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Balancing exploration, exploitation, and efficiency : a framework of entrepreneurial learning.

Shaun Paul Digan
University of Louisville

BALANCING EXPLORATION, EXPLOITATION, AND EFFICIENCY:

A FRAMEWORK OF ENTREPRENEURIAL LEARNING

By
Shaun Paul Digan

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By
Shaun Paul Digan
B.S., Liberty University, 2011
M.B.A., University of Cincinnati, 2013

A Dissertation Approved on

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by the following Dissertation Committee:

Chair- Dr. Robert P. Garrett

Dr. James O. Fiet

Dr. Ghiyoung Im

Dr. Per Davidsson

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ABSTRACT

BALANCING EXPLORATION, EXPLOITATION, AND EFFICIENCY:
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Shaun Paul Digan

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Entrepreneurial learning (EL), defined as "learning in the entrepreneurial process through which individuals acquire new knowledge, either vicariously or from direct experience, which has the potential to change the range of entrepreneurial actions", is a key construct in the pursuit and development of entrepreneurial opportunities. However, the field of entrepreneurship has yet to produce a theory of learning explaining under what conditions individuals engage in differing types of entrepreneurial learning. Further, the limited research within this line of inquiry is diverse and disconnected.

In this research, I attempt to advance the literature on organizational and entrepreneurial learning through the examination of a multi-level framework of entrepreneurial learning processes. I do this within a framework supported by social cognitive (or learning) theory, where I attempt to examine the relationships between the influence of prior performance, organizational factors, and personal cognitive characteristics on what an entrepreneur learns. However, my findings suggest that entrepreneurial learning is best described as a process. Rather than finding support for a model of entrepreneurial learning with learning as an outcome, the data supports a model of entrepreneurial learning focused on the process of entrepreneurial learning.

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1 INTRODUCTION

There appears to be a growing consensus within the entrepreneurship discipline that entrepreneurship revolves less around the "who" and more around the processes of economic change (Gartner, 1988; McMullen & Dimov, 2013; Wiklund, Davidsson, Audretsch, & Karlsson, 2011). Therefore, it may be said that "entrepreneurship is the function by which growth is achieved" (Stevenson & Jarillo, 1990, pp. 21). Theories of economic change—those of growth and innovation—are "necessarily [theories] of learning" (Harper 1996, pp. 4), and are fundamental in explaining market processes. One particularly useful lens in studying theories of economic change is that of organizational learning.

Organization learning theories attempt to explain the processes by which organizations acquire, assimilate, and transform information into knowledge which ultimately alters its behavior (or at least the range of its potential behaviors) and performance. Organizational learning is a "multilevel process of change in cognition and action" incorporating individual, group, and organizational processes (Berends & Lammers, 2010, pp. 1046). Extending organizational learning theories to the level of the individual, scholars have begun to investigate the role of individual learning in the entrepreneurial process, or what has been called Entrepreneurial Learning. Entrepreneurial learning (EL) has been described as learning in the entrepreneurial process (Holcomb, Ireland, Holmes Jr., & Hitt, 2009; Politis, 2005; Ravasi & Turati, 2005) and learning how

to work entrepreneurially (Rae, 2000). Depicted broadly, entrepreneurial learning can be thought of as the process by which "entrepreneurs accumulate and update knowledge" (Minniti & Bygrave 2001, pp. 8); therefore, theories of entrepreneurial learning are "primarily related to how individual entrepreneurs learn" (Wang & Chugh, 2014, pp. 30). In this dissertation, I define *entrepreneurial learning* as learning in the entrepreneurial process through which individuals acquire and update knowledge, either vicariously or from direct experience, which has the potential to change the range of entrepreneurial actions.

Entrepreneurial learning has received relatively little attention in the entrepreneurship literature despite the widespread recognition that individual differences in cognitive processing significantly influence the ability to identify (Gaglio & Katz, 2001; Lumpkin & Lichtenstein, 2005; Sarasvathy, Simon, & Lave, 1998; Shackle, 1982; Shane, 2003), evaluate (J. R. Baum, Bird, & Singh, 2011; Shane, 2003; Vinogradov & Kolvereid, 2010), and pursue (Baron, 2006; De Wit & Van Winden, 1990; van Praag & Cramer, 2001) entrepreneurial opportunities. Given that entrepreneurship is, by its very nature, a learning phenomenon (Corbett, 2005; Dimov, 2007b; Politis, 2005), and that "a theory of entrepreneurship requires a theory of learning" (Minniti & Bygrave, 2001, pp. 7), relatively little is known about the learning processes of entrepreneurs and entrepreneurial firms and how these may differ from the learning processes of non-entrepreneurs and non-entrepreneurial firms (Wang & Chugh, 2014). From an organizational learning perspective, scholars have identified three distinct learning strategies within organizations: those which focus on exploration, on incremental exploitation, and on repetitive exploitation (Piao & Zajac, 2015). As such, this dissertation attempts to shed additional light on entrepreneurial

learning processes by addressing the overarching research question: "*Under what conditions do individuals engage in differing types of entrepreneurial learning?"*

1.1 Research Questions

In order to address the central research question, I adopt a social cognitive theory perspective. Social cognitive theory attempts to explain behavior in organizations and has been used to examine complex managerial decision-making (Wood & Bandura, 1989). According to social cognitive theory (Bandura, 1977b, 1977a, 1982, 1986), learning is directed by the "triadic reciprocality" of interactions among aspects of "behavior itself (previous successful or unsuccessful performances)", "the environment (consequences from the organizational environment)", and "the person (unique personal characteristics)" (Stajkovic & Luthans, 2002, pp. 127). In accordance with social cognitive theory, I consider three essential themes of research questions inquiring how prior outcomes, organizational factors, and personal cognitive characteristics influence entrepreneurial learning at the individual level of analysis. First, I examine how prior behavioral outcomes (organizational performance) shape the engagement in behaviors associated with entrepreneurial learning. Second, I delve into organizational characteristics suspected of influencing knowledge acquisition processes, examining the moderating role of characteristics of an organization's internal and external relationships on entrepreneurial learning. Third, I investigate the moderating role of personal cognitive characteristics—namely an individual's orientations toward learning and acting entrepreneurially—which may enable entrepreneurs to avoid some of the maladaptive learning patterns ("traps") associated with multi-level learning processes.

1.1.1 Research Question #1

In order to shed light on the conditions under which individuals are likely to acquire differing types of entrepreneurial knowledge, the first research question to be addressed concerns the influence of prior outcomes (organizational performance) on behaviors associated with entrepreneurial learning. Social cognitive theory suggests that behavioral factors—such as prior performance—influence behavior and learning within an organization (Bandura, 1986). In this research, I examine the influence of prior performance on behaviors associated with three types of learning within organizations: exploratory learning, exploitative learning, and efficiency learning.

Research Question # 1: [How] Do prior behavioral outcomes (organizational performance) influence entrepreneurs' engagement in exploratory, exploitative, and efficiency learning?

1.1.2 Research Question #2

The second research question to be addressed concerns organizational characteristics likely to influence the entrepreneurial learning process. Social cognitive theory suggests that environmental factors, such as consequences of the organizational environment, influence an entrepreneur's learning within the organization (Bandura, 1986). According to Simon (1991), "What an individual learns in an organization is very much dependent on what is already known to (or believed by) other members of the organization and what kinds of information are present in the organizational environment" (pp. 126). Therefore, I examine how organizational factors related to how one's social relationships within the organizational environment influence the relationship between prior performance and each of the three types of learning within organizations.

Research Question # 2: [To what extent] Do elements of the organizational environment moderate the impact of organizational performance on entrepreneurial learning?

1.1.3 Research Question #3

The final research question to be addressed concerns personal cognitive characteristics which may impede or impel individuals from engaging in different types of learning within organizations. Social cognitive theory suggests that personal cognitive characteristics also influence individual behavior and learning within an organization (Bandura, 1986). Individual characteristics have long been associated with entrepreneurial action (J. R. Baum & Locke, 2004); however, research has yet to link personal cognitive characteristics with each of the three types of actions associated with entrepreneurial learning. Therefore, I examine how personal cognitive characteristics influence the relationship between prior performance and each of the three types of learning within organizations.

Research Question # 3: [To what extent] Do personal cognitive factors moderate the impact of organizational performance on entrepreneurial learning?

1.2 Significance of the Study

Learning is a central tenant to a theory of entrepreneurship. Given that the pursuit and development of opportunities is, in essence, a learning process (Corbett, 2007; Dimov, 2007a; Politis, 2005), and that "a theory of entrepreneurship requires a theory of learning" (Minniti & Bygrave, 2001, pp. 7), relatively little is known about the learning processes of entrepreneurs and entrepreneurial firms and how these may differ from the learning

processes of non-entrepreneurs and non-entrepreneurial firms (Wang & Chugh, 2014). To the extent that such research does exist, the literature streams on learning remain "diverse, highly individualistic, and fragmented" (Wang & Chugh, 2014, pp. 24). While a fragmented research agenda has contributed to detailed insights on particular elements of the learning process, missing from this body of research is evidence of how these elements interact in complex, multi-level learning relationships (Politis, 2005). These relationships may prove essential in furthering our understanding of learning in the entrepreneurial process.

Among the management and strategy literatures, the majority of learning research over the past 25 years has focused on the organizational level of analysis. Albeit learning has received much attention at the firm level, organizations do not learn on their own. Rather, organizational learning occurs through the interaction of processes at the individual, group, and organizational level (Argote & Miron-Spektor, 2011; Berson, Nemanich, Waldman, Galvin, & Keller, 2006; Crossan, Lane, & White, 1999; Drejer, 2000). Yet, while individuals are integral to organizational learning processes, many theories of organizational learning fail to explicitly address the role of individuals in the organizational learning process (Daft & Weick, 1984; Levitt & March, 1988). Extending organizational learning theories to the level of the individual, some research has begun to investigate the role of individual learning in the entrepreneurial process. However, the field of entrepreneurship has yet to produce a theory of learning which explains how and under what conditions individual entrepreneurs learn (Cope & Watts, 2000). Although it is widely acknowledged that the start-up phase of a new venture is typically entrepreneurial and involves considerable learning, we do not yet know why some entrepreneurs continue to

engage in behaviors which enable entrepreneurial learning while others become ingrained in their current knowledge and discontinue the process of actively acquiring new knowledge and information. This is a critical question given the role of learning in organizational innovation, growth, and survival.

1.3 Intended Contributions

The purpose of this study is to advance the literature on organizational and entrepreneurial learning through the development of a multi-level framework of entrepreneurial learning processes reflecting the behavioral, organizational, and personal cognitive factors that act together to determine human learning and behavior. In doing so, I attempt to provide several important contributions. First, this research extends the body of literature on organizational and entrepreneurial learning by providing a broader understanding of the entrepreneurial learning process. Despite decades of research on learning, further understanding of what and how entrepreneurs learn remains a primary research objective (Cope, 2003). Limited research has empirically examined the entrepreneurial learning behaviors of individuals within the organizational context. While some prior research (e.g. Mom et al., 2015, 2009, 2007) focuses on the exploratory vs. exploitative behavior of managers, several reasons compel the investigation of learning among entrepreneurs. First, we know the activities of managers and entrepreneurs have been noted to be vastly different. Compared with entrepreneurs, managers spend much more time engaged in routine activities (Casson, 2000). Second, entrepreneurs often operate in contexts of severe resource constraints. The paradoxes faced by new and young firms are likely to intensify the trade-offs made by individuals. The focus on the learning behaviors of entrepreneurs is important, as small businesses typically begin with a single

or small group of founders (Flamholtz, 1986; Lechner & Leyronas, 2009; Mazzarol, Reboud, & Soutar, 2009) who have a significant influence on the organizations they establish (Boeker, 1989; Chandler & Jansen, 1992; Peteraf & Shanley, 1997). Further, a paucity of information exists on the learning behaviors of entrepreneurs of new and young firms, where prior performance, resource constraints, consequences of the organizational environment, and personal cognitive factors are all likely to increase the salience of such behaviors on organizational learning and performance.

Further, Wang and Chugh (2014) note that the entrepreneurial learning research which does exist is "diverse, highly individualistic, and fragmented" (pp. 24). Numerous scholars warn of the consequences of theoretical fragmentation in organizational research, calling for the integration of theory (Hambrick, 2004; March, 2006; Tsoukas, 2005). Through the development and empirical analysis of a framework of entrepreneurial learning, this dissertation intends to advance a research agenda spanning micro and macro levels of analysis, answering the many calls for scholarly study of learning across multiple level of analysis (Andriopoulos & Lewis, 2009; Raisch & Birkinshaw, 2008; Simsek, 2009), and more specifically at the individual level of analysis (Gupta, Smith, & Shalley, 2006; Mom et al., 2009; Raisch & Birkinshaw, 2008).

