time to mature before the initial benefits can be reaped.

Diffusion of innovation. Any new knowledge that is developed through the innovation process, captured, and subsequently transferred to other organizational members, or to society as whole, can be thought of as a process of diffusion of innovation. Rogers (1995) defined diffusion as “the process in which an innovation is communicated through certain channels over time among the members of the social system. It is a special type of communication, in that the messages are concerned with new ideas” (p. 5). Rogers described the innovation process as a decision process, which is mental model driven and systematic. This conceptualization of the innovation process was echoed throughout the literature on the topics of learning, organizational identity, strategy development, and organizational survival (Chermack, 2003a, 2003b; De Geus, 1988, 2002; Garvin, 1993; Glick et al., 2012; Mintzberg & McHugh, 1985; Richard A. Swanson & Holton, 2009).

Rogers (1995) argued that the innovation process consists of six nonconsecutive phases that include (a) needs or problems, (b) research, (c) development, (d) commercialization, (e) diffusion and adoption, and (f) consequences (p.138). The first four phases of the innovation decision process— problem identification, research, development, and commercialization (p. 138-154)—are well researched in the literature. The fifth phase, diffusion and adoption of

innovation, was described by Rogers as one of the most critical stages in the innovation lifecycle (pp. 155-156). Some of the external environmental pressures applied on the organizational governance of the innovation process include social need, organizational survival, contextual understanding, and consensus around the importance of the innovation (pp. 156-157). The sixth phase of innovations, the consequences of innovations, received little attention in the literature and in research.

Change agencies, such as consulting firms, typically consider the adoption of an innovation as the success criterion, and survey research was deemed to be an inappropriate method to study consequences because consequences are “almost unavoidably subjective and value laden, regardless of who makes them” (p. 441). The study of consequences through the lens of cultural relativism, with all the measurement difficulties associated with such a method, was recommended. Rogers classified the consequences as desirable versus undesirable, and each is highly subjective based on who benefits from the innovation and who does not benefit (pp. 442-443).

Direct versus indirect consequences were predicated on systems theory and the degree to which the consequences and the system within which they interact are understood. Rogers argued that systematic understanding of the consequences of innovations is rarely fully understood (pp. 445-448), and he cited the Irish potato famine and steel axes for Stone Age aborigines as examples of anticipated versus unanticipated consequences of innovation. The systematic lens that Rogers used to understand anticipated versus anticipated consequences illuminates the need to consider the ecosystem and the environment at large before, during, and after the innovation and implementation phases of innovation management (pp. 448-452).

Creative destruction. Foster and Kaplan (2001) described the process of innovation through Schumpeter's theory of creative destruction and offered the concept of convergent thinking wherein innovation is used to develop short-term solutions quickly. Convergent thinking was described by Foster and Kaplan as the opposite of divergent thinking. Specifically, convergent thinking is concerned with developing the right set of questions before proceeding through the normative implementation process, which is typically in the convergent thinking realm (pp.45-46). Divergent thinking was closely aligned with Rogers's (1995) view of developing deep understanding for the innovation process, consequences, and diffusion before engaging in the innovation implementation process itself. Rogers's view is conceptually closer to the convergent thinking process. Divergent thinking aligned closer with the process by which mental models align themselves with organizational environment.

Foster and Kaplan argued that misalignment between mental models and the environment, such as overreliance on convergent thinking, subdue the early warning systems that alert organizations that their environment has changed (p. 46). Markets lack corporate controls; yet, they produce more innovations than corporations, and Foster and Kaplan pointed out that corporate control systems and convergent thinking greatly limit innovation (p. 47). The implication of the observations by Foster and Kaplan to organizational survival, using the lens of creative destruction theory, was that corporate control systems create headwind for organizational survival by stifling learning, silencing the voices of dissent within an organization, and dulling environmental scanning mechanisms. Therefore, long-lived organizations are expected to have a greater balance between divergent and convergent thinking.

Diamond (2006) presented a similar perspective through review of the evidence available on Schumpeter's creative destruction theory. Diamond found that incumbent firms find it more

difficult to innovate within their own industry, contrary to Schumpeter's original proposition that size matters when it comes to innovation. Diamond discovered that smaller and nimbler firms outpace large organizations when it comes to innovation (p. 134). Diamond argued that in a dynamic and destructive environment wherein innovation is critical for survival, incumbent firms do not innovate as much as younger and smaller firms (p. 137). Diamond's view links well with Foster and Kaplan's (2001) argument that corporate control systems perpetuate the successful models of the past, which slowly drift apart from the changing dynamic environment into obsolescence. The implications of Diamond's view is that long-lived organizations are not necessarily the largest in size, and part of adaptability to an ever-changing environment results in the *right-size organization* that is sustainable by the business environment. Further growth for the sake of growth is not necessarily the best survival strategy.

Innovation and organizational survival. Cefis and Marsili (2005) argued that innovation is directly linked to organizational survivability irrespective of an organization's size or age. Industry segments that are characterized by highly dynamic environments, such as technology sectors, exhibit a high degree of innovation (p. 1167). In Cefis and Marsili's study, survival time was the dependent variable, and the independent variables were degree of innovation, innovation types (product innovation and process innovation), firm size, firm age, firm growth, and industrial classification (p. 1174). Cefis and Marsili found that firm age and size were positively related to survival and that innovation increased survivability probability in the firms studied by 11%. In some industry sectors, innovation enhanced the chances of survival by 25% through creating a *temporary* competitive advantage. The authors concluded that innovation alone is not enough to help increase survival rates. Rather, innovation had to be coupled with specific firm capabilities to take advantage of the premium generated through the

innovation process; thus, linking the management of innovation was a key variable that contributes to increased firm survival rates. Cefis and Marsili's research confirmed some of Schumpeter's views on innovation as being the engine behind the generation of value through the process of creative destruction, a view that is evolutionary in nature (Caballero & Jaffe, 1993, p. 6).

The literature provided a connection between innovation and organizational survival. Therefore, the third hypothesis of this study is:

H3: There will be a positive relationship between organizational longevity and degree to which organizations have adopted innovation programs.

Organizational Fiscal Conservatism

Financial performance of an organization was described in the literature as a fundamental success factor for organizational survival. The literature described a multitude of financial ratios, measures, and an array of hypotheses that are used to capture organizational performance as a way of predicting organizational success and as way of differentiating and ranking organizational success and failure probabilities. Organizational failure was described in the literature as various forms of bankruptcy and insolvency (Altman, 1968; Ellinger et al., 2002; Musso & Schiavo, 2008). Beaver (1966) broadly defined failure as the "inability of the firm to pay its financial obligations as they mature" (p. 71). Beaver included bankruptcy, bond default, and other forms of nonpayment as some of the operational definitions of the firm's inability to meet its financial obligations. Beaver defined a financial ratio as a factor of two items that exist on a firm's financial statement (pp. 71-72). The work that was carried out by Beaver (1966) and Altman (1968) has often been cited in the literature as the centerpiece of the method that adopted financial ratios for the purpose of predicting firms' financial distress (Abdel-Khalik, 1993;

Balcaen & Ooghe, 2006; Turetsky & McEwen, 2001). The degree to which various financial ratios are useful in predicting organizational failure varies by industry, country, and the timing of the various studies. In the following sections, the historical use of financial ratios in predicting bankruptcy and the selection of the relevant financial ratios for this study will be presented.

Financial ratios and firm bankruptcy. The literature approached the prediction of bankruptcy through the use of financial ratios by using ex post methods. Early studies by Beaver (1966) and Altman (1968) provided both the theoretical foundation and the early results of such investigation approaches. The literature consistently treated bankruptcy as a proxy for organizational failure because it was a matter of public record. Public records are relatively easy to correlate with publicly available financial statements from sources such as Moody's industrial manual, Compustat, and various firms' public filings such as 10K statements (Ellinger et al., 2002; Turetsky & McEwen, 2001). Turetsky and McEwen (2001) offered an ex ante model for predicting financial distress; however, that was an exception in the literature. Other studies relied on lagging metrics, such as return on assets (ROA), return on equity (ROE), current ratio (current assets/current liabilities), and other liquidity ratios (Altman, 1968; Gallagher & Andrew, 2007; Turetsky & McEwen, 2001).

The study of financial ratios as predictors of bankruptcy has several key limitations. These included the selection of firms for the study, the definition of a failure, and the selection of the right method for the analysis. Balcaen and Ooghe (2006) reviewed 35 years of studies by looking at each study's methods, and they concluded that most studies were focused on developing one type of model or another with somewhat arbitrary rules for classifying firms on a bankruptcy risk continuum (pp. 66-67). Due to the ambiguous definitions of failure, the likelihood of type I and type II errors in the statistical failure prediction models was significant

(p. 65). Balcaen and Ooghe described the various prediction methods and models, including a popular unique variance failure prediction model that assumed linear relationship between all the failure measurements, an assumption that the authors described as tenuous at best. Various risk index models used a scale ranging from 0 to 100 with unequal weighting and great subjectivity, including the multiple discriminant analysis model (MDA) used by Altman (1968) and other who followed in his footsteps. The MDA was used to differentiate failing and not failing firms; however, this model suffered from a built-in inconsistency wherein an ordinal method was applied to continuous data, and the researchers relied on beta weights for ranking the firms on the chosen index. Balcaen and Ooghe argued that many of the researchers did not test their models for underpinning assumptions, which included nonoverlapping and identifiable groups, multivariate normality in the distributed dependent variables, equal variance covariance across groups, specific prior probability of failure, and misclassification of firms.

The implications of these observations were that financial ratios could be beneficial in predicting bankruptcy; however, which financial ratios are best used in this context remains ambiguous. Liquidity ratios were consistently cited as the most reliable financial ratios for the purpose of predicting firms' performance (Altman, 1968, pp. 549-595; Chen & Lee, 1993, pp. 671-672; Musso & Schiavo, 2008, p. 136; Turetsky & McEwen, 2001, p. 331). Tobin's Q, defined as market value of assets/replacement cost of assets (Ellinger et al., 2002, p. 12), was mentioned in the literature as a possible forward-looking financial ratio. This ratio is based on the value of the firm in the marketplace and the belief that firms with Q values exceeding one are both valued investment opportunity and may have high quality managers (Ellinger et al., 2002, p. 12).

Servaes (1991) investigated the relationships between Tobin's Q and corporate takeovers, both friendly and unfriendly. Servaes's results indicated that the Q value of the target firms is important. Low Q was related to larger gains to the acquiring firm; however, Servaes's study produced a regression model with low explanatory power. While Tobin's Q may have been an important financial ratio to evaluate from a performance perspective, the numerator was market value of firms' assets. This valuation, while important to the potential investors, was only relevant to organizational longevity if such valuation led to an acquisition. An explicit link between low Tobin Q values and takeovers was ambiguous in the literature.

In conclusion, financial ratios could serve investors, lenders, and various stock market indices well. However, the concept of organizational longevity did not necessarily fit the method by which markets place value on a firm. For example, a firm that maintains constant levels of debt and earnings but does not exhibit growth will be rated lower than a firm with an aggressive growth agenda. Swanson and Holton (2009) argued that many of the typical firm performance metrics could have become easily disconnected from true firm performance (p. 392). Swanson and Holton argued other measures did not capture the true value of the firm, such as intellectual capital, management's tenure and experience, and other expertise that influenced the firm's true performance (p. 395).

Financial ratios and organizational longevity. Gallagher and Andrew (2007) described the importance of liquidity ratios. These ratios are critical because if an organization fails to meet short-term obligations, it results in an immediate failure. Investors use financial ratios to determine if the firm adequately invests in its assets (p. 94). The importance of liquidity ratios was different for investors than for the firm. High liquidity ratios mean that the firm has the ability to cover its short-term obligations; however, investors consider such behavior to be

suboptimal when it comes to maximizing a firm's performance, which is measured in return on its investments. This paradoxical relationship between shareholders and organizational longevity interests is critical in interpreting the relationships between long-term debt and short-term debt, organizational survival, and investors' interests. Gallagher and Andrew argued that liquidity ratios, current ratio, and quick ratio are important firm performance indicators. The quick ratio is more rigorous than the current ratio because it excludes inventory from the coverage of debt. Both liquidity ratios estimate the ability of the firm to pay its current liabilities. Liquidity ratios are not dependent on the value that the markets place on a firm's assets, which makes such ratios less subjective.

de Geus (2002) argued that organizations that are able to maintain higher liquidity gain several advantages. Having "spare cash in the kitty" (p. 7) allows organizations to have flexibility in choosing the types of activities they want to pursue and provide organizations with less debt with a greater degree of independence. Organizations that do not have much debt do not need to gain the agreement of external stakeholders before choosing to capitalize on various opportunities. De Geus noted that financing operations through debt allows firms, especially startups, to work with someone else's funds while retaining the majority of the equity that is built from operations (p. 173). Debt service is a tax write-off in most cases, which adds to the allure of financing operations through selling debt instruments. However, de Geus argued that growth through debt financing strategy eventually limits organizations from achieving their full potential. Conservatism in financing is arguably an essential element for organizational longevity (p. 174). De Geus's view clashes to some extent with the traditional stock market perception of a firm's value. Firms that are listed on the *Fortune Magazine's* 500, or *The Financial Times's* 100, have all conformed to the economic theory of profit maximization. De

Geus described such firms as “a company is a moneymaking machine” (p. 176). De Geus pointed out that the purpose of an organization is first to survive before producing value for shareholders and investors (pp. 176-177). De Geus’s argument aligns with Swanson and Holton’s (2009) discussion around “softer” forms of capital. Swanson and Holton’s argument is similar to Ellinger et al.’s (2002), who positioned organizational learning as a value added contributor to a firm’s overall financial performance. Market value is financial capital plus intellectual capital, which is a more intangible value that is more difficult to measure (p. 395). Swanson and Holton defined intellectual capital, which traditional accounting systems are unable to capture directly, as the sum of human capital and structural capital.