Second, this research contributes to organizational and entrepreneurial learning theories by advancing and empirically developing a model of entrepreneurial learning characterizing individual-level behavior within three distinct types of entrepreneurial learning: exploratory learning, exploitative learning, and efficiency learning. Previous research has focused on the entrepreneurial learning paradigm as a dichotomous choice between either acquiring new, unrelated, or distant knowledge (exploring) or acquiring

incremental, related, or proximal knowledge (exploiting). In this sense, *exploration* refers to "experimentation with new alternatives", whereas *exploitation* refers to "the refinement and extension of existing competencies, technologies, and paradigms" (March, 1991, pp. 85). Focusing on exploitation as an "extension" and improvement of current knowledge, the majority of scholars approach the tension between exploration and exploitation as a dichotomy between two distinct, yet related, types of learning (Gupta et al., 2006; He & Wong, 2004; Sirén, Kohtamäki, & Kuckertz, 2012). In contrast, others treat all learning activities as exploration, reserving exploitation as an essentially non-learning phenomenon (Rosenkopf & Nerkar, 2001; Vermeulen & Barkema, 2001). Integrating these perspectives, Piao and Zajac (2015) contend that prior research may have confounded two distinct forms of exploitation: incremental exploitation, in which incremental learning takes place, and repetitive exploitation, in which passive learning may occur through the engagement in repetitive and routine behaviors.

This is important when investigating the learning behavior of individuals. Entrepreneurs and CEOs are often tasked with managing and running the day-to-day actitivies of the organization (Cao, Simsek, & Zhang, 2009; He & Wong, 2004; Lubatkin, Simsek, Ling, & Veiga, 2006; Mueller, Volery, & von Siemens, 2012; Volery, Mueller, & von Siemens, 2013). Furthermore, entrepreneurs in diferent stages of the entrepreneurial process pursue different activities with different time allocations (Mueller et al., 2012). However, the majority of extant research does not account for aspects of focus, attention, and time despite a clear understanding that the entrepreneurial process is characterized by temporal issues (Bird & West III, 1997). This research begins to account for these issues by examining the full range of activities in which entrepreneurs may spend their time—

exploring, incrementally exploiting, and carrying out the day-to-day actvities of the organization. Herein, I build off these concepts to offer and test a three-factor conceptualization of behaviors related to entrepreneurial learning

Third, this research extends the literatures on entrepreneurial learning by integrating organizational learning theory with a social cognitive framework in order to investigate organizational factors and personal cognitive characteristics which have been suggested to influence the entrepreneurial learning process. Little is known concerning which factors play important roles in the acquisition of entrepreneurial knowledge, leading scholars to conclude that more research is needed on the factors which influence entrepreneurial learning as well as how entrepreneurs manage learning paradoxes within their organizations (Hill & Birkinshaw, 2014; Nasim & Sushil, 2011; Turner & Lee-Kelley, 2013; Yukl, 2012). For instance, we still do not know whether situational or individual factors have a greater impact on learning within organizations (Van der Sluis, 2002). This dissertation expands upon our current understanding of entrepreneurial processes by investigating the role of organizational factors and personal cognitive characteristics on entrepreneurial learning processes.

Fourth, by providing a broader understanding of entrepreneurial learning processes and more clearly distinguishing the role of organizational factors and personal cognitive characteristics in these learning processes, this research will aid entrepreneurs in discerning and implementing effective learning activities, potentially avoiding falling into maladaptive learning patterns. Much knowledge is transitory, and, as such, successful entrepreneurial outcomes could require continual learning. Without continual learning, competitive advantages resulting from knowledge could be short-lived. However, multi-

level learning processes naturally abate learning over time. Entrepreneurs benefit from understanding how to structure their organizations and draw upon their personal cognitive characteristics to avoid learning "traps". This is especially important considering that entrepreneurial learning experiences are "dynamic, contextual, and cumulative" (Cope, 2005, pp. 383) and ongoing and future oriented (Mezirow, 1991; Reuber & Fischer, 1999). Alerting entrepreneurs to the dangers of maladaptive search or specialization has the propensity to influence not only learning and performance within current ventures, but also the identification, evaluation, and development of future entrepreneurial opportunties.

1.4 Research Plan

The research plan for this stream of research consists of a multi-study format constructed to a) develop a measure of entrepreneurial learning and b) use the developed measure to examine the hypotheses and research questions. In order to anlayze the data, I employ a variety of statistical concepts and techniques including pilot interviews, statistical concepts and tools, descriptive statistics, Q-Sort methodology, expert review, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Hierarchical Linear Regression.

In the first stage of this research I develop measures of the types of entreprenuerial learning across four interconnected studies. First, in a pre-study, I generate a sizable item pool to develop individual level measures of the concepts of exploratory, exploitative, and efficiency learning by drawing from both inductive and deductive approaches. Next, drawing from subject matter experts, academic researchers, and entrepreneurs I subject the item pool to Q-Sort and expert analysis.

Drawing on a sample of entrepreneurs and small business owners of firms which compete in the U.S. tax preparation industry, I use a split sampling approach to conduct a series of exploratory and confirmatory factor analysis in order to develop and validate measures of entrepreneurial learning.

In the second stage of this research I examine the study hypotheses and assess the overall research questions. In this stage, I use hierarchical linear regression to examine the hypotheses, using the measures of entrepreneurial learning developed in the first stage of this research.

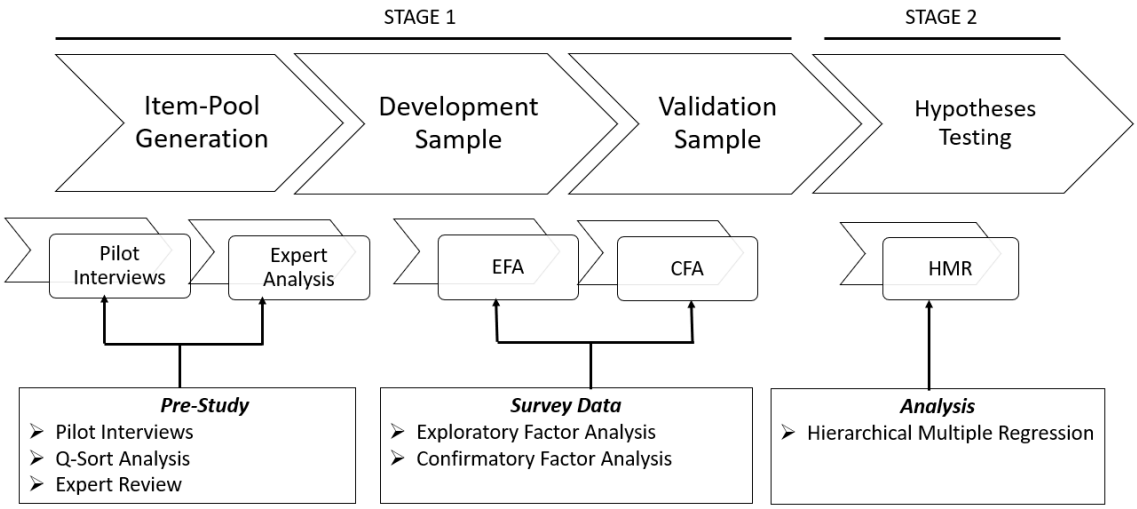

Figure 1: Research Plan

1.5 Outline of Remainder of the Research Program

The remainder of this dissertation is organized as follows. In Chapter Two, I will begin by providing the theoretical background and discussing and defining several concepts surrounding organizational and entrepreneurial learning. Next, in Chapter Three, I assess entrepreneurial learning at the level of the individual and develop three sets of hypotheses related to learning in the entrepreneurial process. Chapter Four outlines the research methodology I will use to test the research questions, wherein I describe the

sample and its appropriateness, how items were generated, and the survey instrument and measures. Chapter Five recounts the measurement development procedures and reports the results of measurement development. Chapter Six provides a detailed description of the analysis and results related to my hypotheses. Chapter Seven concludes with a discussion of the findings, limitations, and suggestions for future research.

2 THEORETICAL BACKGROUND

Chapter 2 is devoted to presenting the theoretical background that will inform this study. The focus of this research is to explore the conditions under which individuals acquire entrepreneurial knowledge in a multi-level learning process. Building upon the emerging literatures on learning within the organizational context, this chapter begins by specifying and defining several concepts surrounding organizational learning and the role of the individual, namely the two primary streams of research concerning organizational learning and entrepreneurial learning. Each body of literature is examined with specific attention to the role of the individual in the entrepreneurial learning process, along with conditions that facilitate the acquisition of differing types of entrepreneurial knowledge.

2.1 Organizational Learning

Learning is a vital construct in understanding organizational change such as innovation, growth, and even survival. From a business perspective, it is change—changes in demographics, in politics, in regulations, in technology, and in social factors—that not only gives rise to uncertainty, but also provides opportunity (Schumpeter, 1934; Shane, 2000). Every organization—especially those competing in dynamic and uncertain environments—must pursue learning and adaption in response to change. In fact, how organizations manage the ability to learn and adapt in response to market and technological change is an indispensable question of strategic management (Teece, Pisano, & Shuen, 1997), and is accurately described as the key to organizational growth and survival (Teece,

2007). It makes sense, then, that a vast portion of organizational literatures focuses on how organizations learn—adapt and grow—in dynamic environments. One particularly useful lens in studying theories of economic change is that of organizational learning.

Although organizational learning has not been well defined (Crossan et al., 1999; Huber, 1991), a vast body of literature exists to inform future research. A substantial number of reviews have surveyed the organizational learning literature (Argyris & Schon, 1996; Bapuji, 2004; Berson et al., 2006; Dodgson, 1993; Easterby-Smith, 1997; Easterby-Smith, Crossan, & Nicolini, 2000; Easterby-Smith, Snell, & Gherardi, 1998; Fiol & Lyles, 1985; Huber, 1991; M. Jones, 1995; Levitt & March, 1988; Miller, 1996; Mirvis, 1996; Shrivastava, 1983; Vera & Crossan, 2003; Vince & Sutcliffe, 2002), as well as the related literatures such as entrepreneurial learning (Wang & Chugh, 2014) and organizational ambidexterity (Almahendra & Ambos, 2015; Birkinshaw & Gupta, 2013; Gupta et al., 2006; Junni, Sarala, Taras, & Tarba, 2013; Lavie, Stettner, & Tushman, 2010; Nosella, Cantarello, & Filippini, 2012; O'Reilly & Tushman, 2013; Raisch & Birkinshaw, 2008; Raisch, Birkinshaw, Probst, & Tushman, 2009; Rosing, Frese, & Bausch, 2011; Simsek, Heavey, Veiga, & Souder, 2009; Turner, Swart, & Maylor, 2013), indicating the wide array of literature to inform research. Table 2-1, below, provides a selection of definitions of organizational learning drawn from extant literature. Evident in the ways organizational learning has been described, the concept of organizational learning is quite broad, as learning superimposes several lines of research such as innovation, organizational knowledge, knowledge management, intellectual capital, and organizational memory (Bapuji, 2004; Spender, 1996; Vera & Crossan, 2003).

The remainder of Section 2.1 draws from these literatures to, first, explain the importance of organizational learning as a source of sustainable competitive advantage, and then to describe organizational learning processes, the role of the individual and how each relate to advances in organizational and entrepreneurial learning theories.

Table 2-1: Organizational Learning Defined

Author(s)	Definition
Cangelosi & Dill (1965)	"A series of interactions between adaptation at the individual or subgroup level and adaptation at the organizational level." (pp. 200)
Argyris (1977)	"A process of detecting and correcting error." (pp. 116)
Fiol & Lyles (1985)	"The process of improving actions through better knowledge and understanding." (pp. 803)
Stata (1989)	"The principal process by which management innovation occurs." (pp. 64)
Huber (1991)	"An entity learns if, through its processing of information, the range of its potential behaviors is changed." (pp. 89)
Kim (1993)	"Increasing an organization's capacity to take effective action." (pp. 67)
Cook & Yanow (1993)	"The capacity of an organization to learn how to do what it does." (pp. 378)
Sinkula (1994)	"The means by which knowledge is preserved so that it can be used by individuals other than its progenitor." (pp. 36)
Slater & Narver (1995)	"The development of new knowledge or insights that have the potential to influence behavior." (pp. 63)
Nevis, DiBella & Gould (1995)	"The capacity or processes within an organization to maintain or improve performance based on experience." (pp. 74)
Nicolini & Meznar (1995)	"A social construction which transforms acquired cognition into accountable abstract knowledge." (pp. 727)
Miller (1996)	"The acquisition of new knowledge by actors who are able and willing to apply that knowledge in making decisions or influencing others in the organization." (pp. 486)
Snell & Chak (1998)	"Entails meaningful change in the processes, structures, assumptions or concerns connecting individual members." (pp.341)
Marks & Louis (1999)	"The social processing of knowledge or the sharing of individually held knowledge or information in ways that construct a clear, commonly held set of ideas." (pp. 711)
Templeton et al. (2002)	"The set of actions (knowledge acquisition, information distribution, information interpretation, and organizational memory) within organizations that intentionally and

	unintentionally influence positive organizational change." (pp. 189)
Vera & Crossan (2004)	"A process of change in thought and action both individual and shared—embedded in and affected by the institutions of the organization." (pp. 224)
Lumpkin & Lichtenstein (2005)	"The processes of exploiting externally-generated knowledge or transforming internally-stored knowledge to increase the strategic assets of the firm." (pp. 454)
Askim, Johnsen & Christophersen (2008)	"Processing of information which changes an entity's range of potential behavior." (pp. 300)

2.1.1 Organization Learning and Competitive Advantage

Organizational learning is a critical tool in the strategic management of organizations (Argyris & Schon, 1996) and an integral component of organizational frameworks (Schimmel & Muntslag, 2009). In terms of strategic management, learning is the process through which actors acquire and create knowledge, fostering improved efficiencies, innovativeness, and new capabilities and competencies (Dougherty, 1995; Hurley & Hult, 1998; Thornberry, 2003). Although knowledge has been extensively discussed in the entrepreneurship literature, and has been shown to be a major source of opportunities (Eckhardt & Shane, 2003; Fiet, 1996; Hayek, 1945; Shane, 2000, 2003), it may be that the role of learning has just as important implications. In fact, learning is of such great importance to organizations that Dixon (1999) ascertains "we have entered the Knowledge Age and the new currency is learning—it is learning, not knowledge itself which is critical" (pp. 1).