Connecting the view of de Geus, Swanson and Holton, and Ellinger et al. reveals that firms that are highly leveraged will be less likely to invest in developing their human capital. Financing activity is tied to return on investment (ROI), wherein the lenders are focused on recovering the principal and interest. Debt financing is typically used to invest in capital equipment and other forms of tangible assets that have well-established accounting values.

Titman and Martin (2007) argued that the ability to secure attractive financing is among the principal determinants of the value corporations gain from their investments (p. 6). In their discussion of risk analysis, Titman and Martin described the use of discounted cash flow as the principal method by which project risk analysis is carried out. The same approach is used to evaluate whole enterprises (pp. 69-70). Corporate strategy decision making is hinged on return ratios, such as net present value and internal rates of return, which are tied both to sources of financing and the return on investment. The finance and accounting literature, as well as finance textbooks and accounting textbooks and articles, have all approached the value concept of a firm through the economic theory of maximizing return on investment (Abdel-Khalik, 1993; Hamel &

Prahalad, 1994; Musso & Schiavo, 2008; Turetsky & McEwen, 2001). The finance and accounting literature does not offer a single reference to “soft” values, nor does it mention intellectual capital, learning organization, organizational learning, employee empowerment, collaboration, or organizational awareness of its environment. The implication of this observation is that there is a significant gap between financial management and organizational development and how this gap relates to long-term organizational survival.

Low-debt ratios are conducive to increasing the odds of organizational survival (Altman, 1968; de Geus, 2002; Ohlson, 1980). The investment in people through learning, training and development, and empowerment has produced positive financial results for firms (Ellinger et al., 2002). Since training and development is typically funded through internal resources, such resources become available when other obligations have been met. Liquidity ratios, such as current ratio, measure a firm’s ability to meet its short-term obligations. The point of view proposed here is that low leverage would mean having more funds to invest in organizational development, and such flexibilities are afforded to organizations that do not have to rely extensively on external sources of funds. Therefore, the fourth and fifth hypotheses are:

H4: There will be a positive relationship between organizational longevity and current ratio.

H5: There will be a negative relationship between organizational longevity and long-term debt.

These hypotheses were implied in the following studies: (Altman (1968); de Geus (2002, pp. 7, 174-176); Ellinger et al. (2002); Gallagher and Andrew (2007, p. 92)).

Summary

This chapter provided the theoretical foundation for the five hypotheses of this study. The economic and social costs of the diminishing life expectancy of organizations were presented. These costs were linked to the urgency to understand organizational longevity. The learning organization concept was presented as a way by which organizations can learn to adapt to their environments and thereby increase their chances of survival. Organizational identity was presented in the context of reduced members' attrition and how change is managed in organizations with varying identity strengths. It was argued that higher members' commitment to their organizations and better-defined organization identity are conducive to overall organizational survival.

Innovation was presented as the engine behind organizational financial performance. Higher degrees of innovation have been linked to increased survival rates; however, innovation carries with it the danger of *creative destruction*, which could destroy parts of firms and even whole industries, creating new ones in their stead. Fiscal conservatism was presented as a divergent concept from investors' firm valuation. It was argued that low debt, both short term and long term, are conducive to a firm's survival, while market-facing ratios that appeal to investors are not always in a firm's best interests. The central learning from this literature review was that the longer an organization lives, the higher its levels of learning, identity, and innovation and the lower its levels of debt.

CHAPTER THREE: METHODOLOGY

The purpose of this chapter is to present and describe the method and research design used for this research. Specifically, this chapter:

- presents the research questions,
- presents the overall study design,
- describes the population and sample,
- describes the measurement instruments used in the research, and
- describes the data collection and data analysis strategies.

Research Question

This study is focused on answering the following primary research question:

Can organizational longevity predict levels of organizational learning, identity, innovation, and financial conservatism?

Hypotheses

In chapter two, the following hypotheses were developed:

1. There will be a *positive* relationship between organizational longevity and the Dimensions of The Learning Organization Questionnaire scores.
2. There will be a *positive* relationship between organizational longevity and the level of Organizational Identity.
3. There will be a *positive* relationship between organizational longevity and the degree to which organizations have adopted innovation programs.
4. There will be a *positive* relationship between organizational longevity and current ratio.

5. There will be a *negative* relationship between organizational longevity and long-term debt.

Research Design

The research design followed a nonexperimental, quantitative, ex post facto design using survey instruments and objective financial ratios listed in the Value Link database. Three of the variables were measured by surveys that contained a total of 22 items. Fiscal conservatism (objective financial ratios) was measured through publically available reports and information.

The three variables measured with survey instruments were (a) learning organization culture, (b) organizational identity, and (c) innovation. The portion of the survey that measured the learning organization culture used the seven-item version of the DLOQ-A (Yang, 2003). The portion of the survey that measured organizational identity used the 10-item organizational identity survey that was adapted from Kreiner and Ashforth (2004). The portion of the survey that measured innovation used a 5-item survey that inquired about the existence of an innovation program, the length of time such program had been in place, and other key elements common in assessing innovation in organizations (Cefis & Marsili, 2005; Cormican & O'Sullivan, 2004; Rogers, 1995). Fiscal conservatism was measured by using the firms' current ratios (Gallagher & Andrew, 2007). This data was compiled by using firm financial information from *Value Line*, a database that contains 10 years of financial information about publically traded firms.

Figure 2 outlines the relationships between the independent variable and the dependent variables.

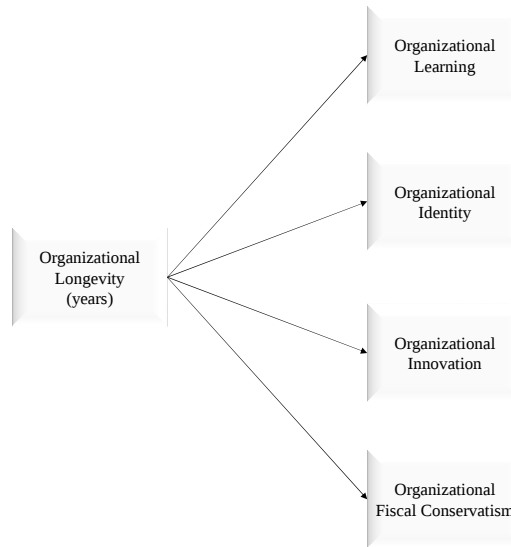


Figure 2: Organizational longevity and dependent variables

Organizational Learning is comprised of seven items (dimensions) that were aggregated and averaged for the purpose of this study. Since this study sought to investigate the connection between organizational longevity and organizational learning—and not the specific connection between organizational longevity and various dimensions of organizational learning—the responses from each organization to the DLOQ-A results were averaged. Similarly, the responses to the organizational identity portion of the survey and the organizational innovation portion of the survey were also averaged. Fiscal conservatism had two items: (a) short-term debt, which was measured using publically available information about the firms’ current ratio; and (b) using the same data sources from *ValueLink*, the long-term debt of the organizations was calculated. Current ratio and long-term debt were not averaged since there was only value of each from each corresponding organization. This study reported on the relationships between the predicting variable and the four predicted variables in Chapter 4 of this study.

Population and Sample

This section describes the population and sample for the research study. Each is described in detail, and while limitations are identified, they will be discussed in a later section.

Population. The study focused on testing the variables that could potentially be predicted by organizational longevity. This means that the theoretical population is all companies, and the target population is *Fortune Magazine's* 1,000 companies as of 2012. One of these variables, fiscal conservatism, relies on current financial ratios to determine if a firm can meet its short-term obligations, as well as the amount of long-term debt that a company can hold. The use of these financial measures limited the study to publically traded organizations wherein information about their current assets and current liabilities is in the public domain. The target population of this study was *Fortune Magazine's* 1,000 list of publically traded companies. This introduced a limitation to the study in the degree to which the results can be generalized to all companies. The dependent variables that were measured through the survey were (a) the learning organization, (b) organizational identity, and (c) innovation. Current ratios and long-term debt information were collected on organizations that responded to the survey.

Sample. The study focused on *Fortune Magazine's* list of the top 1,000 companies as of 2012. The list of these companies was obtained through a subscription to *jigsaw*, a database that lists the *Fortune Magazine's* 1,000 companies and also contains employees' contact information. The population of senior managers working at Fortune 1,000 companies was estimated to be about 82,000 director level individuals based on the search criteria shown in Table 1 below,

Table 1

Search Terms for Fortune 1,000 Firms

Term	Criteria
Level	Director, Senior Manager
Department	Human Resources, Training and Development
Country	United States
Metro Area	U.S. Metro
Industry	All
Employees	Full-Time Employees => 100
Ownership	Public
<i>Fortune Magazine's Rank</i>	1,000

Source: Data.Com Contacts by Jigsaw www.data.com

Due to variances in titles between Fortune 1,000 organizations, employees whose title was senior manager were accepted in lieu of a director title. The target population of directors and senior managers working in human resources or training and development was 6,000 individuals. After further scrub of the data, 3,900 contacts remained for whom valid e-mail addresses were available. The study utilized a survey instrument that sent queries to all the contacts that matched the search criteria and held a director or a senior manager title at the time of the research study. The reason for targeting senior managers and directors was the concern that higher-level individuals may have very low response rate, as low as 0.25% (Glick, 2011), while lower-level individuals may lack the perspective to answer in-depth questions about their organization's learning culture, innovation, and identity. According to Krejcie and Morgan

(1970), a sample size of 278 is required for adequate representation of the Fortune 1,000 companies.

Research aimed at the population of senior manager or director tends to yield an average response rate of approximately 25% (Petroni, Sigman, Willimack, Cohen, & Tucker, 2004). Because the response rate is critical to the research design, these titles and levels in organizations were specifically targeted. In addition to aiding with response rate, human resources directors were targeted because these managerial levels would be familiar with the content and operations covered by these surveys. In other words, the research design relied upon respondents being knowledgeable about their organizations' training and development programs.

Power Analysis

Power refers to "the ability to reject a null hypothesis when it is truly false" (Holton & Swanson, 2005, p. 54; Passmore & Baker, 2005, p. 54). This study's sample involved key decision-makers at the senior management level whose response rate historically is notoriously low (Glick, 2011). The purpose of the power analysis was to ensure the sample size was adequate for performing the statistical tests as the basis for answering the research question. In other words, a power analysis revealed the minimum acceptable sample size required to perform the statistical tests and reduce the possibility of Type II error (Cohen, 1992; Faul, Erdfelder, Lang, & Buchner, 2007).

The power analysis was conducted using G*Power software to determine the sample needed to find statistical significance. Parameters were set with an alpha level of .05, a power level of .80 and an r of .50. Alpha level of .05 referred to the Type I error, and .80 referred to the Type II error (Ferguson, 2009). Setting $r = .50$ was consistent with finding a medium effect (Ferguson, 2009). Under these parameters, a minimum sample size of 55 was needed to achieve

a statistically significant result. Figure 3 shows the results of the power analysis conducted for the required sample size.

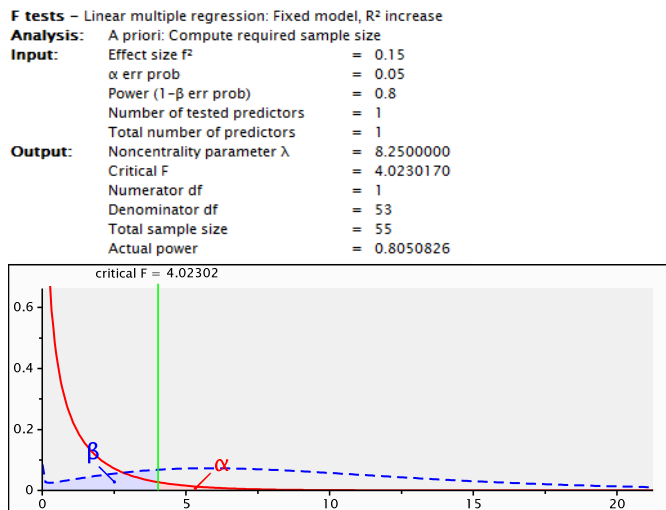


Figure 3: Power analysis

Instruments and Measurement

This section briefly describes the instruments that were used to measure the dependent variables in the study; namely, learning organization culture, organizational identity, and organizational innovation. For each measurement instrument, prior reports of score reliability and validity are summarized. Finally, the measurement strategy for the independent variable, organizational longevity, is described.

Measuring learning organization culture. Yang et al. (2004) developed the DLOQ on the foundation of an integrative perspective (p. 33). After reviewing systems' thinking, a learning perspective, and a strategic perspective, Yang et al. argued that lack of clear identification of measurable characteristics, too conceptual and high-level frameworks, and lack of congruence and consistency between construct were some of the reason why these three

perspectives were not chosen as a viable research set of variables to measure the learning organization construct (pp. 32-33).

Prior reports of score reliability and validity. Yang et al.'s (2004) integrative perspective joined *people* and *culture* into a framework that was the foundation for the development of seven dimensions of the DLOQ. The authors argued that the congeneric model, instead of the popular Cronbach's coefficient alpha, was the less restrictive and appropriate method for measuring the internal consistency of the DLOQ instrument. The Cronbach's alpha model bias estimation of individual items in cases of inequality between the item's score and the true score was given by the authors as the reason for rejecting Cronbach's alpha (p. 39). Yang et al. argued that the assumption of the congeneric model that each item's score is a true score to a different degree was tested by using a confirmatory factor analysis (CFA). Yang et al. used structured equation modeling to test the relationships between the dimensions of the learning organization and the financial outcomes variables. The authors argued that if there was a significant relationship between the seven dimensions of the learning organization, resulting in the gain of organizational knowledge and organizational outcome that increased financial performance, it would provide evidence of instrument validity (pp. 40-41).