Prior research indicates that in order for firms to grow and sustain superior performance they must develop and maintain competitive advantages (Barney, 1991; M. Porter, 1980; M. Porter & Millar, 1985). Therefore, establishing competitive advantages should be a fundamental concern of organizations (M. Porter, 1989). Given that the pursuit

and subsequent development of opportunities is, for all intents and purposes, a learning process (Corbett, 2007; Dimov, 2007a; Politis, 2005), one way in which firms build and sustain competitive advantage is through the acquisition of knowledge and information (De Geus, 1988; M. Porter & Millar, 1985; Stata, 1989). In fact, organizational learning theories advance the creation of new knowledge as a distinguishing factor in obtaining competitive advantages (Hsu & Pereira, 2008).

The notion that learning precipitates improved organizational performance has been well established in the literature (Argote & Miron-Spektor, 2011; Bapuji, 2004; Liao, Fei, & Chen, 2007). Empirical research has made clear that an organization's ability to learn and adapt quickly could be a major source of competitive advantage (Bapuji, 2004; De Geus, 1988; Marsick & Watkins, 2003; Senge, 2006; Yukl, 2002), and it has been frequently argued that learning is the single most important source of competitive advantage (De Geus, 1988; Kogut & Zander, 1992; Levitt & March, 1988; Prahalad, Hamel, & June, 1990; Starbuck, 1992; Stata, 1989). In short, organizations which learn faster than their competitors could reap advantages over time (Bierly & Chakrabarti, 1996; De Geus, 1988). According to Eisenhardt and Brown (1998), an organization's ability to learn and adapt their strategies to environmental and market conditions must be tailored to industries and markets; however, organizations which learn faster than their competition gain competitive advantage. It may even be said that "the rate at which organizations learn may be the only sustainable source of competitive advantage (Stata 1989, pp. 64). De Geus, (1988) concurs, suggesting that, for an organization, the ability to learn is the exclusive source of competitive advantage.

One resounding intellection in organization science is that—in order to build and maintain competitive advantages, achieve optimal performance, and ensure long-term survival—organizations must engage in learning that leads to both the more efficient exploitation of existing opportunities as well as the exploration of new opportunities (Hitt, Ireland, Camp, & Sexton, 2001, 2002; Ireland, Hitt, Camp, & Sexton, 2001; Ireland, Hitt, & Sirmon, 2003). Although some scholars might contend the need for balance between exploration and exploitation activities (c.f. Atuahene-Gima, 2013; Ebben and Johnson, 2005; Venkatraman et al., 2007), the general consensus suggests that the balance of exploratory and exploitative activities and processes—often referred to as ambidexterity—is crucial to an organization's long term success and survival (Gibson & Birkinshaw, 2004b; Junni et al., 2013), as neither exploration nor exploitation alone will be sufficient (Amit & Zott, 2001). In fact, a rather large body of literature has arisen around the dual concepts of exploration and exploitation and their impacts on performance and the attainment of competitive advantages. The following section will provide an overview of the exploration-exploitation paradigm as it has been employed in organizational learning theories.

2.1.2 The Exploration-Exploitation Paradigm

Across academic disciplines scholars have suggested that, in the face of uncertainty learning, adaption and goal-directed behavior require a choice between the exploration of new possibilities and the exploitation of old certainties (Holland, 1975; March, 1991; Schumpeter, 1934). From animals to humans to organizations, goal-directed search behavior is a "ubiquitous requirement of life" (Hills et al., 2015, pp. 46). Within the organizations literature, much of this research follows March's (1991) seminal work where

he uses an organizational learning perspective to propose a competing framework between the exploration of new possibilities and the exploitation of old certainties. He describes exploration in terms such as "search, variation, risk taking, experimentation, play, flexibility, discovery and innovation", and exploitation in terms such as "refinement, choice, production, efficiency, selection, implementation, and execution" (pp. 71).

As previously mentioned, the dual concepts of exploration and exploitation have been applied to a vast array of literatures, producing a number of operationalizations of their interplay depending upon the field of study and the lens of scholars examining this paradigm. An extensive portion of current organizational learning research presents learning as a choice between exploration and exploitation (Hill & Birkinshaw, 2014). For example, integrating research on entrepreneurship and strategic management, research within the stream of literature on strategic entrepreneurship examines the exploration and exploitation behaviors in organizations in terms of "opportunity seeking" (i.e. exploration) vs. "advantage seeking behaviors" (c.f. Hitt et al., 2001; Hitt et al., 2011). Other literature streams, such as those on new product development, innovation, and knowledge management operationalize the exploration-exploitation concepts as the radicalness of innovation (Bierly & Chakrabarti, 1996; Tushman & O'Reilly, 1996), organizational boundary spanning behaviors (Rosenkopf & Nerkar, 2001), patent search scope and breadth (Katila & Ahuja, 2002), or an organization's capabilities toward alignment and adaptability (Gibson & Birkinshaw, 2004a). Drawing from the work of Tushman and Anderson (1986) and March (1991), Bierly and Chakrabarti (1996) describe the tension between exploration and exploitation in terms of incremental vs. radical innovation. Alternatively, investigating the exploratory vs. exploitative nature of opportunity search in

the optical disk industry, Rosenkopf and Nerkar (2001) operationalized these concepts in terms of boundary spanning search behaviors.

Regardless of their operationalization, exploration and exploitation involve unequivocally different types of learning (Wang & Rafiq, 2009), arising from distinct motivations (McGrath, 2001). On the one hand, exploration is motivated by the desire to uncover something new (Rothaermel & Deeds, 2004). The goal of exploration is to increase organizational learning capabilities in order to realize innovation (Valle & O'Mara, 2010). Exploration departs from what is familiar and pursues "variation, experimentation, discovery, and innovation" (Politis, 2005, pp. 408). Resulting knowledge is often new and diverse (Politis, 2005). Exploratory learning is variance-seeking and typically increases performance variance (McGrath, 2001).

On the other hand, exploitation is motivated by the desire to more fully exploit an underutilized set of assets, resources, or capabilities already under firm control (Rothaermel & Deeds, 2004). The goal of exploitation is to develop internal organizational capabilities in order to realize short-term operational efficiency (Valle & O'Mara, 2010). Exploitation builds upon previously pursued concepts, ideas, and knowledge in order to establish stability within the organization (Politis, 2005). The resulting outcome is often the refinement of existing knowledge. Exploitative learning is variance-reducing or mean-seeking learning, with the potential to improve mean performance and decrease performance variance (McGrath, 2001). Various definitions and operationalizations of exploratory and exploitative learning are provided in Table 2-2, below.

Expanding upon these views, Piao and Zajac (2015) contend that extant research may have confounded the constructs of exploration and exploitation. Specifically, they

advance the notion that exploitation may take one of two forms. The first, incremental exploitation, focuses on the devotion of time and resources toward "the creation of new designs for existing products [and services] aimed at existing product-market domains" (Piao & Zajac 2015, pp. 1432). Contrastingly, organizations must also allocate time and resources to the day-to-day operating tasks of the organization. The day-to-day operating tasks involve the repetitive, or routine, activities that organizations must carry out on a daily basis, and may include production, administrative, accounting, control, and sales functions. Indeed, routines—or "patterns of behavior that [are] followed repeatedly, but [are] subject to change if conditions change" (Winter, 1964, pp. 263)—account for the majority of the behavior in organizations (March & Simon, 1958). However, routine or repetitive activities allow for little learning, save for efficiency learning which occurs through problem-solving and repeated experience. Piao and Zajac (2015) call these functions repetitive exploitation, described as focusing on "the repetition of existing designs for existing products [and services] aimed at existing product-market domains" (pp. 1432). Therefore, on the premise that exploration and exploitation must operate in conjunction with the routine operating tasks of the organization (Boumgarden, Nickerson, & Zenger, 2012; K. M. Green, Covin, & Slevin, 2008; He & Wong, 2004; Volery et al., 2013), organizations must allocate their time and resources among three distinct types of activities in relation to learning (Piao & Zajac, 2015).

Table 2-2: The Exploration-Exploitation Dichotomy

Authors	Exploration	Exploitation
March (1991)	Includes "search, variation, risk taking, experimentation, play, flexibility, discovery, and innovation." (pp. 71)	Includes "refinement, choice, production, efficiency, selection, implementation, and execution." (pp. 71)
Levinthal and March (1993)	"The pursuit of new knowledge, of things that might come to be known." (pp. 105)	"The use and development of things already known." (pp. 105)
Baum, Li & Usher (2000)	"Learning gained through processes of concerted variation, planned experimentation, and play." (pp. 768)	"Learning gained through local search, experiential refinement, and selection and reuse of existing routines." (pp. 768)
McGrath (2001)	"The search for new organizational routines and the discovery of new approaches to technologies, businesses, processes, or products." (pp. 118)	--------
Benner and Tushman (2002)	"Require knowledge and capabilities that are new to the firm" (pp. 676)	"Build on or extend the existing knowledge of a firm" (pp. 676)
Politis (2005)	"Learn[ing] from experiences by exploring new possibilities including issues such as variation, experimentation, discovery, and innovation." (pp. 408)	"The exploitation of what is already known, implying that individuals learn from experience by exploiting old certainties." (pp. 408)
Smith and Tushman (2005)	"Rooted in variance-increasing activities, learning by doing, and trial and error." (pp. 522)	"Rooted in variance-decreasing activities and disciplined problem solving." (pp. 522)
Voss and Voss (2012)	"Explores new product capabilities and new customer markets." (pp. 1460)	"Exploits current product capabilities and current customer markets." (pp. 1460)
Siren, Kohtamaki & Kuckertz (2012)	"Creates new knowledge through experimental and exploratory actions that are inherent to entrepreneurial behavior (Anderson et al., 2009)." (pp. 19)	"Creates knowledge regarding improved applications of existing resources and capabilities, primarily in localized practices." (pp. 19)
Piao & Zajac (2015)	"The development of new products aimed at entering new product-market domains." (pp. 1432)	"The repetition and/or incremental refinement of a firm's existing product-market domains." (pp. 1432)
Prange and Schlegelmilch (2016)	"Experimentation with new alternatives, having returns that are uncertain, distant, and often negative." (pp. 444)	"Refinement and extension of existing competencies, technologies, and paradigms, exhibiting returns that are positive, proximate, and predictable." (pp. 444)

2.1.3 Organization Learning: Product vs. Process

It is important to differentiate organizational learning as a product (something which has been learned) from organizational learning as a process from which the product is derived (Argyris & Schon, 1996). As a product, learning may be thought of as "what we have learned." Therefore, organizational learning is conceptualized as a change in the *knowledge or behaviors* of the organization which result from the outcome of the learning process. While some scholars contend that a change in behavior is necessary in order for learning to take place (Argyris & Schön, 1978; Daft & Weick, 1984; Fiol & Lyles, 1985), others argue that the only requirement of organizational learning is a change in knowledge and thinking which impacts an organization's potential range of behaviors (Askim, Johnsen, & Christophersen, 2007; Huber, 1991). For instance, while Rae (2000) argues that learning must involve "change which causes or enables [an] individual to do things differently" (pp. 151), Huber (1991) posits that "an entity learns if, through its processing of information, the *range* of its potential behaviors is changed… or an organization learns if any of its units acquires knowledge that it recognizes as *potentially* useful to the organization" (pp. 89).

On the other hand, organizational learning has also been extensively described and studied as a process. In these terms, organizational learning refers to the process through which actors acquire and retain knowledge intended to improve organizational performance (Argyris & Schon, 1996; Stata, 1989; Valaski, Malucelli, & Reinehr, 2012). Vast streams of research describe organizational learning as a process—revolving around the sub-processes of collecting, processing, and storing information (Argyris, 1977; Fiol & Lyles, 1985; Nevis, DiBella, & Gould, 1995; Stata, 1989). For example, early

conceptualizations of organizational learning depict organizational learning as the process of detecting and correcting errors (Argyris, 1976, 1977; Argyris & Schön, 1978), emphasizing action as the outcome. Alternatively, others emphasize knowledge (and a change in the range of potential behaviors) as the outcome of organizational learning processes. For instance, Shrivastava (1983) characterizes organizational learning as the process which shapes and develops the organizational knowledge base. Building on these early views, Fiol and Lyles's (1985) conceptualization reconciles knowledge and action outcomes, contending that organizational learning relates to "the process of improving actions through better knowledge and understanding" (pp. 803).