Yang (2003) presented a shorter version of the DLOQ: DLOQ-A, which contained 21 items. Yang provided evidence to support validity through structured equation modeling results showing that the variables measured in the instrument explained 66% of organizational financial performance and 74% of the variation in knowledge performance. The seven dimensions of the DLOQ-A were grouped by people level and structural level. The people-level group included these characteristics: (a) create continuous learning opportunities, (b) promote inquiry and dialogue, (c) encourage collaboration and team learning, and (d) empower people towards

collective vision. The structural-level group included these characteristics: (a) connect the organization to its environment, (b) establish systems to capture and share learning, and (c) provide strategic leadership for learning (p. 41).

Yang (2004) provided an even shorter version of the DLOQ-A wherein one question representing each of the seven dimensions of the DLOQ can be used. The seven-question survey version was tested and developed by Yang and an initial data set yielded a .84 reliability score (p. 160). The seven-question version of the DLOQ-A was used for this study. The survey was constructed from answers laid out on a Likert scale between *almost never* to *almost always*, resulting in six levels. Since the survey was targeting a diverse population, it was important to determine the cross-cultural reliability of the survey. Haeffner, Leone, Coons, and Chermack (2012, p. 530) reported on the cross-cultural evidence of the DLOQ reliability. Haeffner et al. established a data set that showed an alpha value above .7 across cultures.

Measuring organizational identity. Pate et al. (2009) argued that changing landscape in relationships between employer and employees increased the need to better understand employees' commitment to their organizations and that organizational identity was the construct on the critical path towards understanding the relationship between organizational members in their organization (pp. 3-4). Pate et al. argued that organizational efficiency strategies, which changed organizational identities, adversely affected how employees related, contributed, and viewed their organizations. The authors described the shift from a social contract whereby job security is exchanged for loyalty of the employees to a transactional market contract that diluted employer-employee relationships. The authors argued that, subsequently, organizational performance suffers due to employees' disassociation from organizational membership, which means that employees begin to view their membership in an organization as a job rather than as a

social network within which they belong. Such dissociation leads to the employees' identification with the trade or their professional network, a relationship that substitutes their former allegiance to their employer. The authors argued that when employees develop this type of external identification, it is detrimental to long-term organizational performance.

Kreiner and Ashforth (2004) expanded the model of organizational identity and members' identification. Their research provided evidence that the strength of organizational identity is not associated with organizational reputation. Members' disidentification was instead associated with organizational reputation. The authors argued that ambivalent identification is associated with conflicting organizational identities and that neutral identification is associated with members' individualism. Pate et al. (2009) used Kreiner and Ashforth's (2004) instrument, which is constructed on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*, to measure organizational identity and members' identification with their organizations.

Prior reports of score reliability and validity. Kreiner and Ashforth (2004) developed an instrument that measures the levels of all organizational identity and conflicting identities. Kreiner and Ashforth operationalized an extended model of identification that includes identification, disidentification, ambivalent identification, and mutual identification. They sought to begin to establish criterion-related validity of the extended organizational identity model. Criterion-related validity is composed of two types of validity: predictive validity and concurrent validity (Cronbach & Meehl, 1955, p. 281). Predictive validity is a lagging measure that confirms an ex ante prediction of organizational identity. Concurrent validity is obtained when "the test score and the criterion score are determined essentially at the same time" (Cronbach & Meehl, 1955, p. 282). Kreiner and Ashforth (2004) were able to establish an initial criterion-related validity in their model that measures organizational identity and identification.

For the purpose of this study, a 5-point Likert scale composed of the first 10 questions from Kreiner and Ashforth's survey was used to measure organizational identity strength and organizational identity incongruence (conflict), resulting in a total of 10 items.

Measuring organizational innovation. Anderson and West (1998) claimed that innovation requires the right climate to flourish. Innovation flourishes when the organization provides clarity, participative safety, and supports innovation, which is bound by task (p. 240). Vvan de Ven (1986) argued that humans suffers from an inability to focus on complex issues for long periods of time, that inertia and group conformity further limit human attention, and that institutional leadership limits innovation if there is not a formal program that helps manage innovation through focus on double-loop learning (pp. 601-603). The purpose of this study *was not* to measure the efficacy of various innovation approaches or management paradigms. Rather, this study was focused on the *existence* of tenured innovation programs. This study sought to find out when such programs begin, how many ideas are submitted, and how many ideas are implemented.

In this study, this researcher hoped to uncover the degree to which innovation is adopted and managed within an organization by measuring how many ideas are implemented within each organization. This study asked participants to (a) indicate whether their organization had an innovation program, (b) provide the name of their organization's innovation program, (c) indicate how long the innovation program had been in place, (d) estimate the number of ideas that were submitted per employee, and (e) estimate the implementation rate of such ideas, resulting in a total of five items.

Prior reports of score reliability and validity. Prior reports of score reliability and validity were not relevant for this measure because this study asked the survey respondents to

indicate whether an innovation program exists in their organization and estimate how many ideas had been implemented.

Measuring fiscal conservatism. Fiscal conservatism was assessed using financial ratios. Specifically, the study used short-term and long-term debt ratios as measures of fiscal conservatism. Using the current ratio allowed this inquiry to assess the ability of the organizations to meet their short-term obligations. This is a critical measure for organizational longevity since organizational inability to cover short-term obligations could result in immediate financial distress and lead to bankruptcy (Gallagher & Andrew, 2007). Organizational fiscal conservatism over the long range was measured by the amount of long-term debt on the company's balance sheet. This measure illuminated the ability of the company to rely on internal sources of financing rather than external sources of funding and was link to de Geus's (2006) argument that organizations with little debt gain flexibility and independence that allow them to respond quickly to changes in their environments, thus increasing the chances of survivability (de Geus, 2002, p. 7).

Measuring organizational longevity. Organizational longevity, the independent variable in the study, was defined as the time that passed from incorporation of the company until the company dissolved, merged, was acquired, or went bankrupt under Chapter 7 of U.S. bankruptcy law (US Courts, 2012). Incorporation dates were listed in the Value Line database for the targeted companies. Since this study utilized a quantitative, ex post facto design, instead of using bankruptcy dates, time from incorporation was calculated by subtracting the survey close date from the date of incorporation of the firms for which responses had been received. For example: Accenture, Ltd. was incorporated by separating from Anderson Worldwide and Arthur Anderson LLP and was organized as Accenture, Ltd., on July 19, 2001 (Value Line, Accenture

PLC NYSE-ACN, 2012). If the study was then conducted on January 15, 2013, Accenture, Ltd.'s age would be measured as 4,198 days or 11.5 years at the time of the study (July 19, 2001, to January 15, 2013).

Data Collection

Official permission to conduct the data collection via survey was requested from the Internal Review Board at Colorado State University. Once approval to conduct the study was received, surveys were sent to the database of identified participants meeting the selection criteria using the Qualtrics surveying tool. Qualtrics is a survey administration tool approved by and linked to Colorado State University. The surveys were sent to the target population of directors and senior managers working at *Fortune Magazine's* list of top 1,000 companies.

Data Analysis

This section describes the data analysis strategies that were used to examine the data and answer the research questions. Data analysis was focused on descriptive statistics to establish data normality, reliability, and validity of scores for the instruments used, and bivariate linear regression to answer the research question and hypotheses.

Descriptive Statistics

Data analysis was begun with basic descriptive statistics. These were examined to determine the distribution of the data set. Specifically, skewness and kurtosis statistics were reported to demonstrate whether or not the data fit a normal curve. Skewness and kurtosis are measures of the dispersion of the data from the center to the tails of the distribution, which can be used to determine if the data follows a normal distribution (D'agostino, Belanger, & D'Agostino Jr, 1990). Skewness ($\sqrt{\beta_1}$) was defined as the expected value of the random variable X , less the population mean cubed, over the standard deviation cubed:

$$\sqrt{\beta_1} = \frac{E(X - \mu)^3}{\sigma^3}$$

The closer skewness is to zero, the closer the distribution of a random variable X is to a normal distribution. Kurtosis (β_2) is defined as the expected value of the random variable X , less the population mean raised to the power of 4, over the standard deviation raised to the power of 4:

$$\beta_2 = \frac{E(X - \mu)^4}{\sigma^4}$$

The closer Kurtosis is to the value 0, the closer X distribution is to a normal distribution (D'agostino et al., 1990, pp. 316-317). The letters μ and σ represent the population's average and standard deviation, respectively. D'agostino et al. (1990, pp. 318-319) developed an omnibus test to test for normality that combined skewness and kurtosis into a single test (p. 318). This was tested on a standardized score (Z score) and the K^2 statistic that was similar to a $\chi^2_{df(2)}$. The test was initiated by multiplying the $\sqrt{\beta_1}$ by Z^2 and adding β_2 , which was multiplied by Z^2 as follows:

$$K^2 = Z^2(\sqrt{\beta_1}) + Z^2(\beta_2)$$

The result of the omnibus test can be tested for significance using a *Kolmogorov*, or an Andersen-Darling (Stephens, 1974) test, for significance and determine if the data follows a normal distribution via an hypothesis test. The test for normality returns the test statistic value and p value of significance, which allows the rejection or failure of rejection of the null hypothesis of data normality. Skewness values indicate if the data is left- or right-skewed wherein negative values indicate a left skew, long tail to the left of the peak of the distribution, and positive values reflect the opposite. Kurtosis values indicate whether the distribution's tails are platykurtic or leptokurtic. Thus, skewness and kurtosis help illuminate the shape of the data and the degree to which the shape of the data may depart from a normal distribution.

Reliability

In order to establish data reliability, the study used Cronbach's alpha (alpha). Reliability is defined as the consistency of repeated measurements taken under similar conditions (Bravo, 1991; Cronbach, 1951; Nunnally, Bernstein, & Berge, 1967). Cronbach (1951) explained that coefficient alphas is an equivalence measure of the half-split coefficients and is a measure of the correlation of random items from the domain of the test (p. 297). Cronbach argued that when the split-half method is used to take consecutive measures, the resulting computation of the correlation is a measure of *score stability*, and if the measures are taken simultaneously, the resulting coefficient is a measure of *score equivalency* (p. 298).

Validity

Validity is examined through Factor Analysis. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are methods to determine the validity of the measurement scales. The difference between EFA and CFA is said to be in the presence of strong theoretical foundation that illuminates validity (J. C. Anderson, 1988; DeVon, 2007; Hurley et al., 1997; Van Prooijen & Van Der Kloot, 2001; Williams, 1995). Hurley et al. (1997) concurred with the prevailing view that CFA is based on strong theoretical foundations and is thus better suited for *testing* relationships between variables. Conversely, EFA is better suited for scale development in the early phase of instrument construction (pp. 667-668). This study utilized existing scales in the presence of well-developed theories of the learning organizational and organizational identity; therefore, CFA would have been determined to be the appropriate method for this study.

Validity is defined as the degree to which a method or instrument is able to measure what the researcher intends to measure (1955). Cronbach and Meehl presented four types of validation: (a) predictive validity, (b) concurrent validity, (c) content validity, and (d) construct

validity (pp. 281-283). In this study, the data collected through the seven-question version of the DLOQ-A and organizational identity were not assessed with CFA as there are substantial previous studies to establish their theoretical foundations, along with evidence of reliability and validity. Principal component analysis was used in this study to help illuminate the internal validity of the results.

Innovation did not have a validity measure since this study was seeking to determine whether an innovation program exists within the target organizations and not the degrees of innovation efficacy. Fiscal conservatism was measured through meta-data analysis and was not subjected to a validity test.

Bivariate Regression

This study had only one independent variable, organizational longevity; therefore, multicollinearity could arise in a case wherein several firms' ages were influenced by external factors, including but not limited to: government bailouts, affiliation with specific industries, tax law, and other external factors. The regression equations used for this study were the following:

1. *Average Learning Organization* = $\alpha + \beta_i X + \varepsilon_i$
2. *Average Organizational Identity* = $\alpha + \beta_i X + \varepsilon_i$
3. *Average Innovation* = $\alpha + \beta_i X + \varepsilon_i$
4. *Current Ratio* = $\alpha + \beta_i X + \varepsilon_i$
5. *Long-term Debt* = $\alpha + \beta_i X + \varepsilon_i$

Where X = Organizational Longevity measured in years.

Effect Sizes

Because the study involved hypothesis testing and used p values, effect sizes were also computed. As stated by Thompson, "Effect sizes quantify the degree to which sample statistics

diverge from the expectations specified in the hull hypothesis” (Thompson, 2005, p. 60). Tyron (1998) criticized significance testing, arguing that:

the fact that statistical experts and investigations publishing in the best journals cannot consistently interpret the results of these analyses is extremely disturbing. Seventy-two years of education have resulted in miniscule, if any, progress toward correcting this situation. It is difficult to estimate the handicap that widespread, incorrect, and intractable use of a primary analytic method has on a scientific discipline, but the deleterious effects are doubtless substantial. (p. 796)

Effect sizes help to isolate the effect of any relationship within the sample and are sometimes referred to as practical significance (Thompson, 2005). Effect sizes also describe the strength of the relationship between the independent and dependent variables. Consistent with common practice, this study judged effect size to be small at 0.02, medium effect size at 0.15, and large effect size at 0.35 to help determine the minimum sample size (Cohen, 1992).

Limitations

This study has several limitations. The study only focused on *Fortune Magazine*’s top 1,000 publically traded companies, which, as cited earlier, are an outlier of the over 6 million public and private organizations in the US. This limited the generalizability of this study’s results to the total population of companies in the US.

The second limitation was in the aggregation of survey responses. That is, if there was more than one response received from any one organization, the results were averaged, which reduced the precision of the analysis. The third limitation of this study was in the way the survey scales were aggregated and averaged. While this was done to allow for a bivariate regression analysis, it reduced the study’s ability to illuminate the connection between organizational longevity and specific scales within each dependent variable.

Summary

Data was entered into SPSS for Windows and analyzed using learning organization culture, organizational identity, organizational innovation, and fiscal conservatism as the predicted variables of organizational longevity. A significance level of 0.05 was specified as the critical value for the directional hypothesis threshold.

The rationale for the study design and the use of the regression were established in this chapter and the preceding chapters. Descriptive statistics and the results of the analysis are presented in chapter 4.

CHAPTER FOUR: FINDINGS

The purpose of this study was to examine the relationships between organizational longevity and four dependent variables: (a) organizational learning, (b) organizational identity, (c) organizational innovation, and (d) organizational fiscal conservatism. As described in chapter 3, a three-part survey was used to collect data from human resources directors who worked for *Fortune Magazine*'s list of top 1,000 companies. Organizational longevity was measured in years from the date of incorporation to September 2, 2013. Three of the dependent variables: organizational learning, organizational identity, and organizational innovation, were measured through a survey. The fourth dependent variable, fiscal conservatism, was measured using two variables: (a) current ratio and (b) long-term debt. The current ratio is a measure of the organization's ability to meet its short-term liabilities, and long-term debt is a measure of organizational long-term liabilities. The research question that guided this study was: Can organizational longevity explain variance in levels of organizational learning, identity, innovation, and financial conservatism?

In this chapter, the results are presented in several sections. First, descriptive statistics for the scales are given. Next, the reliabilities of the study's organizational learning and organizational identity scales are presented in the form of computed coefficient alphas. Coefficient alphas of .70 or above were considered as sufficient evidence of the scale's internal consistency (Cronbach, 1951; DeVellis, 2003). Next, bivariate correlation results are presented followed by the results of curve-fitting procedures that were performed to explore the possible relationships between the study's variables.

Descriptive Statistics

The target population was *Fortune Magazine's* top 1,000 publically traded companies. Out of the Fortune 1,000, contact information for human resources directors was available for 703 companies. The survey was sent to a total of 3,900 human resources and training directors or senior managers working for the 703 Fortune 1,000 companies. Tracking responses through Qualtrics revealed that all 3,900 contacts' information was correct as no rejected e-mail addresses were reported. Out of the 703 companies, responses for 97 companies were received, resulting in a 13.80% response rate. This was a lower response than the 25% reported by Petroni et al. (2004); however, this was higher than the 0.25% response rate reported by Glick (2011). This response rate was lower than what the study hoped to achieve; however, it confirmed that the right levels of individuals were targeted. There were only 2 organizations for which three responses were received, and only 15 organizations for which two responses were received. The remaining 80 organizations provided only one response per organization. For organizations with more than one response, an average was computed and used as single data point.

Power refers to the ability to reject a null hypothesis when it is truly false (Holton & Swanson, 2005; Passmore & Baker, 2005). A sample size of 55 companies was required to provide enough power to reduce the likelihood of type I error to less than 5%. The results from the survey provided sufficient number of responses to meet the minimum response rate required. A sample size of 278 companies was required to adequately represent the Fortune 1,000 companies (Kotrlík & Higgins, 2001; Krejcie & Morgan, 1970). The 97 organizations responding to the survey were not enough to adequately represent the population of the Fortune 1,000 companies. Nonresponse error will be discussed at the end of this chapter.

Table 2 below reports on the range, skewness, kurtosis, means, and standard deviations for the scales to assess variation and central tendency of the data.

Table 2

Descriptive Statistics of Instrument Scales

Measure	No. of Items	n	Mean	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
DLOQ-A Short*	7	97	3.99	-0.27	0.25	-0.43	0.46
Organizational Identity*	10	97	3.73	-0.77	0.25	0.32	0.46
Organizational Innovation (no. of implemented ideas)*	1	97	631	4.03	0.25	17.40	0.46
Current Ratio**	1	97	1.94	3.40	0.25	13.62	0.46
Long-term Debt (in mill.)**	1	97	4,295	4.16	0.25	23.10	0.46
Organizational Longevity (years)**	1	97	68.81	0.79	0.25	-0.39	0.46

The survey responses showed high levels of skewness and kurtosis. Only the short version of the DOLQ-A returned approximately normally distributed data. The analysis of organizational age and financial information for the organizations that responded to the survey demonstrated that the data were not normally distributed. The descriptive statistics reported in Table 2 indicate that the study's results cannot be analyzed using parametric methods. The approach outlined in chapter 3 proposed using several linear regressions to analyze the relationships between the organizations' age and the five independent variables. However, this was not possible given the skewness and the kurtosis of the variables reported in Table 2. The results presented in Table 2 indicate that the normality assumptions, which are central to linear regression analysis, were violated. Therefore, a nonparametric correlation and curve-fitting

methods of data analysis are reported in this chapter. These methods were used as an alternative way to evaluate the relationships between the independent and the dependent variables.

Linear Regression, Nonparametric Analysis, and Correlation Assumptions

There are four main assumptions for standard linear regression. They are as follows: (a) The variables are normally distributed, (b) there is a linear relationship between the independent and dependent variables, (c) the variables are measured without errors, and (d) the data set is homoscedastic (Osborne & Waters, 2002). The response data set from this study met only one of these assumptions (that the variables are measured without error, as evidenced by the discussion of data reliability analysis below), thus requiring the use of nonparametric tests for data analysis. In other words, the data set did not have a normal distribution, did not show a linear relationship between the independent and dependent variables, and was not homoscedastic. Table 2 clearly demonstrates that the data were not normal. In chapter 3, a detailed explanation of skewness and kurtosis was provided. Chapter 3 explained that the closer skewness is to zero, the closer the distribution of a random variable X is to a normal distribution. Further, the closer Kurtosis is to the value 0, the closer X distribution is to a normal distribution (D'agostino et al., 1990). Table 2 shows that there were no instances wherein both skewness and kurtosis met both criteria.

The use of nonparametric tests also requires the consideration of several important assumptions. Assumptions for nonlinear regression are that (a) the model is correctly specified, (b) the dependent variable is normally distributed, (c) the dependent variable is homoscedastic, (d) the values of the independent variable are known or measured without error, and (e) the observations are independent (Staudhammer, 2008). In this case, assumptions a-c were not met, and as a result, a variety of statistical tests were considered in hopes of making sense of the data. All of the nonparametric tests and analyses were performed under the judgment of the

best-fitting alternative test to standard parametric procedures. Since the data for the dependent variables were not normally distributed, nonlinear regression models could not be used for the purpose of analyzing the relationships between the study's variables.

Correlations

Nonparametric correlations are reported in Table 3 with levels of significance set at $p < .01$ and $p < 0.5$. One-tailed correlations were used to test the directional relationships that were hypothesized in chapter 3. Spearman's rank-order correlation coefficient is suitable for nonparametric correlation data analysis in which the variables are measured on an ordinal scale (Leech, 2005).

Table 3

Spearman's Rho

	1	2	3	4	5
1. Organization's Age					
Sig. (1-tailed)	-				
2. Avg. Organizational Learning	.15				
Sig. (1-tailed)	.22				
3. Avg. Organizational Identity	.02	.65**			
Sig. (1-tailed)	.47	.00			
4. Avg. Organizational Innovation	-.00	.32	.24		
Sig. (1-tailed)	.50	.04	.10		
5. Avg. Current Ratio	.28	.26	.33*	-.11	
Sig. (1-tailed)	.07	.09	.04	.28	
6. Avg. Long-Term Debt	-.01	.49**	.30	.22	.02
Sig. (1-tailed)	.49	.00	.05	.13	.46

**Correlation is significant at the .01 level (1-tailed).

*Correlation is significant at the .05 level (1-tailed).

Organizational learning and organizational identity were significantly correlated (.65 at $<.01$ alpha). Long-term debt and organizational learning were correlated at .49, and current ratio was correlated with organizational learning (.33 at .04). There were no significant correlations between organizational longevity and any of the other variables.

Reliability

A reliability analysis was conducted on the organizational learning and organizational identify instruments by computing Cronbach's alpha for each of the instruments. Cronbach's alpha is a measure of the variance that is attributed to a common source (DeVellis, 2003). Stated differently, it is a measure of the extent to which respondents answer the questions consistently due to some latent variable. Alpha can range from 0 to 1, with a reliability threshold commonly established at .70 (Streiner, 1993). The results of the reliability determination are shown in Table 4 below.

Table 4

Reliably Coefficients

Measure	No. of Items	α (Cronbach's Alpha)	Omitted Variable Alpha
Organizational Learning (DLOQ-A short)	7	0.84	0.79 – 0.84
Organizational Identity	10	0.93	0.92 – 0.92

In all cases the reliably coefficients ranged from .84 to.93. The alpha value for omitted variables was examined by removing one variable at a time and see if overall homogeneity decreased below .70. Table 4 showed that there were no cases in which alpha value decreased below .79, indicating that the response data were reliable.

Validity

Validity is concerned with the degree to which an instrument measures what it claims to measure (Cronbach & Meehl, 1955; Shultz & Whitney, 2005). In this study, the seven-item DLOQ-A and organizational identity validly were analyzed. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was evaluated prior to the factor analysis. A KMO above .50 indicates that the correlations between factors are accounted for by factors' communalities

(Frohlich & Westbrook, 2001, p. 189; Leong & Austin, 2006, p. 250). Table 5 summarizes the study's results and shows that sampling was adequate.

Table 5

Kaiser-Meyer-Olkin Measure of Sampling Adequacy

	Number of Items	Number of Factors	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
DLOQ-A	7	1	.87
Organizational Identity	10	2	.90

The seven-item DLOQ-A constituted a single factor, measuring overall organization learning culture. The total variance explained by this factor was 51.35%. The Organizational Identity portion of the survey was composed of two factors: (a) organizational identity and (b) organizational identity incongruence, resulting in a total of 10 items. Table 6 shows the results of a factor analysis, which revealed that 71.10% of the response variance can be explained by these two factors.

Table 6

Principal Component Analysis

	Component	
	1	2
1. There is a common sense of purpose in this organization.		.73
2. This organization has a clear and unique vision.		.84
3. There is a strong feeling of unity in this organization.		.73
4. This organization has a specific mission shared by its employees.		.86
5. My organization stands for contradictory things.	.71	
6. The values of my organization are not compatible with each other.	.73	
7. The mission, goals, and values of my organization are all well aligned.		.64
8. My organization sends mixed messages concerning what it cares about.	.84	
9. The goals of my organization are often in conflict.	.85	
10. The major beliefs of my organization are inconsistent.	.80	

Extraction Method: Principal Component Analysis
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in three iterations.

Hypotheses Testing

In chapter 3, a regression analysis was purposed as a way to test the following five hypotheses:

1. There will be a *positive* relationship between organizational longevity and the Dimensions of The Learning Organization Questionnaire (DLOQ-A) scores.

2. There will be a *positive* relationship between organizational longevity and the level of Organizational Identity.
3. There will be a *positive* relationship between organizational longevity and the degree to which organizations have adopted innovation programs.
4. There will be a *positive* relationship between organizational longevity and current ratio.
5. There will be a *negative* relationship between organizational longevity and long-term debt.

The data analysis was performed with and without outliers. The reason for the data analysis without outliers was that the presence of outliers may distort the data and lead to reduced power of statistical analysis and therefore inferences (Rasmussen, 1988; Zimmerman, 1994). The data for each variable were standardized first, then the data points that lay beyond ± 3 Z were considered outliers (Shiffler, 1988).

Hypothesis 1. The positive relationship between organizational longevity and the Dimensions of The Learning Organization Questionnaire (DLOQ-A) scores was evaluated.

Figure 4 below shows the curve fitting output from SPSS, demonstrating that no regression model has adequately fit the data. The lowest *F*-significance value was .70 for the compound model, which is still much higher than the required .05 significance value before a model can be deemed a good fit. If the significance value fails to meet the .05 threshold, no further analysis is required as the model simply does not fit the data. The seven-item DLOQ-A results were standardized and checked for outliers, but no outliers were found. Figure 4 also shows that organizational longevity was not a good predictor of organizational learning.

Therefore, the hypothesis that organizations' age has a positive relationship with organizational learning is rejected.

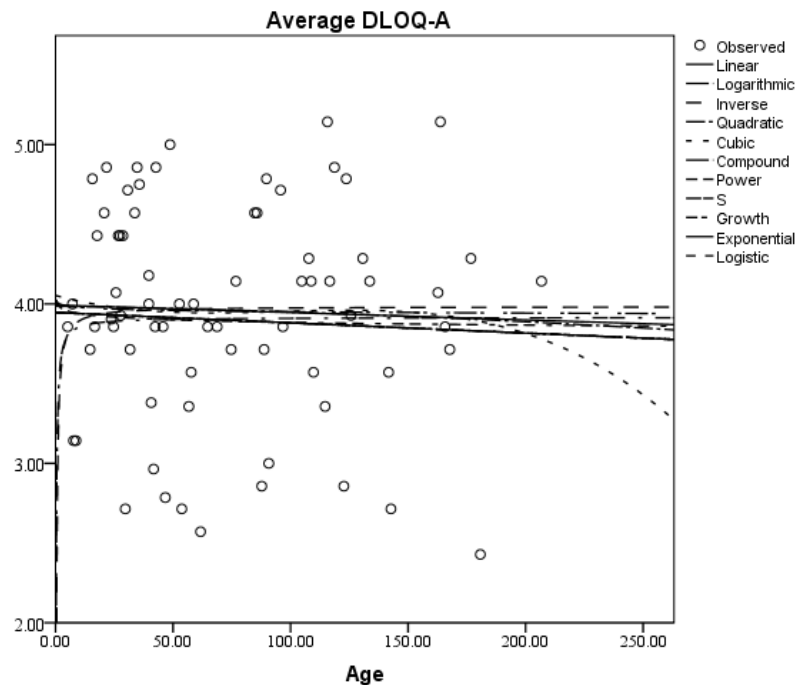


Figure 4: Organizational longevity vs. organizational learning

Hypothesis 2. A positive relationship between organizations' age and organizational identity was tested.