Building upon early conceptualizations of learning within organizations, scholars have conceptualized organizational learning processes and sub-processes in several ways. Daft and Weick (1984) conceptualize these processes as (1) scanning (data collection), (2) interpretation (data given meaning), and (3) action (learning). Slater and Narver (1995) describe a similar three process model of organizational learning: (1) information acquisition, (2) information dissemination, and (3) shared interpretation. Similarly, Zollo and Winter, 2002) specify organizational learning as a collective capability based on experiential and cognitive processes and involving: (1) knowledge acquisition, (2) knowledge sharing, and (3) knowledge utilization. Templeton, Lewis, and Snyder (2002) describe a four process model of organizational learning as involving "the set of actions (1) knowledge acquisition, (2) information distribution, (3) information interpretation, and (4) organizational memory) within organizations which intentionally and unintentionally influence positive organizational change" (pp. 189). Crossan, Lane, and White (1999) expand on early work by proposing a multilevel model of organizational learning,

suggesting four specific processes linking individuals, groups, and organizations. They describe these processes as the 4I framework, distinguishing between the (1) intuiting, (2) interpreting, (3) integrating, and (4) institutionalization of knowledge within an organization.

Although a general model of organizational learning does not yet exist, scholars typically agree that learning at the level of the organization occurs through a sequence of interconnected activities at the individual, group or team, and organizational level (Drejer, 2000; D. H. Kim, 1993; Lumpkin & Lichtenstein, 2005; Marsick & Watkins, 1990; Oliver & Jacobs, 2007; Popper & Lipshitz, 2000). In early research on organizational learning, Cyert and March (1963) and Cangelosi and Dill (1965) theorize that organizational learning operates as a cycle of interactions between adaption at the individual level and adaption at the organizational level. Building upon these views, March and Olsen (1975) describe this process as the organizational "Cycle of Choice" (depicted in Figure 2: Cycle of Choice), highlighting the cycles of connections between individual cognitions and preferences, individual behavior, organizational actions, and the environmental response. Similarly, Lee, Courtney, and O'Keefe (1992) describe the organizational learning process as a cycle where "individuals' actions lead to organizational interactions with the environment, the environment responds, and environmental responses are interpreted by individuals who learn by updating their beliefs about cause-effect (i.e. action-response) relationships" (pp. 23). Nonaka (1994) builds upon these views, describing organizational learning as an "upward spiral process" which begins at the level of the individual, progresses to the group level, and then upward to the organizational level (pp. 20).

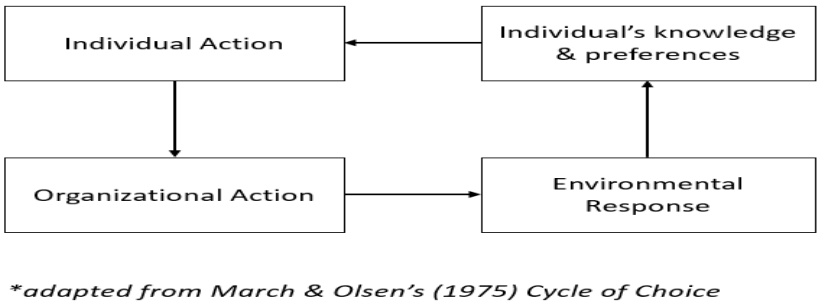

Figure 2: Cycle of Choice

2.1.4 The Role of the Individual in Organizational Learning

As suggested by March and Olsen's (1975) "Cycle of Choice", organizations do not learn by themselves (Fiol & Lyles, 1985; D. H. Kim, 1993). They "do not have brains, but they do have cognitive systems and memories that retain some behaviors, mental maps, norms and values over time- for instance, the standard operative procedures and the organizational routines" (Balbastre & Moreno-Luzón, 2003, pp. 372). Rather, individuals play a vital role in the organizational learning process. Organizational learning both begins with and is directed by individuals. It is individuals, rather than organizations, that apply and create novelty within organizations (Olivera & Straus, 2004). Further, leaders wield great influence, and have significant impact on organizational learning outcomes (Argyris & Schon, 1996; Popper & Lipshitz, 2000; Schimmel & Muntslag, 2009; Senge, 1990), as successful organizational learning relies on the influence, support, and involvement of its leaders (Senge, 1990). In order to more fully understand the processes of organizational learning, attention must be paid to the individual, group or team, and organizational levels (Senge, 2003).

Argyris and Schön (1978) contend "there is no organizational learning without individual learning, and that individual learning is a necessary but insufficient condition for organizational learning" (pp. 20). For organizations to learn, individuals are required for the acquisition, assimilation, and transformation of knowledge and experience (T. Campbell & Cairns, 1994). Simon (1991) even posits "all learning takes place inside individual human minds" (pp. 125). Drawing from this assertion, he, and others (Guiette & Vandenbempt, 2013; Leifer & Steinert, 2011; Maden, 2012) postulate that organizations learn in one of two ways, either through "(1) the learning of its members; or (2) by ingesting new members who have knowledge the organization did not previously have" (Simon, 1991, pp. 125).

Popper and Lipshitz (2000) suggest that although individual learning and organizational learning are similar in some respects, they are dissimilar in several ways. Organizational learning processes are far more complex than individual learning (Senge, 1990), involving an iterative process taking place across multiple levels. Popper and Lipshitz (2000) contend that individual learning and organizational learning are similar in that they involve the same phases of information processing, namely: collection, analysis, abstraction, and retention. However, they are dissimilar in two respects: information processing is carried out at different systemic levels by different structures (Roth, 1997), and organizational learning involves an additional phase: dissemination— i.e. the transmission of information and knowledge among different persons and organizational units. (Popper & Lipshitz, 2000, pp. 185)

First, learning processes begin with individuals (Barker & Neailey, 1999; Elkjaer, 2004). Organizations learn because the members of the organization learn. Organizational

learning initiates as individuals acquire and interpret information. Chen, Lee, Zhang, and Zhang (2003) contend "individual learning is not organizational learning until it is converted into organizational learning" (pp. 74). In order to spread newly acquired information across the organization, individuals must share and discuss their knowledge with others (Cunningham & Iles, 2002). Individuals impart their knowledge and information on the organization (Hamel, 1991), where it is stored in the form of policies, procedures, rules, norms, and routines (March, 1991). Only when knowledge becomes integrated within the group and organization may it then become institutionalized and embedded within organizational systems, structures, and routines. In this way, individual entrepreneurs act as learning agents (Crossan et al., 1999), collecting, absorbing and transforming their learning into organizational knowledge (Lien, Hung, & McLean, 2007).

Second, individuals direct organizational learning. Organizational leaders play a key role in organizational learning. Leaders are often charged with initiating and spreading organizational learning initiatives within the organization (Fiol & Lyles, 1985; Vera & Crossan, 2004). Furthermore, the perspectives and meanings leaders assign to organizational learning activities play a substantial role in organizational learning (Argyris & Schon, 1996). In order to foster organizational learning, leaders often attempt create learning cultures, supporting organizational learning through entrusting autonomy to their employees, capacitating acceptable risk-taking, and encouraging feedback (Rebelo & Duarte Gomes, 2011; Tohidi, Mohsen Seyedaliakbar, & Mandegari, 2012). Furthermore, managing the 21st century organization requires complex capabilities from CEO's and senior teams (Benner & Tushman, 2003). Increasingly, organizations are expanding their sources of innovation: encouraging experimentation and the promotion of personal

projects, providing greater autonomy to their workforce, and pursuing open- and customer-driven innovations. In order to manage inherent tensions, decision makers must fulfill multiple roles, manage contradictory goals, and engage in paradoxical thinking (Raisch et al., 2009).

To summarize, several premises comprise the framework of organizational learning:

Premise 1: Organizational learning is an ongoing and continuous process that allows organizations to build and sustain competitive advantages.

Premise 2: Organizational learning is a multi-level phenomenon, beginning with the acquisition of information at the level of the individual and linked with group and organizational learning through cognitive and social processes.

Premise 3: Organizational learning involves a tension between (a) acquiring knowledge more likely to be useful in exploring new product-market domains (exploration) and (b) acquiring knowledge more likely to be useful in exploiting current product-market domains (exploitation).

Premise 4: Exploitative learning may take one of two forms: (a) the creation of new products and services aimed at existing product-market domains, and (b) the repetition of existing products and services aimed at existing product-market domains.

2.2 Toward a Clearer Conceptualization of Entrepreneurial Learning

Often characterized broadly, entrepreneurial learning has been described as learning in the entrepreneurial process (Holcomb et al., 2009; Politis, 2005; Ravasi & Turati, 2005) or learning to work entrepreneurially (Rae, 2000). Theories of entrepreneurial learning are "primarily related to how individual entrepreneurs learn" (Wang & Chugh, 2014, pp. 30). Entrepreneurs learn. It is an integral part of what makes them entrepreneurs. According to Minniti and Bygrave (2001), entrepreneurs "process information, make mistakes, update their decisional algorithms and, possibly, through this struggle, improve their performance" (pp. 5). Smilor (1997) notes that "effective entrepreneurs are exceptional learners. They learn from everything. They learn from customers, suppliers, and especially competitors. They learn from employees and associates. They learn from other entrepreneurs. They learn from experience. They learn by doing. They learn from what works, and more importantly from what doesn't work" (pp. 344).

Depicted broadly, entrepreneurial learning can be thought of as the process by which "entrepreneurs accumulate and update knowledge" (Minniti & Bygrave 2001, pp. 8). Select scholarly conceptualizations of entrepreneurial learning are provided in 2-2, below. According to Politis (2005) entrepreneurial learning is "a complex process where entrepreneurs transform experience into knowledge in disparate ways" (pp. 408). Scholars posit that entrepreneurs learn through both their own experience and observations as well as vicariously through the experience and knowledge of others (Holcomb et al., 2009; Sardana & Scott-Kemmis, 2010). Drawing upon these conceptualizations, I define *entrepreneurial learning* as learning in the entrepreneurial process through which

individuals acquire and update knowledge, either through direct experience or vicariously, which has the potential to change the range of entrepreneurial actions.

It is important to note that entrepreneurial learning is not restricted to either the start-up phase of a venture (Reuber & Fischer, 1993) nor to an entrepreneur or business owner, as the entrepreneurial context itself provides continuous opportunities for learning (Löbler, 2006). Furthermore, although the founding of a venture is a novel process and typically involves learning, entrepreneurial learning is never-ending, and takes place across the lifecycle of an organization and beyond. However, entrepreneurial learning should not be seen strictly as a subset of learning. Whereas learning in most domains is directed by feedback and self-assessments of one's own performance (Nicol & MacFarlane-Dick, 2006), entrepreneurial learning is more likely to be directed by feedback and assessments of the organization's performance.