Figure 5 below shows the curve-fitting output form SPSS, demonstrating that no regression model has adequately fit the data. The lowest F -significance value was 0.29 for the compound model, which is still much higher than the required .05 significance value before a model can be deemed a good fit. If the significance value fails to meet the .05 threshold, no further analysis is required as the model simply does not fit the data. The organizational identity survey results were standardized and checked for outliers, but no outliers were found. Figure 5 also shows that organizational longevity was not a good predictor of organizational identity

strength. Therefore, the hypothesis that organizations' age has a positive relationship with organizational learning is rejected.

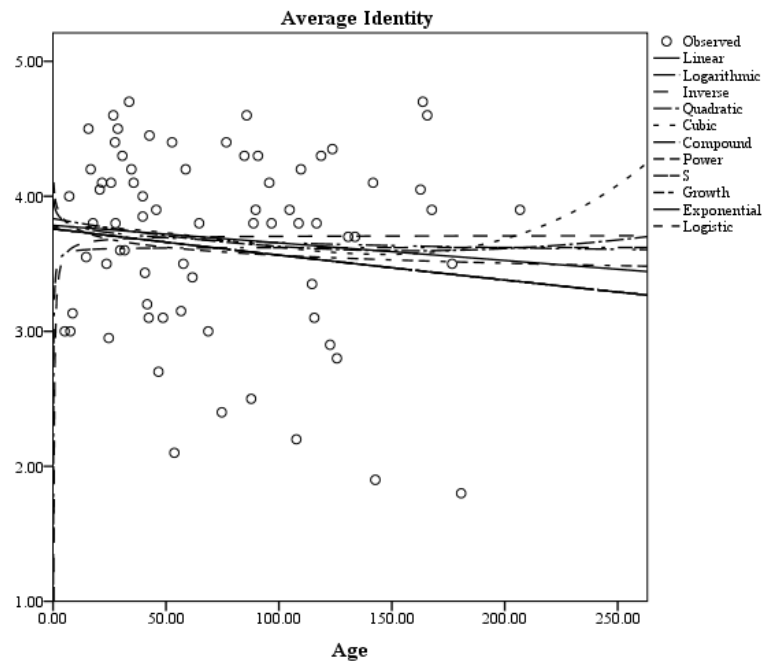


Figure 5: Organizational longevity vs. organizational identity

Hypothesis 3. A positive relationship between organizations' age and innovation was tested. The curve fitting was performed in SPSS once with outliers and once with outliers removed. Figure 6 shows the results from the two procedures with the first, curve fitting with outliers, on the left side of figure 6, and the second, curve fitting without outliers, shown on the right side of figure 6.

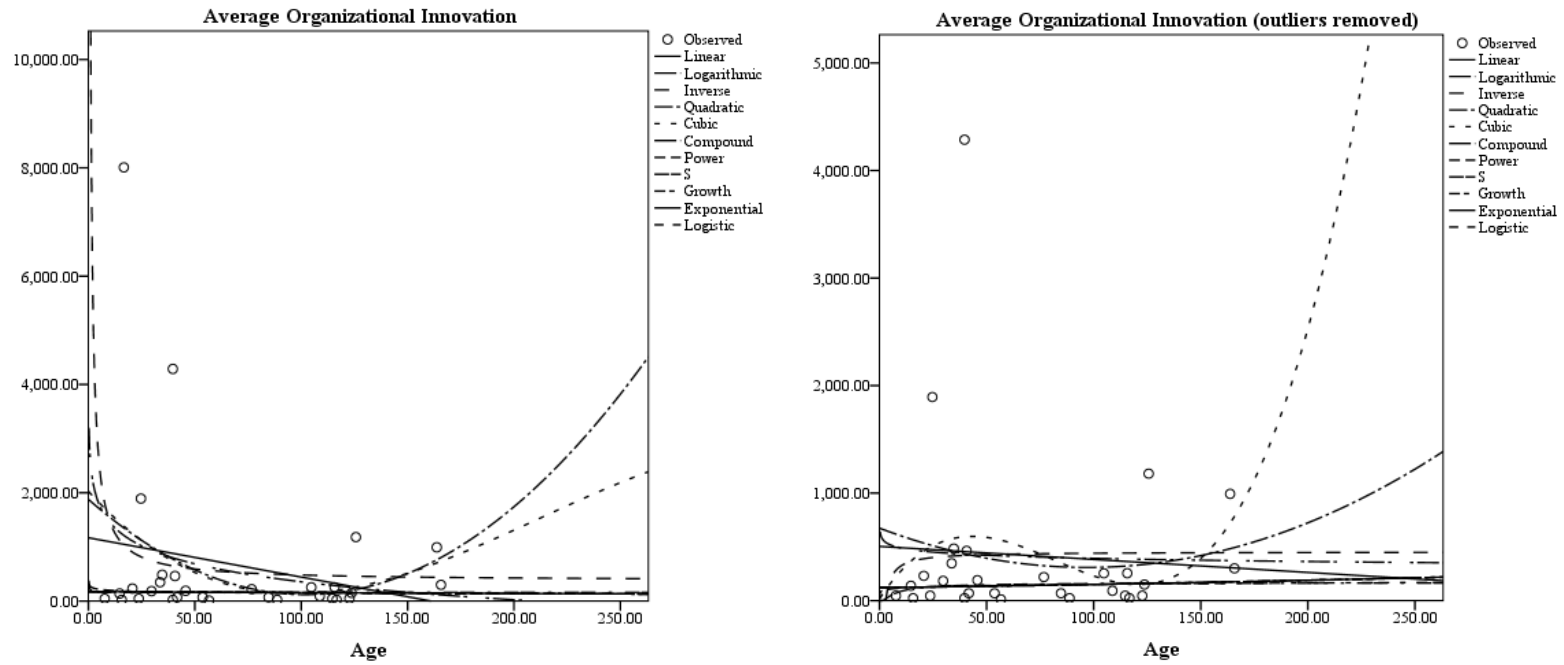


Figure 6: Organizational longevity vs. organizational innovation

Figure 6 also shows the curve-fitting output form SPSS, demonstrating that no regression model has adequately fit the data. The SPSS curve-fitting analysis was performed with outliers and again without outliers. The lowest F -significance value for the data with outliers was .20, and for the data with outliers removed, the lowest F -significance was .53. Both significance values indicated that, with or without outliers, the data did not pass the .05 threshold required to fit models available models in SPSS. In addition, Figure 6 shows that organizational longevity is not a good predictor of organizational innovation. Therefore, the hypothesis that organizations' age has a positive relationship with organizational learning is rejected.

Hypothesis 4. A positive relationship between organizations' age and current ratio was tested. The curve fitting was performed in SPSS once with outliers and once with outliers removed. Figure 7 shows the results from the two procedures with the first, curve fitting with outliers, on the left side of figure 7, and the second, curve fitting without outliers, shown on the right side of figure 7.

Figure 7 also shows the curve-fitting output form SPSS, demonstrating that no regression model has adequately fit the data. The SPSS curve-fitting analysis was performed with outliers and again without outliers. The lowest F -significance value for the data with outliers was .38, and for the data with outliers removed, the lowest F -significance was .04. The F statistics significance for the model without outliers did fit the inverse curve; however, the adjusted R^2 was .05, which indicates that while the fit to the model is significant, the amount of the variation in the dependent variable that is explained by the variation of the independent variable was not enough to support further analysis. In addition, Figure 7 shows that organizational longevity was not a good predictor of organizational innovation. Therefore, the hypothesis that organizations' age has a positive relationship with current ratio is rejected.

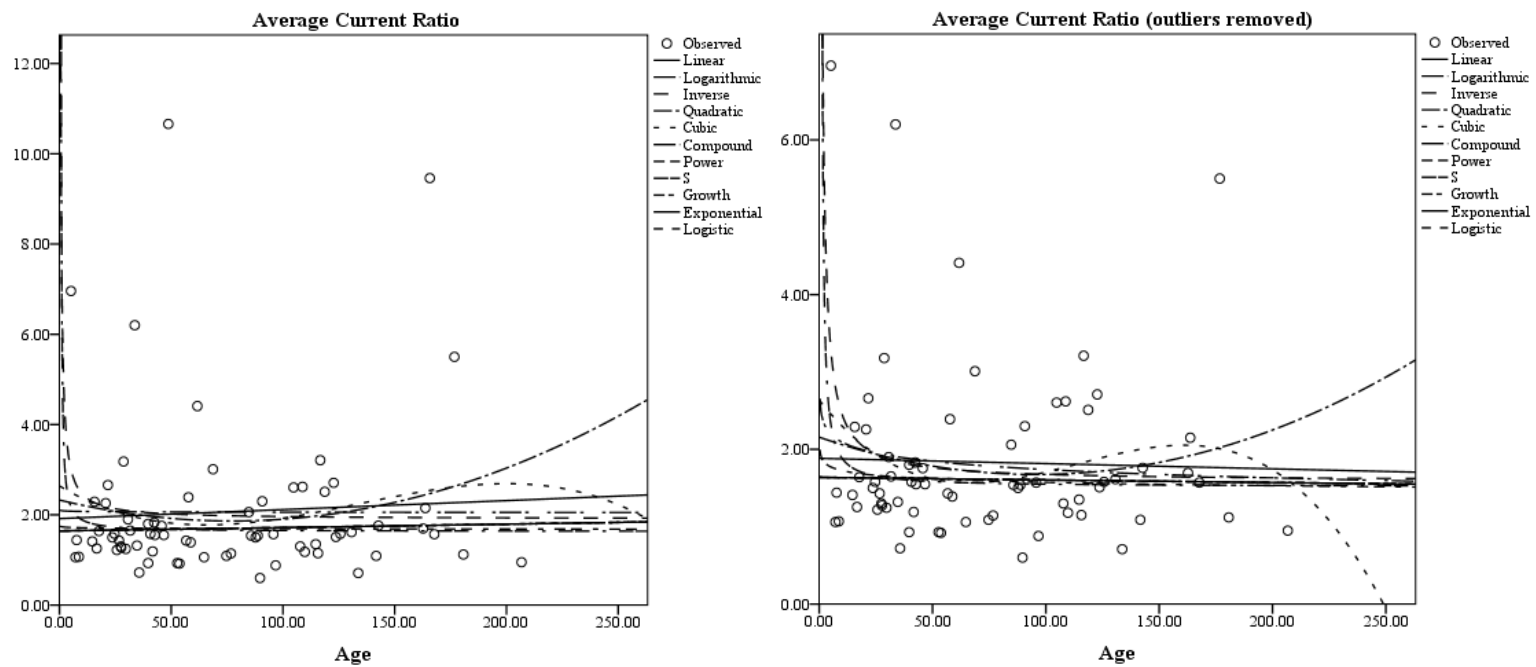


Figure 7: Organizational longevity vs. average current ratio

Hypothesis 5. A negative relationship between organizations' age and long-term debt was tested. The curve fitting was performed in SPSS once with outliers and once with outliers removed. Figure 8 shows the results from the two procedures with the first, curve fitting with outliers, on the left side of figure 8, and the second, curve fitting without outliers, shown on the right side of figure 8.

Figure 8 also shows the curve fitting output form SPSS, demonstrating that no regression model has adequately fit the data. The SPSS curve-fitting analysis was performed with outliers and again without outliers. The lowest *F*-significance value for the data with outliers was .62, and for the data with outliers removed, the lowest *F*-significance was .36. Both significance values indicate that, with or without outliers, the data did not pass the .05 threshold required to fit available models in SPSS. In addition, Figure 8 shows that organizational longevity is not a good predictor of long-term debt. Therefore, the hypothesis that organizations' age has a negative relationship with long-term debt is rejected.

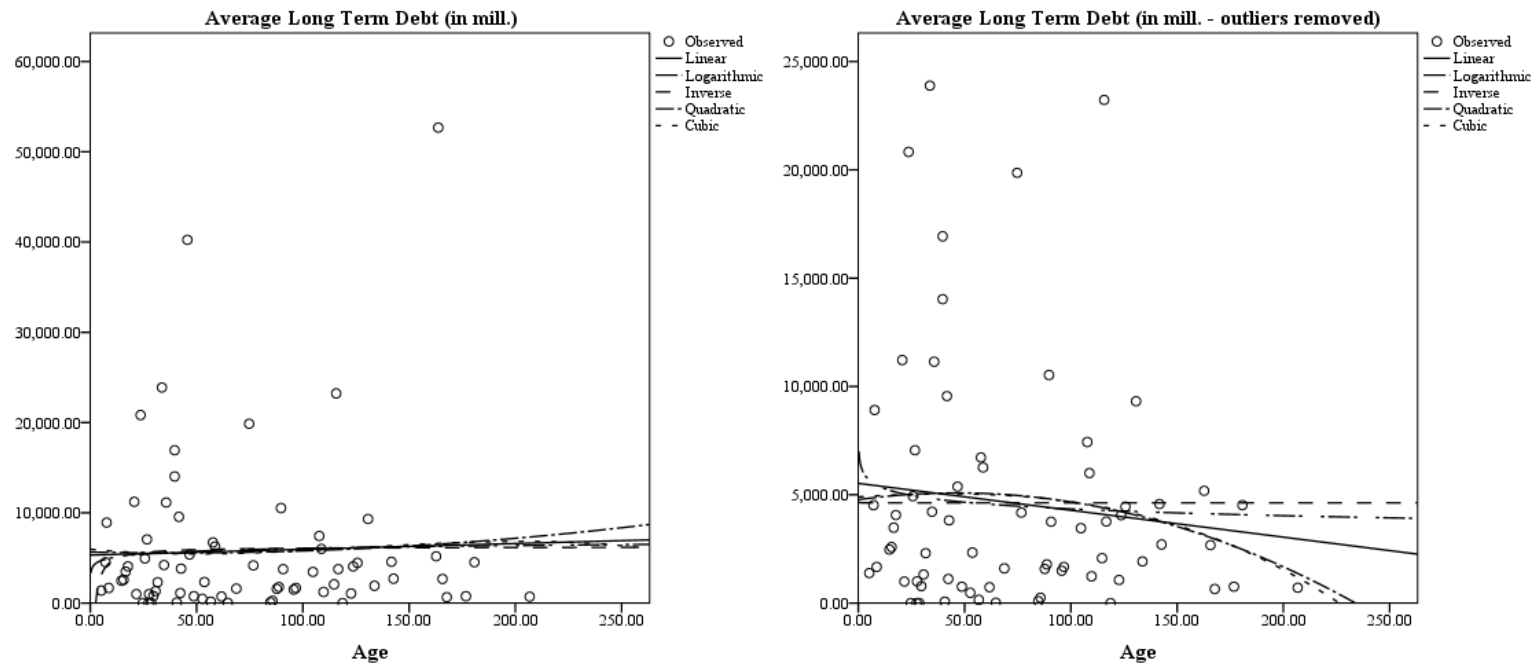


Figure 8: Organizational longevity vs. long-term debt

Table 7 summarizes the study's curve estimation results.

Table 7

Model Fitting for Nonlinear Regression

Curve Fitting												
Variable	Model Summary	Linear	Logarithmic	Inverse	Quadratic	Cubic	Compound	Power	S	Growth	Exponential	Logistic
Age vs. DOLQ	R Square	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Adjusted R Square	(0.01)	(0.01)	(0.01)	(0.03)	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	F	0.09	0.02	0.14	0.04	0.05	0.16	0.06	0.06	0.16	0.16	0.16
	Sig.	0.77	0.90	0.71	0.96	0.98	0.69	0.81	0.81	0.69	0.69	0.69
Age vs. Identity	R Square	0.01	0.00	0.00	0.01	0.01	0.02	0.01	0.00	0.02	0.02	0.02
	Adjusted R Square	(0.00)	(0.01)	(0.01)	(0.02)	(0.03)	0.00	(0.01)	(0.01)	0.00	0.00	0.00
	F	0.65	0.31	0.10	0.37	0.26	1.15	0.65	0.01	1.15	1.15	1.15
	Sig.	0.42	0.58	0.75	0.70	0.85	0.29	0.42	0.93	0.29	0.29	0.29
Age vs Innovation	R Square	0.04	0.06	0.03	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	Adjusted R Square	0.01	0.03	(0.00)	0.02	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)
	F	1.31	1.75	0.93	1.22	0.79	0.03	0.12	0.00	0.03	0.03	0.03
	Sig.	0.26	0.20	0.34	0.31	0.51	0.87	0.73	0.98	0.87	0.87	0.87
Age vs Current Ratio	R Square	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00
	Adjusted R Square	(0.01)	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	F	0.23	0.00	0.79	0.56	0.45	0.11	0.01	0.56	0.11	0.11	0.11
	Sig.	0.63	0.98	0.38	0.57	0.72	0.74	0.94	0.46	0.74	0.74	0.74
Age vs LT Debt	R Square	0.00	0.00	0.00	0.00	0.00	*	*	*	*	*	*
	Adjusted R Square	(0.01)	(0.01)	(0.01)	(0.03)	(0.04)	*	*	*	*	*	*
	F	0.09	0.13	0.25	0.06	0.04	*	*	*	*	*	*
	Sig.	0.76	0.72	0.62	0.94	0.99	*	*	*	*	*	*
Curve Fitting with Outliers removed												
Variable	Model Summary	Linear	Logarithmic	Inverse	Quadratic	Cubic	Compound	Power	S	Growth	Exponential	Logistic
Age vs Innovation	R Square	0.00	0.00	0.00	0.01	0.05	0.01	0.00	0.01	0.01	0.01	0.01
	Adjusted R Square	(0.03)	(0.04)	(0.04)	(0.06)	(0.06)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
	F	0.12	0.04	0.04	0.16	0.47	0.15	0.11	0.40	0.15	0.15	0.15
	Sig.	0.73	0.84	0.84	0.86	0.70	0.71	0.74	0.53	0.71	0.71	0.71
Age vs Current Ratio	R Square	0.00	0.01	0.06	0.01	0.03	0.00	0.01	0.02	0.00	0.00	0.00
	Adjusted R Square	(0.01)	(0.00)	0.05	(0.01)	(0.01)	(0.01)	(0.01)	0.01	(0.01)	(0.01)	(0.01)
	F	0.06	0.90	4.58	0.51	0.79	0.03	0.36	1.65	0.03	0.03	0.03
	Sig.	0.81	0.35	0.04*	0.61	0.50	0.86	0.55	0.20	0.86	0.86	0.86
Age vs LT Debt	R Square	0.01	0.00	0.00	0.02	0.02	*	*	*	*	*	*
	Adjusted R Square	(0.00)	(0.01)	(0.01)	(0.01)	(0.03)	*	*	*	*	*	*
	F	0.87	0.33	0.00	0.58	0.39	*	*	*	*	*	*
	Sig.	0.36	0.57	1.00	0.56	0.76	*	*	*	*	*	*

The coefficient of determination (noted as R^2) is used to determine how much of the variation in the dependent variables can be explained by the variation of the independent variable. The R^2 measures how well the regression model represents that data whereby the closer the R^2 value is

to 1, the better the regression model is able to predict the data. The Adjusted R^2 compensates for the increase in the R^2 value when additional variables are added to the model. An adjusted R^2 could become significant even in cases where the additional variables have not provided any additional explanatory power to the model. Therefore, the adjusted R^2 is lower than the R^2 reported.

The ANOVA table was used to test how well the data fit the various models. Using the significance value form of the ANOVA table, the SPSS curve estimation was used to determine whether the regression model was statistically different than the residuals. Significance values lower than .05 indicate that the variation that the model explains is significant. If the significance value is below .05, then the adjusted R^2 may signify how much of the variance in the dependent variable is explained by the variance in the independent variable.

Table 7 shows the results of the curve estimation in SPSS. The results indicate that only age and current ratio with outliers removed has a significance value lower than .05. However, when looking at the adjusted R^2 , it is clear that the independent variable explains only .05 of variation in the dependent variable, which is very low.

Nonresponse Bias

The responses representing 97 organizations (out of the 703 that were targeted) did not meet the 278 required to be representative of the Fortune 1,000 population. Thus, the response rate was not enough to make the results generalizable. However, the study sought to determine if the organizations that did not respond differed in a substantial way from those organizations that did. Nonresponse is a common problem in organizational research in applied settings (Rogelberg, 2007; Tomaskovic-Devey, Leiter, & Thompson, 1994). Dooley and Linder (2003) reviewed the available literature on handling nonresponses and concluded that not addressing

nonresponse bias is a threat to external validity of the study (pp. 107-108). While this study recognized that the low response rate of 13.80% has prevented the results from being generalizable, an effort was made to assess nonresponse bias. Analyzing the nonresponse bias results can provide an insight into how the study results should be interpreted, and it can potentially suggest ways to consider them for the rest of the population that did not respond.

Dooley and Linder (2003) proposed several methods for handling nonresponse bias. The relevant method to handle nonresponse error in this study was the comparison of respondents to nonrespondents on characteristics that were known a priori. In this study, organizational age, organizations' current ratio, and organizations' long-term debt were known prior to the administration of the survey. If the nonrespondent results were the same as the respondent results on the basis of these characteristics, it would lend credibility and robustness to the study. However, if the similarities were not significant, nothing is gained beyond the results as they are reported.

The study required 278 responses to be generalizable; however, only 97 responses were received. Therefore, 181 responses were needed to make up the 278 required for generalizability. The study used 181 randomly selected organizations from the remaining 607 nonrespondents. The results were compared to the 97 respondents. Given that both the respondent and the nonrespondent populations had similar distributions, nonparametric comparative measures were used to complete the analysis.

Analysis of Nonrespondents

The two-sample rank test, also known as the Mann-Whitney Test, was the chosen method for comparing the two nonparametric distributions of respondents and nonrespondents. The Mann-Whitney is a distribution free (Milton, 1964) test that compares the equality of two

population medians and calculates the corresponding point estimate and confidence intervals. Central to the Mann-Whitney Test is the assumptions that data are independent and that the data are collected from similar distributions. Additionally, the test assumes that the data scales are at least ordinal (Fay & Proschan, 2010).

Nonresponse bias analysis for organization age. The analysis below begins with descriptive statistics of medians and ranges, followed by graphical representations of the data and concludes with the Mann-Whitney Test and confidence interval for medians. Table 8 compares the respondent organizations' age parameters to the age of the sample of 181 organizations that did not respond to the survey. The populations are very similar to each other, which does not violate Mann-Whitney Test's assumptions. Figure 9 below compares the two findings visually and confirms that the two samples are very similar.

Table 8

Descriptive Statistics: Comparison of Age Between Response Sample Organizations and Nonresponse Sample Organizations

Variable	N	Min	Max	Median	1 st Quartile	3 rd Quartile	Range	Inner- Quartile Range
Sample organi- zation's age	97	5.17	206.74	48.70	27.68	108.74	201.57	81.05
Nonresponse sample organi- zation's age	181	6.67	221.68	58.71	29.69	108.74	215.01	79.05

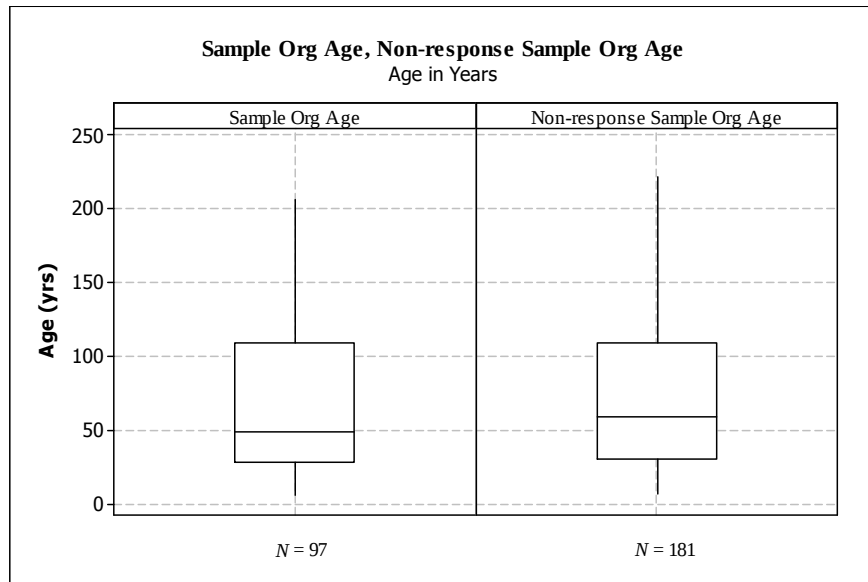


Figure 9. Comparison of age between response sample organizations and nonresponse sample organizations

Table 9 below shows the results of the Mann-Whitney Test.

Table 9

Mann-Whitney Test and CI: Comparison of Age Between Response Sample Organizations and Nonresponse Sample Organizations

	<i>N</i>	Median
Sample organizations' age	97	48.70
Nonresponse sample organizations' age	181	58.71

Point estimate for ETA1-ETA2 is -2.00. 95.0% CI for ETA1-ETA2 is (-12.01, 7.00). W = 13202.00.
 Test of ETA1 = ETA2 vs. ETA1 not = ETA2 is significant at .61.
 The test is significant at .60 (adjusted for ties) **p* = .05

The Mann-Whitney Test calculated the point estimate for the difference between the two samples at -2.00 years. The 95% confidence interval shows a range of -12.01 to 7.00 years. Since this confidence interval range contains a zero, the study fails to reject the null hypothesis that there is no difference between the samples. This test provides evidence that the nonrespondents' population is similar to the respondents. This means that nonresponse error related to organization age was not detected.

Nonresponse bias analysis for current ratio. The analysis below begins with descriptive statistics of medians and ranges, followed by graphical representations of the data, and concludes with the Mann-Whitney Test and confidence interval for medians.

Table 10

Descriptive Statistics: Comparison of Current Ratio Between Response Sample Organizations and Nonresponse Sample Organizations

Variable	N	Min	Max	Median	1 st Quartile	3 rd Quartile	Range	Inner- Quartile Range
Sample current ratio	97	0.14	10.66	1.51	1.12	2.01	10.66	0.89
Nonresponse sample current ratio	181	0.00	24.06	1.64	1.76	2.12	24.06	0.94

Table 10 compares the respondent organizations' current ratio parameters to the current ratio parameters of the 181 randomly selected nonresponse samples. The populations are very similar to each other, which does not violate Mann-Whitney Test's assumptions. Figure 10 below confirms the similarity of the two groups.

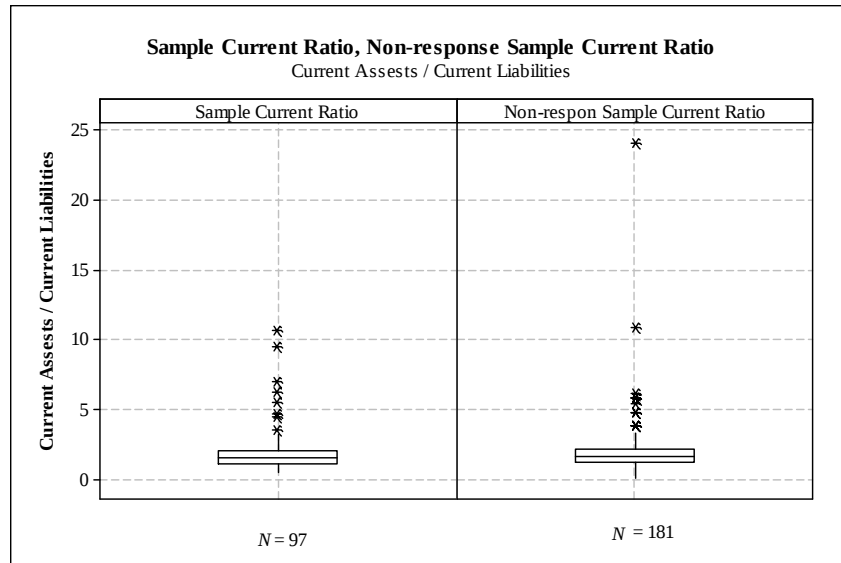


Figure 10: Comparison of current ratio between response sample organizations and nonresponse sample organizations

Table 11

Mann-Whitney Test and CI: Comparison of Current Ratio Between Response Sample Organizations and Nonresponse Sample Organizations

	N	Median
Sample current ratio	97	1.51
Nonresponse sample current ratio	181	1.64

Point estimate for ETA1-ETA2 is .07. 95.0% CI for ETA1-ETA2 is (-.24, .11). W = 13089.00. Test of ETA1 = ETA2 vs. ETA1 not = ETA2 is significant at .49.
The test is significant at .49 (adjusted for ties) * $p = .05$

Table 11 shows the results from the Mann-Whitney Test. The Mann-Whitney Test calculated the point estimate for the difference between the two groups at -.07. The 95% confidence interval shows a range of -.24 to .11. Since this confidence interval range contains a zero, the study fails to reject the null hypothesis that there is no difference between the samples.