Table 2-3: Entrepreneurial Learning Defined

Author(s)	Definition
Rae (2000)	"Learning how to recognize and act on opportunities, how to organize and manage ventures, and so on. EL is taken to mean learning to work in entrepreneurial ways." (pp. 151)
Minniti & Bygrave (2001)	"How entrepreneurs accumulate and update knowledge" (pp. 8)
Rae & Carswell (2001)	"How people construct new meaning in the process of recognizing and acting on opportunities, and of organizing and managing ventures." (pp. 150)
Young & Sexton (2003)	"The variety of experiential and cognitive processes used to acquire, retain and use entrepreneurial knowledge." (pp. 156)
Cope (2005)	"Learning experienced by entrepreneurs during the creation and development of a small enterprise, rather than a particular style or form of learning that could be described as 'entrepreneurial'." (pp. 374)
Politis (2005)	"A complex process where entrepreneurs transform experience into knowledge in disparate ways." (pp. 408)
Rae (2005)	"Learning to recognize and act on opportunities, and interacting socially to initiate, organize and manage ventures." (pp. 324)
Ravasi & Turati (2005)	"The learning process that occur as entrepreneurs accumulate and organize knowledge and information within and across developmental efforts." (pp. 139)
Parker (2006)	"What entrepreneurs learn about, how they learn, and why they learn." (pp. 3)
Rae (2006)	"Learning to recognize and act on opportunities, through initiating, organizing, and managing ventures in social and behavioral ways." (pp. 40)
Thorpe, Gold, Holt & Clarke (2006)	"The ability to take the routines by which people typically make sense of their world and to change them in some arresting manner." (pp. 237)
Berglund, Hellstrom & Sjolander (2007)	"Venture learning, i.e. learning by the whole venture team." (pp. 178)
Franco & Haase (2009)	"What informs the entrepreneur's quest for new opportunities." (pp. 634)
Holcomb, Ireland, Holmes & Hitt (2009)	"The process by which people acquire new knowledge from direct experience and from observing the behaviors, actions and consequences of others; assimilate new knowledge using heuristics to confront discrepancies that are common with information acquired in uncertain contexts; and organize assimilated knowledge by linking it with preexisting structures." (pp. 172)
Sardana & Scott-Kemmis (2010)	"The process by which entrepreneurs develop skill and competency through experience and vicarious experience." (pp. 442)
Miller (2012)	"The learning engaged in by entrepreneurs during their pre-formation organizing activities that becomes embedded and implemented in the structures and practices of the venture" (pp. 62)

In their review of the literature on entrepreneurial learning research spanning the forty year period from 1972-2012, Wang and Chugh (2014) identified 75 academic journal articles which provided meaningful discussion of learning within entrepreneurial processes. Of the articles they identified, nearly one-third (22 articles) drew from March's (1991) seminal work on explorative and exploitative learning. However, recently, scholars have begun to unfold the aspects of the degrees and types of explorative and exploitative learning (e.g. Piao & Zajac, 2015). Using an organizational learning lens, Piao and Zajac (2015) propose that three distinct types of learning occur within an organization. In addition to exploratory activities to find new opportunities, they assert that actors may engage in two distinct types of exploitation: incremental exploitation, which they define as "the creation of new designs for existing products" (pp. 2), and repetitive exploitation, defined as "the repetition of existing designs for existing products" (pp. 2). These distinctions are important as different types of learning are advantageous at different stages in the organizational life cycle. A key argument of this paper is that entrepreneurs' time and attention are not exclusively allocated between exploratory and exploitative actions. Entrepreneurs and CEOs are often tasked with managing and running the day-to-day actitivies of the organization (Cao et al., 2009; He & Wong, 2004; Lubatkin et al., 2006; Mueller et al., 2012; Volery et al., 2013). Furthermore, as organizations grow, entrepreneurs spend more time on administrative functions such as accounting, efficiency, and control (Greiner, 1998; Kazanjian, 1988; Smith, Mitchell, & Summer, 1985). Given that the purpose of this study is to provide insights on the conditions which influence different types of enrepreneurial learning, I build upon the recent work by Piao and Zajac

(2015) describing individual behavior related to three distinct types of learning within an organization—exploratory learning, exploitative learning, and efficiency learning.

2.2.1 Exploratory Learning

Exploratory learning refers to learning which is new to the actor, broadening existing knowledge and competencies. Exploratory learning coincides with the characterization of exploration as "search, variation, risk taking, experimentation, play, flexibility, discovery, [and] innovation" (March, 1991, pp. 71). Exploratory learning is related to activities such as "innovation, basic research, invention, risk taking, building capabilities, entering new lines of business, and investments in absorptive capacity" (Koza & Lewin, 1998, pp. 256). Often, exploration is motivated by the desire to uncover something new (Rothaermel & Deeds, 2004). According to (Politis, 2005) exploration involves "variation, experimentation, discovery, and innovation" (pp. 408), and the resulting knowledge is often new and diverse. Because exploratory learning is related to knowledge which is novel, new, and unrelated to an actors existing knowledge, exploratory learning typically involves learning that comes from outside of the organization.

2.2.2 Exploitative Learning

Exploitative learning refers to learning which builds upon an actor's existing knowledge, deepening and refining existing knowledge and competencies. Exploitative learning coincides with the characterization of exploitation as "refinement", "choice", and "selection" (March, 1991). Exploitative learning typically involves a more directed search, building upon the knowledge and competencies that an individual already possesses. The resulting learning is often the refinement of existing knowledge (Politis, 2005).

Exploitation builds upon previously pursued concepts, ideas, and knowledge to establish stability within the organization. According to Atuahene-Gima & Murray (2007), exploitative learning often involves "information search within a well-defined and limited product/market solution space" closely related to one's current knowledge (pp. 3). Therefore, exploitative learning often leads to knowledge that elaborates on existing beliefs, deepening and refining existing knowledge. In this way, exploitative learning corresponds with activities related to "increasing the productivity of employed capital and assets—improving and refining existing capabilities and technologies" (Koza & Lewin, 1998, pp. 256).

2.2.3 Efficiency learning

Efficiency learning refers to learning which cultivates expertise and effectiveness in existing knowledge and competencies, often resulting from the routine and repetitive application of existing knowledge. Tucker, Edmondson, and Spear (2002) ascertain that "one-way organizational learning can occur is through problem solving- identifying and resolving problems that occur in the execution of day-to-day work routines" (pp. 124). Within the organization, efficiency learning "occurs when a firm repeats its existing designs for its existing products" (Piao & Zajac, 2015, pp. 1432) and is often directed at improving efficiencies and reducing costs with little or no change regarding existing product-market domains (Piao & Zajac, 2015). Efficiency learning coincides with the characterization of exploitation as "production", "execution", and "efficiency" (March, 1991), and corresponds with activities related to "standardization, routinization, and systematic cost reduction" (Koza & Lewin, 1998, pp. 256).

In summary, several key assumptions comprise the basis of a framework of entrepreneurial learning at the individual level of analysis.

Premise 1: Individual learning forms the basis of organizational learning.

Premise 2: Learning within an organization is a social process influenced by behavioral, organizational, and personal cognitive factors.

Premise 3: Entrepreneurs are time constrained and engage in many activities which are routine in carrying out the daily activities of an organization.

Premise 4: At the level of the individual, entrepreneurial learning involves tensions among the acquisition of new knowledge (exploration), the incremental improvement or refinement of existing knowledge (exploitation), and the day-to-day activities and routines of performing a job or running a venture (repetition).

3 DEVELOPMENT OF HYPOTHESES

Chapter 3 describes the theoretical framework and proceeds to develop a series of hypotheses aimed at providing insights toward answering the primary research question "*Under what conditions do individuals engage in differing types of entrepreneurial learning?"* The theoretical framework for this study (depicted in Figure 3) draws on organizational learning theory and social cognitive theory to propose and examine a multi-level model of entrepreneurial learning. Hypotheses are developed surrounding the following themes: (1) the influence of prior outcomes (performance) on learning behaviors, as well as the (2) organizational factors and (3) personal cognitive characteristics which moderate these relationships.

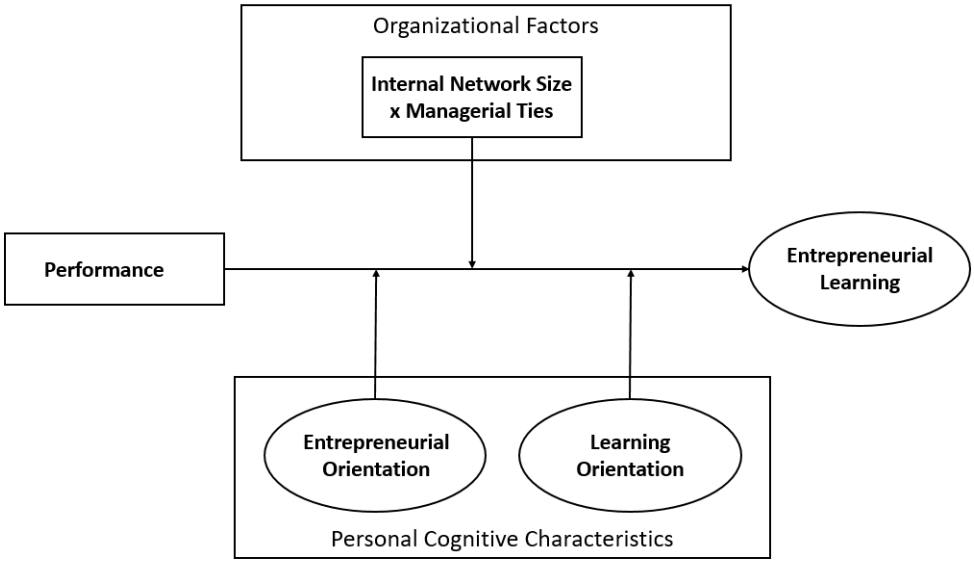

Figure 3: Top Level View of the Hypothesized Models

3.1 The Role of Prior Outcomes on Entrepreneurial Learning

One factor which has been long suggested to have an impact on entrepreneurial learning is the outcome of previous entrepreneurial events (Politis, 2005). According to social cognitive theory (Bandura, 1977b, 1977a, 1982, 1986; Wood & Bandura, 1989), behavioral factors—such as prior outcomes—are one of the three interconnected elements which direct individual learning through the "triadic reciprocality" of interactions among aspects of "behavior itself (previous successful or unsuccessful performances)", "the environment (consequences from the organizational environment)", and "the person (unique personal characteristics)" (Stajkovic & Luthans, 2002, pp. 127). In fact, prior behavior and behavioral outcomes have been suggested to be better predictors of individual behavior than attitudes and intentions (Ouellette & Wood, 1998; Ronis, Yates, & Kirscht, 1989). Therefore, social cognitive theory offers an insightful framework in examining the role of prior entrepreneurial outcomes on individual learning.

Learning and performance are entangled in an intricate relationship (Dayaram & Fung, 2012). Although learning is essential to organizational growth and survival, learning within an organization is not always adaptive (Argote, 1999; Levinthal & March, 1993; Miner & Mezias, 1996). One major concern of the organizational learning process is the danger of falling into patterns of maladaptive learning, often referred to as learning "traps". *Learning traps* refer to patterns of action that reduce the ability to learn. Extant literature has discussed numerous types of learning traps (many of which overlap) such as power traps, success traps, competence traps, vision traps, technology traps, familiarity traps,

maturity traps, propinquity traps, and failure traps (Ahuja & Lampert, 2001; Levinthal & March, 1993; Wei, 2006). For the purposes of this research, I focus on a dichotomy of learning traps that may result from prior behavioral outcomes (organizational performance)—the "success trap" and the "failure trap".

On the one hand, when individual and organizational actions produce desirable outcomes, learning processes are susceptible to what are known as "success traps" or "exploitation traps". The premise of the success trap suggests that organizational actors are apt to fall into a category of traps in which prior successful outcomes interfere with the ability to learn and adapt, focusing on excessive exploitation at the expense of exploration. Actions attributed to positive performance become embedded in individuals within the organization in the form of policies, procedures, rules, norms, and routines (Blackler, 1995; Granovetter, 1985; Levitt & March, 1988). In turn, the routinization of action results in increased stability and decreased variety. Although stability is likely to provide short-term advantages, the resulting learning becomes increasingly passive and is incompatible with change (Hannan & Freeman, 1984). Several factors likely contribute to the tendency for actors to fall into exploitation traps. First, actors and organizations invest time and resources seeking out opportunities, developing capabilities and competencies to exploit those opportunities, and refining these opportunities as they acquire experience and knowledge. When actions produce desirable outcomes, there is less incentive to continue searching for alternatives, and more incentive to imitate past actions that produced favorable results. Throughout this gradual process, it becomes easier and easier to justify the continued exploitation of knowledge and known opportunities which have been successful in the past as opposed to searching for new and better alternatives that will be

necessary for success in the future. However, increasing focus on exploitation puts knowledge at risks of obsolescence (McGrath, 2001). This pattern of action becomes maladaptive when past success motivates actors and organizations to expend resources on substandard routines or technologies which were once successful, rather than exploring for superior and/or newer alternatives (Levinthal & March, 1993).

Additionally, success also fosters self-efficacy, confidence, and persistence (Sitkin, 1992), lending actors to acquire more experience and competence at activities which lead to positive outcomes. When actors invest time and resources gathering experience, building competence, and developing capabilities, the motivation and ability to learn something new decreases. As actors and organizations "develop greater and greater competence at a particular activity, they engage in that activity more, thus further increasing competence and the opportunity cost of exploration" (Levinthal & March 1993, pp. 106). Further, once learning has been routinized and institutionalized, it is difficult to change, whereas existing routines create barriers to new learning and must be unlearned in order for new knowledge to be created (Navarro & Moya, 2005; Newstrom, 1983).

On the other hand, when individual and organizational actions produce undesirable outcomes, learning processes are susceptible to what are known as "failure traps" or "exploration traps". Past activities which result in negative outcomes provide considerable potential for organizational learning (S. G. Green, Welsh, & Dehler, 2003). The premise of the failure trap suggests that organizational actors are apt to fall into a category of traps in which prior unsuccessful outcomes interfere with the ability to expropriate the returns from learning by focusing on excessive exploration at the expense of exploitation. Failure traps occur as "failure leads to search and change which leads to failure which leads to

more search, and so on" (Levinthal & March 1993, pp. 104). In this case, unsuccessful outcomes indicate a gap in existing knowledge. The logic here surmises that when activities fail to produce perceptible and desirable outcomes, organizations will continue searching for superior and/or new alternatives. In fact, there is substantial empirical evidence that performance which fails to reach desired levels precipitates change (Greve, 2003). However, actors and organizations which focus on exploration at the expense of exploitation are unlikely to extract the full benefits of existing knowledge and competencies (Gupta et al., 2006). Further, excessive focus on exploration at the disinvestment of exploration is likely to drain resources, eventually even driving out exploitation (Levinthal & March 1993).

Although the aforementioned literature has provided numerous insights on the implications of performance on learning within organizations, we know less about how these are manifest among entrepreneurs within the organizations they own and manage. Entrepreneurs and key decision makers are charged with carefully balancing exploration and exploitation activities alongside the day-to-day operating tasks of the organization (Cao et al., 2009; He & Wong, 2004; Lubatkin et al., 2006; Mueller et al., 2012; Volery et al., 2013) within limited time and attention spans (Garud & van de ven, 1992; Gifford, 1997).

In relation to entrepreneurial learning, I argue that prior entrepreneurial performance is closely related to the specific types of learning in which an entrepreneur subsequently engages. First, I posit that prior performance is related to exploratory learning in a negative manner such that lower levels of performance will stimulate an increase in an entrepreneur's exploratory learning whereas higher levels of performance will stimulate a

decrease in exploratory learning. These are the basic premises of the "exploration" and "exploitation" traps (Levitt & March, 1988). Exploratory learning refers to that which coincides with the characterization of exploration as "search, variation, risk taking, experimentation, play, flexibility, discovery, [and] innovation" (March, 1991, pp. 71), and is often associated with the acquisition of diverse knowledge which is new, novel, and unrelated to an entrepreneurs existing knowledge. When performance is at or above aspirations, actors are apt to spend time and resources on activities attributed to such performance, therefore, they will be less likely to search for new knowledge and opportunities. Furthermore, with increasing performance, entrepreneurs and executives become more and more committed to the status quo and what is working, and focus less on searching for new alternatives (Geletkanycz & Hambrick, 1997). However, when performance is below aspirations and prior behavior is instead associated with poor performance, entrepreneurs will be apt to search for new knowledge—that which is associated with exploratory learning. Therefore, I propose:

Hypothesis 1: Organizational performance is negatively associated with individual entrepreneur's engagement in exploratory learning.

Next, I posit that prior performance is related to exploitative learning in a curvilinear manner such that initial performance increases will stimulate an increase in exploitative learning; however, as performance reaches and surpasses aspirations, the nature of this relationship will change, instead stimulating decreasing investment in exploitative learning. Exploitative learning coincides with the characterization of exploitation as "refinement", "choice", and "selection" (March, 1991), and is often associated with learning which builds on and extends current knowledge and capabilities.

Entrepreneur's invest time and resources learning to improve the "applications of [their] existing resources and capabilities" (Sirén et al., 2012, pp. 19); however, because exploitative learning does consume time and resources, when entrepreneurs reach their aspired level of performance, their motivation to continue learning and searching for new alternatives will decrease. Thus, I propose:

Hypothesis 2: Organizational performance will exhibit an inverted U-shaped relationship with individual entrepreneur's engagement in exploitative learning.

Finally, I posit that prior performance is related to efficiency learning in a positive manner such that lower levels of performance will stimulate a decrease in efficiency learning, whereas higher performance levels will stimulate an increase in efficiency learning. Efficiency learning coincides with the characterization of exploitation as "production", "execution", and "efficiency" (March, 1991), and is often associated with efficiency, routine problem-solving, and cutting costs. Efficiency learning occurs through the repetition of prior activities, which have become routinized because they have worked in the past. As previously argued, when entrepreneurs reach their aspired level of performance they will be less motivated to continue learning and more apt to repeat what has worked in the past. From this logic, I propose:

Hypothesis 3: Organizational performance is positively associated with individual entrepreneur's engagement in efficiency learning.

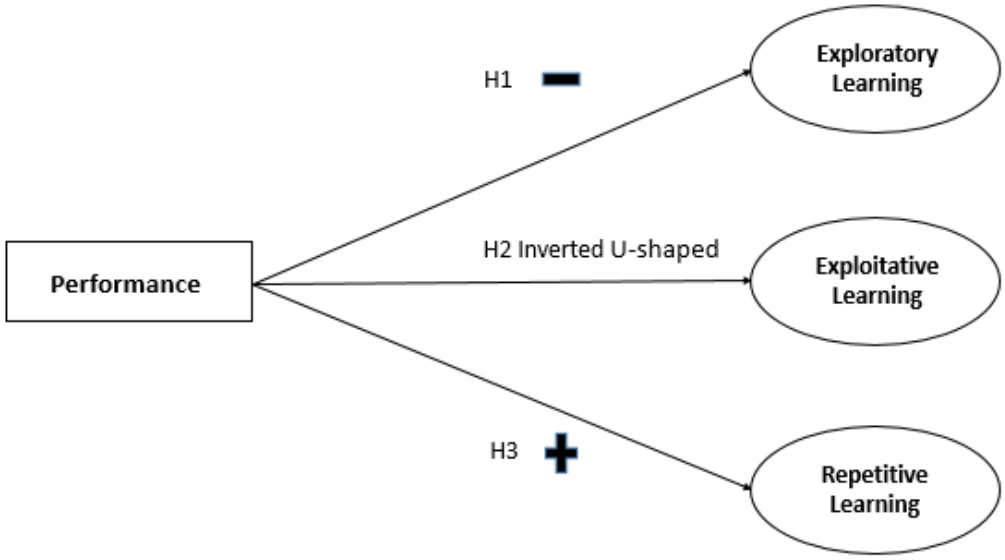

Figure 4: The Impact of Organizational Performance on Learning

3.2 The Role of the Organizational Environment on Performance-Learning Relationships

A second set of determinants of entrepreneurial learning in a multi-level learning process is composed of the elements of the organizational environment. In accordance with social cognitive theory, environmental factors, such as the characteristics of the organization, are one of three interconnected elements which direct individual learning and action (Bandura, 1986). According to Arrow (1974), organizing aids knowledge, as shared learning often takes place in complex, collaborative social practices (Brown & Duguid, 1991). However, social interactions—one of the primary avenues of sharing knowledge within an organization— vastly differ among organizations. Therefore, the second research question theme to be addressed concerns the influence of the social and relational aspects of the organizational environment on entrepreneurial learning.

To better understand the role of the organizational environment on entrepreneurial learning processes, this research attempts to answer the research question: "[To what extent] Do elements of the organizational environment moderate the impact of organizational performance on entrepreneurial learning?" Specifically, this research investigates the moderating roles of internal and external social relationships on entrepreneurial learning. In a social context, entrepreneurs and their top management teams engage in social interactions both inside and outside of their organizations, which influences organizational learning and strategy (Dubini & Aldrich, 1991). According to Simon (1991), "What an individual learns in an organization is very much dependent on what is already known to (or believed by) other members of the organization and what kinds of information are present in the organizational environment" (pp. 126). Therefore, this research focuses on the impact of the size of an organization's internal network and how that network is connected through its intra- and extra-industry managerial ties. Figure 5 depicts the overview of the hypothesized role of organizational level factors on the performance-learning relationship.

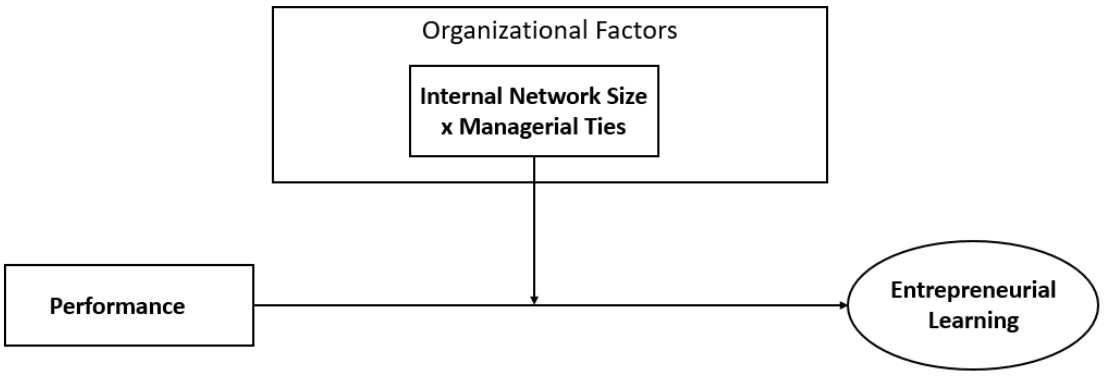

Figure 5: Organizational Level Moderators of the Entrepreneurial Learning Process

3.2.1 Internal Network Density and Managerial Ties

As the aforementioned Simon (1991) quote suggests, the members in one's organization play a pivotal role in what individuals learn. Through internal social relationships, organizational members are provided access to the other members' knowledge (Uzzi, 1997). According to social capital theory, social interactions are a key source of learning within an organization (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998). Likewise, social interactions among organizational members are a key source of learning for entrepreneurs. Lockett *et al.* (2006) note "entrepreneurs rarely act alone" (pp. 117). A significant number of new ventures are formed by teams of entrepreneurs or teams are recruited in the early years of the venture (Ruef, Aldrich, & Carter, 2003; Schjoedt & Kraus, 2009), in many cases for the purpose of access to important skills and knowledge (Forbes, Borchert, Zellmer-Bruhn, & Sapienza, 2006). Entrepreneurs interact with others within their entrepreneurial teams, such as members of an ownership group and top management teams (TMTs), on a regular basis providing access to members' individual knowledge. Top management team refers to an organization's "dominant coalition"- or the

key decision makers who are responsible for organizational strategy (Cyert & March, 1963; Hambrick & Mason, 1984).

In many cases, entrepreneurial teams learn collectively, whereby knowledge develops not only in the mind of the individual, but across the entrepreneurial team (Breslin & Jones, 2012; Dutta & Crossan, 2005; O. Jones & Macpherson, 2006). Cao *et al.* (2009) note that this may be particularly true in small and medium enterprises (SMEs), where lead entrepreneurs, along with their top management teams, operate as "collectives in which information and knowledge processes … are likely to take place at the interactional interface" among the CEO or lead entrepreneur and his or her top managers (pp. 1273). In general, larger networks and teams have a higher capacity for knowledge and information sharing than smaller networks and teams (Burt, 1982; Granovetter, 1973). For examle, Reagans and McEvily (2003) argue and find empirical evidence that an individual's network density—the number of connections around a relationship—plays a significant role in the ease of knowledge acquisition. However, while the size of an entrepreneur's internal network—members of the ownership group and top management team—may indicate its capacity for knowledge and information sharing (Burt, 1982; Granovetter, 1973), it says little as to the types of entrepreneurial knowledge introduced into the network. Therefore, the size of an entrepreneur's internal network is insufficient in determining the type of learning in which entrepreneurs will engage. As Granovetter (1973) discerned, although social relationships may expose individuals to new and novel information, they may also reinforce existing beliefs that reduce the likelihood of learning.

Managerial ties may be one distinguishing factor in determining the types of entrepreneurial learning that may be facilitated by an entrepreneur's internal network.

Managerial ties refer to "executives boundary spanning activities and their associated interactions with external entities" (Geletkanycz & Hambrick, 1997, pp. 654). Geletkanycz and Hambrick (1997) characterize executives' boundary spanning activities with outside executives as intra-industry managerial ties (i.e. ties within an organization's industry) and extra-industry managerial ties (i.e. ties outside of an organization's industry). Each is likely to facilitate entrepreneurial learning, but in a different manner. For example, Atuahene-Gima and Murray (2007) examined the intra- and extra-industry managerial ties of TMT's in new technology ventures in China and found that intra- and extra-industry managerial ties were related to both exploratory and exploitative learning in new product development in opposing manners. However, although exploration and exploitation may compose the types of learning related to new product development, prior research does not speak to the repetitive and routine, non-information seeking activities that comprise a majority of organizational actions.

In relation to entrepreneurial learning, I argue that the interaction between the size of an entrepreneur's internal network and that network's *intra-industry* boundary spanning activities will moderate the relationship between prior performance and the engagement in subsequent types of entrepreneurial learning. First, I posit that the interaction of network density and intra-industry managerial ties is related to exploratory learning in a negative manner such that larger internal networks with greater investments in intra-industry managerial ties will strengthen the negative relationship between performance and exploratory learning. According to Geletkanycz and Hambrick (1997), intra-industry managerial ties promote strategic conformity and may diminish individual's ability to

identify opportunities and innovate. Therefore, entrepreneurs with more extensive intra-industry ties will be less likely to be exposed to and acquire exploratory learning.

I posit that the interaction of network density and intra-industry managerial ties is related to exploitative learning in a positive manner such that larger internal networks with greater investments in intra-industry managerial ties will stabilize the inverted U-shaped relationship between prior performance and exploitative learning. This is in accordance with several recent studies which have found that intra-industry managerial ties are positively related to exploitative learning in TMTs (Atuahene-Gima & Murray, 2007; Land, Engelen, & Brettel, 2012). Intra-industry ties increase top managers access to timely industry knowledge concerning the strategies and practices of other firms including emerging trends and technological knowledge. Ties between managers in the same industry expose entrepreneurs and their top management teams to knowledge related to other firms' policies and strategies, providing knowledge of alternatives, and allowing entrepreneurs to imitate these alternatives in their own firms. Therefore, entrepreneurs with more extensive intra-industry ties (larger networks and stronger ties) will also be more likely to be exposed to exploitative learning.