This test provides evidence that the nonrespondents' population is similar to the respondents. This means that nonresponse error related to organizations' current ratio was not detected.

Nonresponse bias analysis for long-term debt. The analysis below begins with descriptive statistics of medians and ranges, followed by graphical representations of the data, and concludes with the Mann-Whitney Test and confidence interval for medians. Table 12 compares the respondent organizations' long-term debt parameters to the age of the 181 randomly selected nonresponse samples. The results show that the groups are very similar to each other, which does not violate Mann-Whitney Test's assumptions. Figure 11 below visually confirms the finding that the two samples are similar.

Table 12

Descriptive Statistics: Comparison of Long-term Debt Between Response Sample Organizations and Nonresponse Sample Organizations (Values in Millions)

Variable	N	Min	Max	Median	1 st Quartile	3 rd Quartile	Range	Inner- Quartile Range
Sample org. long-term debt	97	0	52,675	2,064	845	4,547	52,675	3,701
Nonresponse sample org. long-term debt	181	0	1,946,000	2,350	600	8,343	1,946,00	7,744

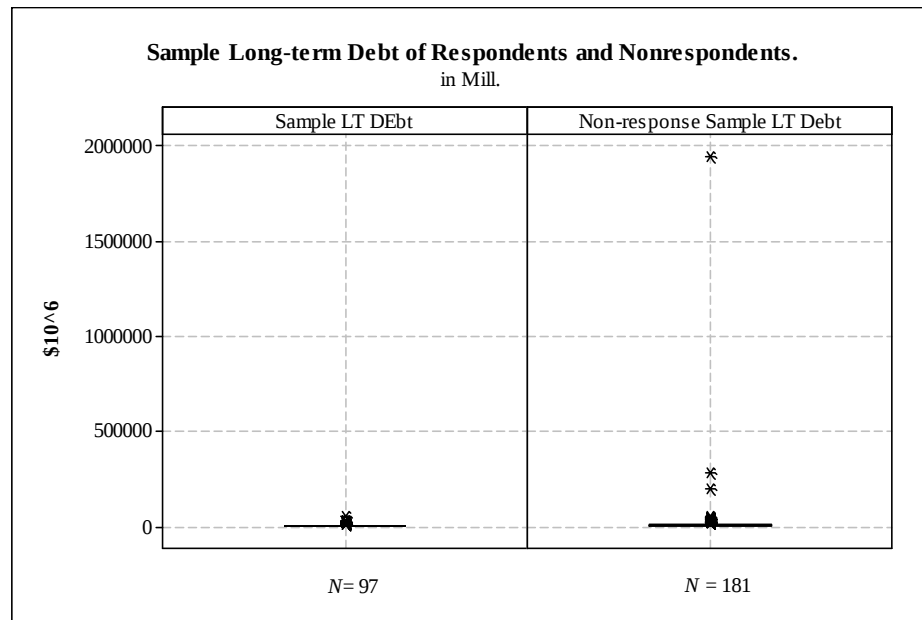


Figure 11. Comparison of long-term debt between response sample organizations and nonresponse sample organizations

Table 13

Mann-Whitney Test and CI: Comparisons of Long-term Debt Between Response Sample Organizations and Nonresponse Sample Organizations

	N	Median
Sample long-term debt	97	2,063
Nonresponse Sample long-term debt	181	2,350

Point estimate for ETA1-ETA2 is -238.60 95.0% CI for ETA1-ETA2 is (-953.10, 292.20). W = 12971.00 Test of ETA1 = ETA2 vs. ETA1 not = ETA2 is significant at 0.38.
The test is significant at 0.38 (adjusted for ties) *p = .05

The Mann-Whitney Test calculated the point estimate for the difference between the two samples at -238.60. The 95% confidence interval shows a range of -953.10 to 292.20. Since this confidence interval range contains a zero, the study fails to reject the null hypothesis that there

is no difference between the samples. This test provides evidence that the nonrespondent group is similar to the respondent group. This means that the nonresponse bias related to organizations' long-term debt was not detected.

The nonresponse analysis provides additional validity to the study's results. The analysis of the nonresponse bias indicates that there is not difference in the a priori characteristics between the respondent and the nonrespondent populations. It can be argued that had the study achieved the 278 responses that were required for generalizability, the results would have been very similar to the results that were obtained by the 97 responses that were received. An argument could be made that the remaining variables that could not be tested for nonresponse bias—including (a) organizational learning, (b) organizational identity, and (c) organizational innovation—may have yielded similar results to those obtained by the 97 responses that were received.

Conclusion

In this chapter, the results of the study were described. The study found that organizational age is not a good predictor of organizational learning, organizational identity, organizational innovations, and organizational fiscal conservatism. An analysis of nonresponders for characteristics that were known a priori revealed that there were no discernable differences between the sample of 97 respondents and an additional 181 randomly selected nonrespondents. This provided further indication that had the adequate response rate been obtained, the results would have been similar to the results obtained with the 97 responses that were received.

CHAPTER FIVE: DISCUSSION OF FINDINGS

The purpose of this study was to investigate the claims in the literature that some organizations have developed survival mechanisms that have allowed them to flourish in a rapidly changing business environment wherein other organizations that have not developed such mechanisms have perished. These survival mechanisms were described as organizational learning, organizational identity, innovation, and fiscal conservatism. The literature claimed that long-lived organizations exhibit higher levels of these variables.

The literature described organizations as living entities that have a unique identity, can learn from their environment. In addition, they may be innovative and conservative with their resources (de Geus, 2002). The argument therefore is that longer-lived organizations have somehow mastered the art of managing the four variables mentioned above, which has allowed them to adapt more quickly to a changing business environment. Thinking about organizations as living entities has an appealing and immediately relatable quality. However, gathering the data and analyzing the information through the five hypotheses that were tested in this study demonstrated that organizational longevity is a complex, and at times, nebulous phenomenon that would not divulge its secrets easily.

The importance of this study was evident by the enormous amount of resources that organizations allocate towards training and development, and by the amount of research and the numbers of journals that have been dedicated to workforce education. The literature claimed that a better-educated workforce will return the investment in its education many times over (Birdi et al., 2008; Ellinger et al., 2002; Ellinger, Ellinger, Yang, & Howton, 2003; Richard A. Swanson & Holton, 2009). Similar claims were made in the organizational identity literature

(Cornelissen, Haslam, & Balmer, 2007; Elsbach & Kramer, 1996), and in the innovation literature (Caballero & Jaffe, 1993; Cefis & Marsili, 2005; Rogers, 1995).

Fiscal conservatism was said to allow organizations to weather the storms brought on by an ever-changing business environment; therefore, researchers have claimed that firms that have less debt are more resilient (Abdel-Khalik, 1993; Balcaen & Ooghe, 2006; Chen & Lee, 1993; Musso & Schiavo, 2008).

Conclusions

This chapter presents the learning from responses to the research survey and the analysis of independent financial information that was collected from the Value Line database. The data were collected through a survey instrument that was developed from an extensive literature review and established surveys. This chapter is organized as follows: The first section is a discussion of the results that answer the research question. The second section discusses the results from the testing of five hypotheses developed for this study. The third section is a summary of the study findings, and the fourth section discusses the implications to theory, research, and practice on the topic of organizational longevity.

Discussion: Research Question

The research question at the core of this study was: *Can organizational longevity explain variance in levels of organizational learning, identity, innovation, and financial conservatism?* The analysis of survey responses and financial data did not find a connection between organizational longevity and organizational learning, organizational identity, organizational innovation, and fiscal conservatism. Nonresponse analysis provided further support that organizational longevity is not a good predictor of fiscal conservatism. The 97 organizations that responded to the survey did not differ with respect to age, level of current ratio, or long-term debt amounts from the nonresponse sample. This similarity between the

samples indicates that organizational longevity is not a good predictor of organizational fiscal conservatism. It is possible that the remaining three dependent variables, organizational learning, organizational identity, and organizational innovation, may have not yielded different results than the ones obtained from the 97 organizations that responded to the study. Therefore, the answer to the research question is that organizational longevity is not a good predictor of organizational learning, organizational identity, organizational innovation, or organizational fiscal conservatism.

Five Research Hypotheses

There were five directional research hypotheses for this study:

1. There will be a *positive* relationship between organizational longevity and the Dimensions of The Learning Organization Questionnaire (DLOQ-A) scores.
2. There will be a *positive* relationship between organizational longevity and the level of members' identification with their organization.
3. There will be a *positive* relationship between organizational longevity and the degree to which organizations have adopted innovation programs.
4. There will be a *positive* relationship between organizational longevity and current ratio.
5. There will be a *negative* relationship between organizational longevity and long-term debt.

The following sections will describe the results from each hypothesis tested, provide the implications of the results, and postulate what other factors may provide better predictive power for the hypotheses.

Research hypothesis one. *There will be a positive relationship between organizational longevity and the Dimensions of The Learning Organization Questionnaire (DLOQ-A) scores* was not supported by the findings. The data set for the seven-question DLOQ-A results showed an acceptable reliability score with alpha $>.7$. The data violated the necessary assumption for linear regression. The data were tested for nonlinear regression across 12 different types of models, and there were no models that adequately fit the data. This demonstrated that organizational longevity is not a good predictor of organizational learning. The implication of this finding is that organizational learning may be better predicted by other factors. One such factor could be the degree to which an organization employs scenario planning, which has been shown to increase organizational learning (Chermack, 2003b). Another factor that could be a better predictor of organizational learning is the amount of resources allocated to training and development (Green & DeSandro, 2011).

The two factors mentioned here are by no means the only other factors that could better predict organizational learning. Crossan et al. (1999) provided an extensive review of the various organizational learning frameworks that could have been used to better predict organizational learning. However, the focus of this hypothesis was to determine whether organizational longevity could predict the levels of organizational learning, a hypothesis that was rejected.

Research hypothesis two. *There will be a positive relationship between organizational longevity and the level of members' identification with their organization* was not supported by the findings. The organizational identity data results showed high score reliability with alpha scores $>.7$. The data violated the necessary assumption for linear regression. The data were tested for nonlinear regression across 12 different types of models, and there were no models

that adequately fit the data. This demonstrated that organizational longevity is not a good predictor of organizational identity. The implications of these results are that there may be other factors that can better predict organizational identity. One such factor could be organizational learning, as Table 4 showed a correlation of .65 (significant at the 0.01 level) with organizational identity. While a correlation is not causation, a future study may find a relationship between these two variables. Another factor that could be used to better predict organizational identity is leadership (Sharma & Mahajan, 1980) and how well organizational members identify with their organizations' leadership (Jane E. Dutton, Janet M. Dukerich, & Celia V. Harquail, 1994). The two factors mentioned here are by no means the only factors that could be considered to be better predictors of organizational identity. However, the focus of this hypothesis was to determine whether organizational longevity could predict the levels of organizational identity, a hypothesis that was rejected.

Research hypothesis three. *There will be a positive relationship between organizational longevity and the degree to which organizations have adopted innovation programs* was not supported by the findings. Innovation was measured by asking respondents to report on the number of ideas that were submitted and implemented in their respective organizations. The data were fitted to 12 models twice: once with outliers and a second time with outliers removed. None of the 12 models tested fit the data well. The conclusion was that there is no discernable relationship between organizational longevity and the degree of innovation that the companies that responded exhibited. While the literature provided many claims to the degree that innovation enhances organizational survival (Isaksen & Ekvall, 2010; Lakhani & Tushman, 2012; Prahalad & Mashelkar, 2010), this study was not able to confirm that this relationship was measurable. There may be other factors that are better predictors of

innovation. One such factor could be the degree to which market research and competitive analysis helps drive the development of innovative products and services (Hamel & Prahalad, 1994). Another factor that could better predict innovation is the degree to which organizations adopt new communication technologies that bring together people from diverse locations into a closer-knit global framework (Rogers, 1995, pp. 419-420). The two factors that were mentioned here are by no means the only factors that could better predict organizational innovation. However, this study's hypothesis that organizational longevity will predict the levels of organizational innovation was not supported.

Research hypothesis four. *There will be a positive relationship between organizational longevity and current ratio* was not supported by the findings. A model fitting procedure was carried out to determine if the data would fit any of the 12 models that were available. This procedure was repeated for the data twice: once with outliers and the second time with outliers removed. An inverse nonlinear regression was found to be fit for the data when outliers were removed. However, the degree to which the model without outliers explained the relationship between organizational longevity and the current ratio was extremely weak. The inverse nonlinear regression model indicated that the variation in organizational longevity explains only .05 of the variation in current ratio. The results demonstrated that organizational longevity is not a good predictor of current ratio.

A nonresponse bias analysis was conducted to help determine if companies that did not respond to the survey exhibited different current ratio characteristics than companies that did respond to the survey. The analysis revealed that organizations that did not respond to the survey had virtually the same current ratio characteristics as the organizations that did respond

to the survey. This finding that organizational longevity is not a good predictor of current ratio may apply to the whole Fortune 1,000 list of companies.

Other factors may predict current ratio better than organizational longevity. One such factor could be the industry type where organizations reside. Organizations in financial sectors, such as banks, will have higher leverage, which may result in lower current ratios than organizations that are in public nonfinancial sectors (Opler & Titman, 1994; Strebulaev & Yang, 2013). Another factor that could better predict current ratio might be government regulations and backing. Organizations that are backed by governments may exhibit different levels of current ratios due to the influence of government incentives (Beltratti & Paladino, 2013). The two factors mentioned here are by no means the only factors that could better predict current ratios. However, this study's hypothesis that organizational longevity can predict current ratio was not supported.

Research hypothesis five. *There will be a negative relationship between organizational longevity and long-term debt* was not supported by the findings. A model fitting procedure was carried out to determine if the data would fit any of the six models that were available. This procedure was repeated for the data twice: once with outliers and the second time with outliers removed. None of the models was found to fit the data. The results indicated that organizational longevity is not a good predictor of long-term debt. A nonresponse bias analysis was conducted to help determine if companies that did not respond to the survey exhibited different long-term debt characteristics than companies that did respond to the survey. The analysis revealed that organizations that did not respond to the survey had virtually the same long-term debt characteristics as the companies that did respond to the survey. This

finding that organizational longevity is not a good predictor of long-term debt may apply to the whole Fortune 1,000 list of companies.

Other factors could be better predictors of long-term debt. One such factor could be the nature of an organization's size, especially when the organization's size creates a monopoly. Organizations that are large enough could be considered "too big to fail" (Groff, 2013; Michalski, 2012; Stein, 2012). Such organizations could incur more long-term debt than they could have otherwise and rely on the government to bail them out. Another factor that could better explain long-term debt is the type of industry where the organizations reside. Similar to the explanation provided in the discussion on current ratio, organizations that belong to nonfinancial sectors and require higher investment in capital equipment in infrastructure could have higher levels of long-term debt than organizations that do not require such investment for their operations (Adrian & Shin, 2010). The two factors mentioned here are by no means the only factors that could better predict long-term debt. However, this study's hypothesis that organizational longevity can predict long-term debt was not supported.

Summary of the Findings

The five hypotheses presented in this chapter were all rejected by the study's results. Hypotheses three, four, and five were tested with and without outliers in order to ensure that the data were not affected by the presence of outliers that could reduce the reliability of the statistical analysis (Zimmerman, 1994). Hypotheses four and five had characteristics that were known a priori. These characteristics were used to determine if nonresponse error existed, and the researcher concluded that nonresponse error was not detected. The analysis of nonresponse error strengthened the results of this study. Finally, 10 alternative factors were provided that could predict the levels of the dependent variables better than organizational longevity.

Implications and Recommendations for Future Research

The following will describe the implications for future research, implications for theory, implications for practice, and provide some speculations on why there were no significant findings in this study. The implications for future research will propose three future studies that could be done to expand on the current study. The implication to theory section will address the issues in evaluating de Geus's theoretical foundation. The implication to practice will provide guidance to scholars and practitioners who seek to use the framework presented in this study to help organizations live longer. Finally, the speculation on the lack of significant finding will offer some insights into possible reasons for the inability to uncover significant findings.

Implications for future research. The study rejected the five hypotheses that suggested that organizational longevity was a good predictor of organizational learning, organizational identity, organizational innovation, current ratio, and long-term debt. The implication for research is that there could be other ways to study organizational longevity. The 10 alternative factors provided in this chapter that could better explain the five hypotheses could be studied in reverse, whereby these factors would be the independent variables, and organizational longevity would be the dependent variable; for example, a study that would investigate whether organizational adoption levels of scenario planning can predict organizational longevity. Another example would be a study wherein the level of adoption of new communication methods, such as social networking to drive innovation, could predict organizational longevity.

Another approach, a phenomenological approach, could be used. This approach would seek to better understand the lived experiences of people who are part of long-lived organization and seek their perspective on why they think their organizations have succeeded. This approach

would be similar to the concepts presented in de Geus (2002), Wack (2002) and Senge (2006) whose lived experiences and interaction with their peers have informed their perceptions of organizational longevity.

Future research should expand to include organizations outside the Fortune 1,000 publically traded companies. The Fortune 1,000 list was identified as an outlier at the beginning of this dissertation, and it would be beneficial to understand what the rest of the publically traded companies' organizational longevity data may reveal. Finally, future researchers must be aware of the difficulties in getting acceptable response rate when dealing with organizations that were the subject of this study. Future research should seek to develop a method for eliciting higher response rates and establish a larger list of characteristics that can be known a priori, which would help with low response rates.

Implications for theory. A theory of organizational longevity was well articulated by de Geus (2002) who laid the foundation for organizations as living companies. This study operationalized De Geus's concepts using the structure provided by Swanson and Chermack (2013, pp. 73-92). Swanson and Chermack described the operationalize phase in theory development as a set of steps that leads from inputs, through propositions and from results indicators to research questions that provide outputs. Such outputs are empirical and confirmable evidence that no theory could be without because "a theory without these elements does not constitute a theory because there would be no way to judge its accuracy in describing or explaining some instances of human activity" (Swanson & Chermack, 2013 p. 89). This study did not find outcomes that lend increased credibility to de Geus's theory. Therefore, the implication for theory is that de Geus's theory may be inaccurate or there may have been a problem in the way this study attempted to operationalize de Geus's theory. However, since

this study utilized empirical data as well perceptual data that showed high reliability and validity scores, it seems that de Geus's theory might be reconsidered.

Implications for practice. Practitioners and scholars alike may draw the conclusion that following in de Geus's footsteps alone would increase organizational longevity. However, closer attention must be paid to the amount of investment in learning and development. Special attention should also be paid to the measures and metrics that help determine the return on the investment in learning and development in order to establish what the true benefits from such activities are. There may be other tangible benefits from viewing an organization as a living company, such as increased profitability, lower attrition, and better organizational image, just to name a few. However, practitioners must take into account that increased organizational longevity may not be an outcome that is easily measured as a result of such investments as there was no empirical evidence that this study uncovered to that affect.

Speculation on other reasons why there were no significant findings. The results of this study indicate that the type of industry where organizations reside may have contributed to the lack of overall findings. It is possible that a future study may find that, in certain industries, organizational longevity could predict learning, identity, innovation, and fiscal conservatism. For example, in the oil and gas industry where the changing nature of mineral exploration is forcing companies to adapt faster than other industries, learning via scenarios could be a key survival factor. Another example would be in the high-technology industry where organizations such as Apple capture a large marketshare through emphasis on innovation.

Another reason for the lack of findings in this study could be the existence of government bail-out programs. Government interventions exemplified by the automobile industry bail carried out by the U.S. government between 2008 and 2010 (Rattner, 2010) have

helped General Motors , Chrysler, and Ford to survive. Other organizations such as Bear Stearns and Lehman Brothers were allowed to fail (Bebchuk, Cohen, & Spamann, 2010) during the same time frame and are no longer in existence.

There is a considerable amount of risk in business as evidenced by the substantial failure rates noted earlier in this study (Knaup, 2005; Knaup & Piazza, 2007). However, in such a volatile environment, luck may have played a role that is difficult to ignore. For example, as this study was drawing to a conclusion, Twitter (NYSE: TWTR) went through its initial public offering. Twitter was founded in 2006 as a result of “sketch” work by Jack Dorsey’s brainstorming session (Sagolla, 2009). Luck, no doubt, has played a role in the survival of this organization, and while only time will tell if this organization is a long-lived one, the fact is that it has persisted for 7 years, thus beating the odds as described by (Knaup & Piazza, 2007).

Conclusion

This chapter described the learnings from the research question and the five research hypotheses that guided this study. The study findings were discussed, and the key implications to research, theory, and practice were presented. This study did not find a relationship between organizational longevity and organizational learning, organizational identity, innovation, and fiscal conservatism. This study offered several alternatives and future research that could be perused to help uncover factors that may affect organizational longevity.

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APPENDIX A

Demographics

Thank you for participating in this survey. You will be asked to complete 4 short sections in this survey. This survey can be completed in about 8 minutes.

Brief Background

Organizational survival and longevity is important for several reasons. The cost of a company's death can be substantial both in economic and social terms. When a company dies, people lose their jobs, communities are affected, and customers could suffer. This research project is conducted with the full support and approval of Colorado State University, and seeks to develop an understanding of the possible predictors of company's life cycle. Unlike other studies that focused mainly on the financial aspect of organizational performance, this study seeks to join the concepts of: (a) the ability of a company to learn about its business environment, (b) how the company's organizational identity influences the way employees relate to their organizations, and (c) how innovation can help organizations survive, into a framework that would integrate the results of this survey with your organization's publicly available financial information.

Your responses will be strictly confidential and will not be disclosed. All the data will be reported in aggregates only.

You will be asked to identify your organization's name for the single purpose of tying your survey reply to the right organization's financial data. This financial data will be collected only from publicly available sources such as Value Line, Yahoo Finance and similar sources.

Should you have any questions, or a concern about the authenticity of this survey please contact:

Felix Weitzman, PhD Candidate

felixw@rams.colostate.edu

(970) 376-5500

Thomas J. Chermack, PhD

chermack@colostate.edu

(970) 491-1157

Under what name is your organization listed on the stock exchange? Please provide the ticker symbol (e.g. Google is listed as "GOOG" therefore type "GOOG" in the space below. If you don't know your organization's ticker please write the name of your organization)

[this information will remain confidential and will not be report using your company's name in the final results] *

If you would like to receive a copy of the study results please provide your email address and your name in the boxes provided below. This information will not be linked you to your survey response, nor will it be published with the survey's results.

Name (last, first)

Learning Culture

1) In my organization, people are rewarded for learning.

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

2) In my organization, people spend time building trust with each other.

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

3) In my organization, people revise thinking as a result of organization discussions or information collected

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

4) My organization makes its lessons learned available to all employees.

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

5) My organization recognizes people for taking initiative.

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

6) My organization works together with the outside community or other outside resources to meet mutual needs.

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

7) In my organization, leaders continually look for opportunities to learn.

Almost Never			Almost Always		
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

Organizational Identity

1. There is a common sense of purpose in this organization

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
☐	☐	☐	☐	☐

2. This organization has a clear and unique vision

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
☐	☐	☐	☐	☐

3. There is a strong feeling of unity in this organization

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
☐	☐	☐	☐	☐

4. This organization has a specific mission shared by its employees

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
☐	☐	☐	☐	☐

5. My organization stands for contradictory things

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
☐	☐	☐	☐	☐

6. The values of my organization are not compatible with each other

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

☐ ☐ ☐ ☐ ☐

7. The mission, goals, and values of my organization are all well aligned

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

☐ ☐ ☐ ☐ ☐

8. My organization sends mixed messages concerning what it cares about

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

☐ ☐ ☐ ☐ ☐

9. The goals of my organization are often in conflict

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

☐ ☐ ☐ ☐ ☐

10. The major beliefs of my organization are inconsistent

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

☐ ☐ ☐ ☐ ☐

Innovation

1. Does your organization has a *formal* innovation program ?

- ☐ Yes
- ☐ No

2. What is the formal name of your organization's innovation plan?

3. How long has your organization had a formal innovation program ?

less than 1 year

☐

1 to 3 years

☐

3 to 5 years

☐

5 to 7 years

☐

7 to 9 years

☐

more than 9 years

☐

4. Please estimate the number of ideas submitted to your organization's innovation program per year

	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
Estimated number of ideas per year											

5. Please estimate how many of the ideas that were submitted have been subsequently implemented

	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
Estimated number of ideas implemented											

APPENDIX B

ANONYMOUS ONLINE SURVEY

Consent Form

Dear Participant,

My name is *Felix Weitzman* and I am a researcher from Colorado State University. I am conducting a research study on organizational longevity and the factors that may be associated with the longevity of an organization. The title of the project is *Organizational longevity as a predictor of organizational learning, organizational identity, innovation, and fiscal conservatism*. The Principal Investigator is Thomas Chermack from Colorado State University, and the Co-Principal Investigator is Felix Weitzman, also from Colorado State University.

We would like you to take an anonymous on-line survey. Participation will take approximately 8 minutes. Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

We will not collect your name or personal identifiers except for the purpose of sending you a free copy of our results. When we report and share the data to others, we will combine the data from all participants. While there are no direct benefits to you, we hope to gain more knowledge on what factors may help organizations live longer.

There are no known risks in participating in this study. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

If you have any questions about the research, please contact

Felix Weitzman, PhD Candidate
felixw@rams.colostate.edu
(970) 376-5500

Thomas J. Chermack, PhD
Thomas.chermack@colostate.edu
(970) 491-1157

If you have any questions about your rights as a volunteer in this research, contact Jane Barker, Human Research Administrator, at 970-491-1655.

To indicate your consent to participate in this research and to continue on to the survey, select **"I agree"** below and continue to the next page

APPENDIX C



Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX (970) 491-2293

Date: May 7, 2013

To: Dr. Thomas Chermack, Education
Felix Weitzman, Education



From: Janell Barker, IRB Coordinator

Re: Assessment of Student Learning on Sustainability through a Service-Learning Project

IRB ID: 068-14H

Review Date: May 7, 2013

The Institutional Review Board (IRB) Coordinator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(2): Research involving the use of educational tests, ... survey procedures, interview procedures or observation of public behavior, unless: a) **information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects.**

The IRB determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as proposed in the Exempt application**, including obtaining and documenting (signed) informed consent if stated in your application.
- **Any modification of this research should be submitted to the IRB Coordinator through an email prior to implementing any changes**, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB protocol will need to be submitted and approved before proceeding with data collection.
- **Please notify the IRB Coordinator if any problems or complaints of the research occur.**

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB may make the determination of exemption**, even if you conduct a similar study in the future.