Finally, I posit that the interaction of network density and intra-industry managerial ties is related to efficiency learning in a positive manner such that larger internal networks with greater investments in intra-industry managerial ties will strengthen the positive relationship between performance and efficiency learning. Although entrepreneurs with more extensive intra-industry ties are likely to acquire more exploitative knowledge, often the knowledge acquired through other executives within the same industry provides little knowledge that is new or novel. Instead, Geletkanycz and Hambrick (1997) suggest

that an organization's inter-industry managerial ties may also be related to "strategic conformity" (pp. 654). Therefore, entrepreneurs with more extensive intra-industry ties (larger networks and stronger ties) will also be more likely to be exposed to efficiency learning.

Contrastingly, I argue that the interaction between an entrepreneur's internal network and that network's *extra-industry* boundary spanning activities will moderate the relationship between prior performance and the engagement in subsequent types of entrepreneurial learning. I posit that the interaction of network density and extra-industry managerial ties are related to exploratory learning in such a manner that larger internal networks with greater investments in extra-industry ties will mitigate the negative relationship between performance and exploratory learning. This is also in line with previous research which found that extra-industry managerial ties are related to exploratory learning in TMTs (Atuahene-Gima & Murray, 2007; Land et al., 2012). Ties between managers in outside industries have a greater likelihood of exposing entrepreneurs and their top management teams to knowledge that is new, novel, and unrelated to their current knowledge. Therefore, entrepreneurs with more extensive extra-industry ties will be more likely to be exposed to exploratory learning.

Second, I posit that the interaction of network density and extra-industry ties is related to exploitative learning in such a manner that larger networks with greater investments in extra-industry ties will stabilize the inverted U-shaped relationship between performance and exploitative learning. Entrepreneurs with greater extra-industry ties are exposed to diverse knowledge and perspectives. According to Geletkanycz and Hambrick (1997), extra-industry managerial ties may provide opportunities to "acquire insights into

courses of action that extend beyond prevailing industry practice" (pp. 660). Therefore, entrepreneurs with more extensive extra-industry ties will be more likely to be exposed to exploitative learning.

Finally, I also posit that the interaction of network density and extra-industry ties is also related to efficiency learning, however in such a manner that larger internal networks with greater investments in extra-industry ties will weaken the positive relationship between performance and exploratory learning. Whereas intra-industry managerial ties are expected to increase strategic conformity, entrepreneurs with more extensive extra-industry ties are more likely to be exposed to new alternatives to select from in regard to their current routines and practices. Therefore, entrepreneurs with more extensive extra-industry ties (larger networks and stronger ties) will also be less likely to be exposed to and continue engaging in efficiency learning. Thus, Hypotheses 4a, 4b, and 4c and 5a, 5b, and 5c follow:

> ***Hypothesis 4***: The interaction between the size of an entrepreneur's internal network and that network's intra-industry managerial ties is related to entrepreneurial learning such that as the size of internal networks and their associated investments in intra-industry managerial ties increases (a) the negative relationship between performane and exploratory learning will be more negative, (b) the inverted U-shaped relationship between perforance and exploitative learning will be less prononced and more positive, and (c) the positive relationship between performance and efficiency learning will be more positive.
>
> ***Hypothesis 5***: The interaction between the size of an entrepreneur's internal network and that network's extra-industry managerial ties is related to

entrepreneurial learning such that as the size of internal networks and their associated investments in extra-industry managerial ties increases (a) the relationship between performance and exploratory learning will be less negative, (b) the inverted U-shaped relationship between perforance and exploitative learning will be less prononced and more positive, and (c) the positive relationship between performance and efficiency learning will be less positive.

Figures 6 and 7 depict the hypothesized roles of managerial ties on the performance-learning relationship.

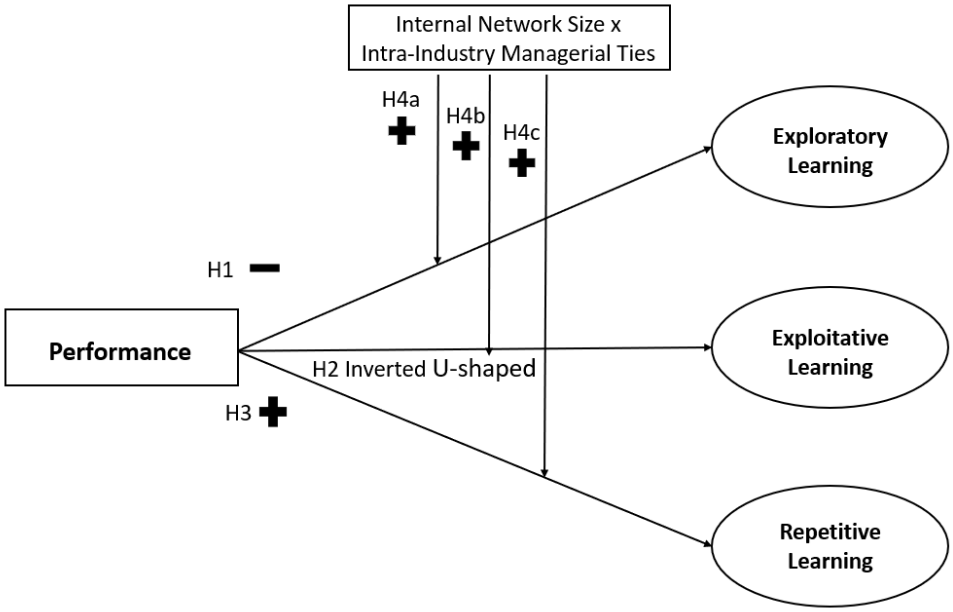

Figure 6: Hypothesized Role of Intra-Industry Managerial Ties on Entrepreneurial Learning

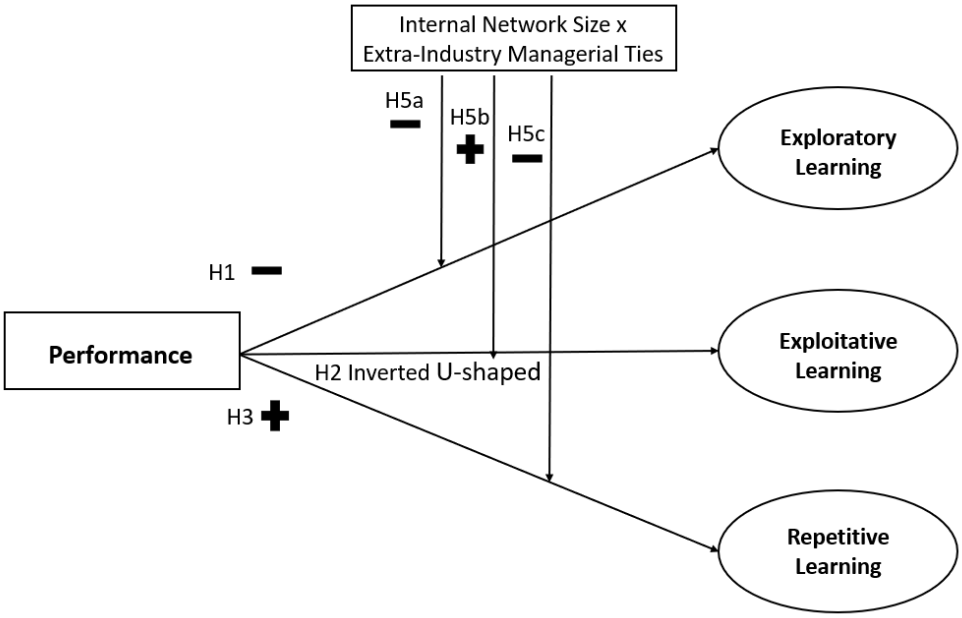

Figure 7: Hypothesized Role of Intra-Industry Managerial Ties on Entrepreneurial Learning

3.3 The Role of Personal Characteristics on Performance-Learning Relationships

The third set of determinants of entrepreneurial learning in a multi-level learning process is the individual's unique personal characteristics. In accordance with social cognitive theory, personal characteristics are the third of the three interconnected elements which direct individual learning and action (Bandura, 1986). Individuals differ from each other in their abilities to learn, understand, make judgments, adapt to the environment, and solve problems (Baron, 1998; Neisser & Boodoo, 1996; Shaver & Scott, 1991), all of which have been suggested to be important factors in the practice of entrepreneurship (McClelland, 1965; Shane, 2003). A significant portion of entrepreneurship research has examined the impact of individual differences on an individual's propensity to become an entrepreneur (De Wit & Van Winden, 1990; Nicolaou & Shane, 2009, 2010; Wit, 1993; Zhang et al., 2009), identify an entrepreneurial opportunity (Bandura, 1995; Gaglio & Katz, 2001; Gaglio & Taub, 1992), and even the overall performance of the firm (Baum, Calabrese, & Silverman, 2000; Hebert & Link, 1988; Shane, 2003; Van Praag & Cramer, 2001). Therefore, the final research question theme to be addressed concerns the influence of individual differences on entrepreneurial learning.

To better understand the role of unique personal characteristics on entrepreneurial learning processes, this research attempts to answer the research question: "[To what extent] Do personal cognitive factors moderate the impact of organizational performance on entrepreneurial learning?" Specifically, this research investigates the moderating roles of two aspects of the individual which may play key roles in shaping an individual's behavior and learning—an individual's entrepreneurial orientation and learning orientation (De Clercq, Honig, & Martin, 2012; Langkamp Bolton, 2012; Langkamp Bolton & Lane,

2012). Individual entrepreneurial orientation is associated with an individual's proclivity toward innovativeness, proactiveness, and risk taking (Langkamp Bolton & Lane, 2012), all of which have been associated with entrepreneurial learning (Alegre & Chiva, 2013; Becherer & Maurer, 1999; McCarthy, 2000). Further, some research suggests that learning orientation plays an important role in what and how entrepreneurs learn (De Clercq et al., 2012). Therefore, this research focuses on the role of an individual's entrepreneurial orientation and learning orientation in the entrepreneurial learning process. Figure 8, below, depicts an overview of the hypothesized role of personal characteristics on the performance-learning relationship.

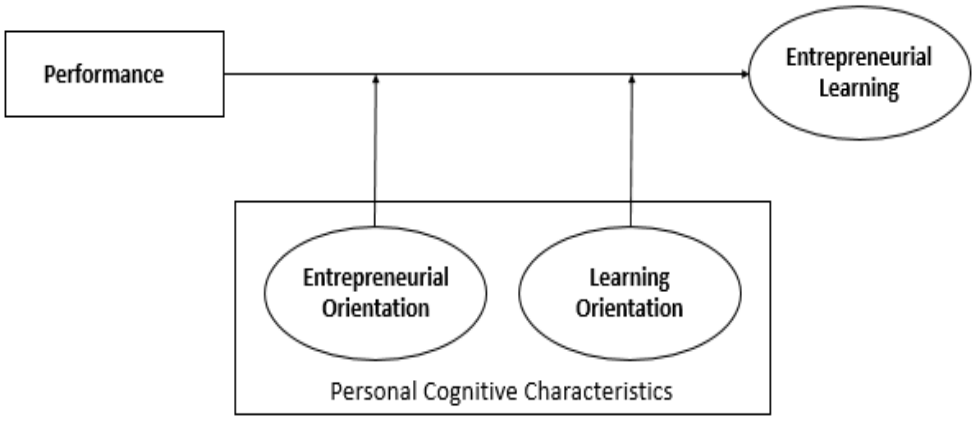

Figure 8: Individual Level Moderators of the Entrepreneurial Learning Process

3.3.1 Individual Entrepreneurial Orientation

Entrepreneurial orientation has the potential to influence the types of learning in which individuals engage within the entrepreneurial process. First proposed by Miller (1983) and further developed by Covin and Slevin (1991, 1989), entrepreneurial orientation

(EO) has been widely recognized as an organizational level construct reflecting a proclivity toward entrepreneurial behaviors. Miller (1983) and Covin and Slevin (1991, 1989) model organizational entrepreneurial orientation in terms of a strategy-making process or strategic posture, conceptualizing EO as consisting of three dimensions, that is: innovativeness, proactiveness, and risk-taking. Expounding on Miler's conceptualization, Lumpkin and Dess (1996) describe entrepreneurial orientation as "the processes, practices, and decision-making activities" that lead to entrepreneurial decisions and behavior (pp. 136), and expand on the dimensions of EO by proposing the addition of autonomy and competitive aggressiveness to Miller's original three dimensions.

In their meta-analysis of the entrepreneurial orientation construct, Rauch and colleagues (2009, pp. 763) synthesize previous work and provide depictions of the five proposed dimensions of EO. Autonomy refers to "independent action undertaken by entrepreneurial leaders or teams directed at bringing about a new venture and seeing it to fruition". Competitive aggressiveness refers to the "intensity of a firm's effort to outperform rivals". Innovativeness refers to a "predisposition to creativity and experimentation through the introduction of new products and services as well as technological leadership via R&D in new processes". Proactiveness is "an opportunity-seeking, forward-looking perspective characterized by new products and services ahead of the competition and acting in anticipation of future demands". Finally, risk-taking is "taking bold action by venturing into the unknown, borrowing heavily and/or committing significant resources to ventures in uncertain environments".

Entrepreneurial orientation has received vast attention in the entrepreneurship literature. At the organizational level, EO has been an object of much debate and subject

to hundreds of empirical examinations. In general, EO has been found to be closely related to innovation, growth, performance, and profitability (Avlonitis & Salavou, 2007; Moreno & Casillas, 2008; Rauch, Wiklund, Lumpkin, & Frese, 2009; Tang, Tang, Marino, Zhang, & Li, 2007; Wiklund & Shepherd, 2003, 2005). However this relationship is complex, as it is mediated and moderated by numerous factors (Rauch et al., 2009; Wales, Gupta, & Mousa, 2013; Wales, Monsen, & McKelvie, 2011). Wales *et al.* (2011a) note that there is "little understanding of the causal mechanisms of how or why EO affects other variables" (pp. 12). However, one factor suggested to be critical is competitive strategy. According to Moreno and Casillas (2008), "firms with greater entrepreneurial orientation will tend to develop certain types of strategies" (pp. 510). Consequently, one key to understanding small firm performance is better understanding the relationships between entrepreneurial orientation and competitive strategy (Lechner & Gudmundsson, 2014; Wales et al., 2013).

Although entrepreneurial orientation has been primarily studied at the organizational level, it has been widely suggested that organizational EO is set and supported by founding entrepreneurs and top managers (Avlonitis & Salavou, 2007; Covin & Slevin, 1989; Lumpkin & Dess, 1996). Founders hold important influence on the activities and strategies of the organizations they manage (Boeker, 1989; Chandler & Jansen, 1992; Peteraf & Shanley, 1997). According to Lau, Shaffer, and Au (2007), "entrepreneurial firms are a natural extension of entrepreneurs" (pp. 127). Thus, entrepreneurial orientation is often a result of the actions and positions of founding entrepreneurs, executives, and the top management team (Joardar & Wu, 2011).

More recently, scholars have begun to unpack entrepreneurial orientation as an individual level construct reflecting an individual's proclivity to act entrepreneurially.

Recent research has identified the dimensions of innovation, proactiveness, and risk-taking as those most salient at the level of the individual (Langkamp Bolton & Lane, 2012). Within the limited research on individual entrepreneurial orientation (IEO), the majority of studies undertaken examine the relationship between IEO and firm performance or IEO and entrepreneurial intentions (Kollmann, Christofor, & Kuckertz, 2007; Langkamp Bolton, 2012; Langkamp Bolton & Lane, 2012). However, considering the critical relationship between entrepreneurial orientation and competitive strategy (Lechner & Gudmundsson, 2014), it is also important to consider how an entrepreneur's individual entrepreneurial orientation influences the strategies one utilizes to learn in relation to his or her venture.

In relation to an entrepreneur's learning, I posit that individual entrepreneurial orientation is related to exploratory learning in a positive manner such that stronger entrepreneurial orientation will mitigate the negative relationship between prior performance and exploratory learning. Entrepreneurs with a strong entrepreneurial orientation are characterized as more inclined to act innovatively and proactively and take calculated risks. Many theories of innovation and creativity note that innovativeness is often the result of the accumulation of diverse knowledge (Griffiths-Hemans & Grover, 2006; Katila & Ahuja, 2002; Laursen & Salter, 2006; von Hippel, 1988), which is the product of exploratory learning. Further, proactiveness lends an actor to exploratory activities such as "seeking new opportunities which may or may not be related to the present line of operations, [the] introduction of new products and brands ahead of competition, and strategically eliminating operations which are in the mature or declining stages of their life cycle" (Venkatraman, 1989, pp. 949). Finally, while exploratory learning

is important in the discovery of an entrepreneurial idea and the early stages of a venture, as ventures grow and organizations find routines that are known to produce favorable results, deviations from known behaviors become increasingly risky. Entrepreneurs with a strong entrepreneurial orientation are more likely to take bold actions often associated with exploration. Therefore, I posit that entrepreneurs with a stronger entrepreneurial orientation—those more likely to act innovatively and proactively, while taking calculated risks—may be more apt to take the calculated risks associated with exploratory learning.

Next, based on the above discussion, I posit that individual entrepreneurial orientation is related to exploitative learning in a positive manner such that stronger entrepreneurial orientation will stabilize the inverted U-shaped relationship between prior performance and exploitative learning. Entrepreneurs with a proclivity toward innovativeness may also be drawn to the accumulation of knowledge geared toward incrementally exploitative knowledge. Lumpkin and Dess (1996) note that "innovativeness may occur along a continuum from a simple willingness to either try a new product line or experiment with a new advertising venue" (pp. 143). Additionally, acting proactively involves the use of exploitative knowledge in seeking related opportunities and introducing new products ahead of competitors (Venkatraman, 1989). Further, introducing new product and service extensions are also associated with their own risks, not only in short-term performance, but also the long-term reputation of the brand and the company (Ambler & Styles, 1997; DelVecchio & Smith, 2005).

Finally, while I expect individual entrepreneurial orientation will be related to exploratory learning and exploitative learning in a positive manner, I posit that individual entrepreneurial orientation is related to efficiency learning in a negative manner such that

stronger entrepreneurial orientation will lessen the positive relationship between prior performance and efficiency learning. Efficiency learning is characterized as learning deriving from known routines and behaviors (Piao & Zajac, 2015), quite the opposite of innovativeness, proactiveness, and risk taking. From the preceding logic, I propose:

Hypothesis 6*:* Individual entrepreneurial orientation is related to entrepreneurial learning such that with increasing entrepreneurial orientation (a) the negative relationship between performance and exploratory learning will be less negative, (b) the inverted U-shaped relationship between perforance and exploitative learning will be less prononced and more positive, and (c) the positive relationship between performance and efficiency learning will be less positive.

Figure 9 depicts the hypothesized roles of entrepreneurial orientation on the performance-learning relationship.

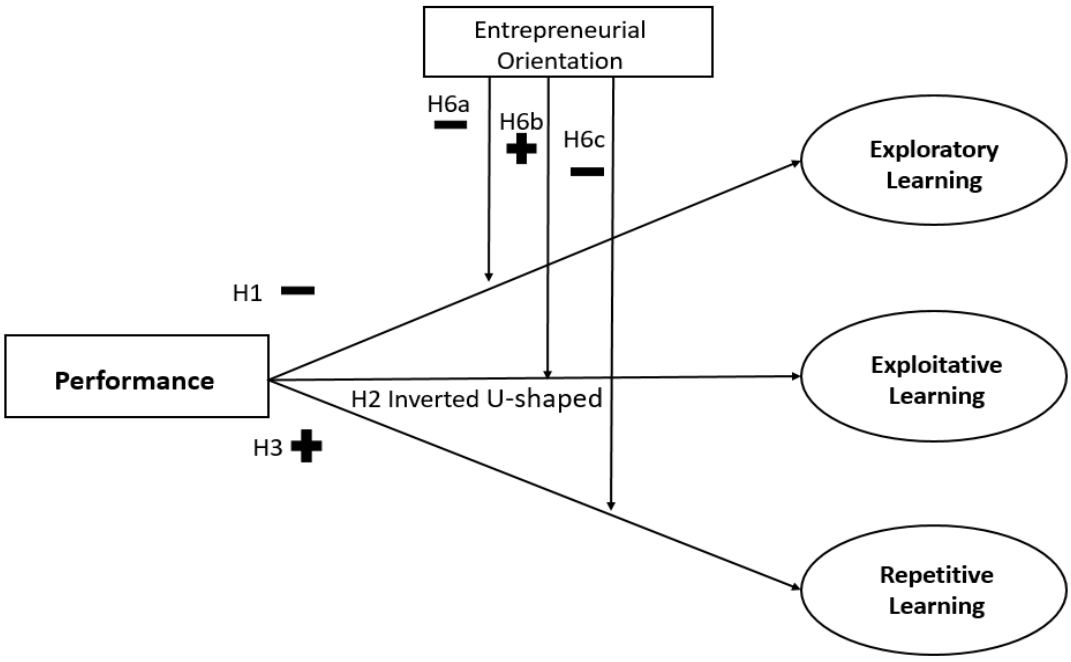

Figure 9: The Hypothesized Role of Entrepreneurial Orientation on Entrepreneurial Learning

3.3.2 Learning Orientation

An entrepreneur's learning orientation also has the potential to influence the types of learning in which individuals engage within the entrepreneurial process. Learning orientation characterizes an individual's basic attitude toward learning, and refers to an individual's inclination to continuously search for new knowledge and regularly update his or her knowledge sets (Kolb, 1984; VandeWalle, Brown, Cron, & Slocum Jr., 1999). Individuals with a strong learning orientation have a thirst for knowledge and a motivation to learn (Colquitt & Simmering, 1998), and they are attracted to complex and challenging tasks (Ames & Archer, 1988) which they approach intent on learning new skills (Dweck, 1986) and improving existing skills (Brett & VandeWalle, 1999).

According to learning theory, a predisposition toward learning bolsters one's ability to assess alternatives and generate novel solutions to current problems and unanticipated situations (Cohen & Levinthal, 1990). Within individuals, learning orientation has been found to be closely related to motivation, effort, creativity, and performance (Colquitt & Simmering, 1998; Gong, Huang, & Farh, 2009; Steele-Johnson, Beauregard, Hoover, & Schmidt, 2000; VandeWalle et al., 1999). For example, Steele-johnson et al. (2000) found that individuals with stronger learning orientation exhibited higher self-efficacy and motivation when undertaking complex and inconsistent tasks. Higher self-efficacy, motivation, and the ability to generate a greater number of alternatives all have implications on creativity, learning, and performance. Further, entrepreneurs are able to establish a strong learning orientation within their organizations by fostering a commitment to learning, open-mindedness and shared vision (Sinkula, Baker, & Noordewier, 1997). At the organizational level, a strong learning orientation has been associated with higher levels

of learning and performance (Baker & Sinkula, 1999; Spicer & Sadler-Smith, 2006; Wang, 2008).

In relation to entrepreneurial learning, I argue that an entrepreneur's learning orientation moderates the relationship between prior performance and the subsequent engagement in each of the specific types of entrepreneurial learning. First, I posit that an entrepreneur's learning orientation is related to exploratory learning in a positive manner such that stronger learning orientation will partially negate the negative relationship between prior performance and exploratory learning. Learning orientation has been positively associated with openness to new experiences (Brett & VandeWalle, 1999), as individuals with a strong learning orientation are inclined to continuously expand their knowledge sets (Ames & Archer, 1988; Dweck, 1986). Connecting an individual's learning orientation and managerial activities and assignments, Dragoni *et al.* (2009) found that individuals with stronger learning orientations were more likely to engage in development activities—activities which "provide opportunities for learning new skills, behaviors, and perspectives" (pp. 732). Therefore, I posit that an entrepreneur's learning orientation will moderate the performance-learning relationship such that an entrepreneur with a strong learning orientation be more inclined to engage in exploratory learning—which is often associated with the acquisition of knowledge that is diverse- new, novel, and unrelated to an entrepreneur's existing knowledge.

Next, I posit that an entrepreneur's learning orientation is related to exploitative learning in a positive manner such that stronger learning orientation will stabilize the inverted U-shaped relationship between prior performance and exploitative learning. Individuals with a higher learning orientation have been found to espouse goals which

focus not only on developing new skills, but also refining existing skills (Brett & VandeWalle, 1999). Further, individuals with a strong learning orientation exhibit higher self-efficacy in dynamic and uncertain environments, and are more likely to believe that they can further exploit their current knowledge to adapt to an uncertain future (Dweck & Leggett, 1988; Vandewalle, 1997). Exploitative learning seeks information that deepens and refines existing knowledge in order to build upon and improve existing knowledge and competencies. Thus, I posit that an entrepreneur's learning orientation will moderate the performance-learning relationship such that an entrepreneur with a strong learning orientation may also be more inclined to engage in exploitative learning.

Finally, while I expect learning orientation will be related to exploratory learning and exploitative learning in a positive manner, I posit that individual learning orientation is related to efficiency learning in a negative manner such that stronger learning orientation will lessen the positive relationship between prior performance and efficiency learning. As entrepreneurs with stronger learning orientations are more motivated to engage in and derive more satisfaction from opportunities to learn and acquire new knowledge, an entrepreneur's learning orientation will moderate the performance-learning relationship such that an entrepreneur with a strong learning orientation will be less inclined to engage in repetitive activities which limit their ability to learn. Based on the above arguments, I propose:

> ***Hypothesis 7***: Learning orientation is related to entrepreneurial learning such that with increasing learning orientation (a) the negative relationship between performance and exploratory learning will be less negative, (b) the inverted U-shaped relationship between perforance and exploitative learning will be less

prononced and more positive, and (c) the positive relationship between performance and efficiency learning will be less positive.

Figure 10 depicts the hypothesized roles of learning orientation on the performance-learning relationship.

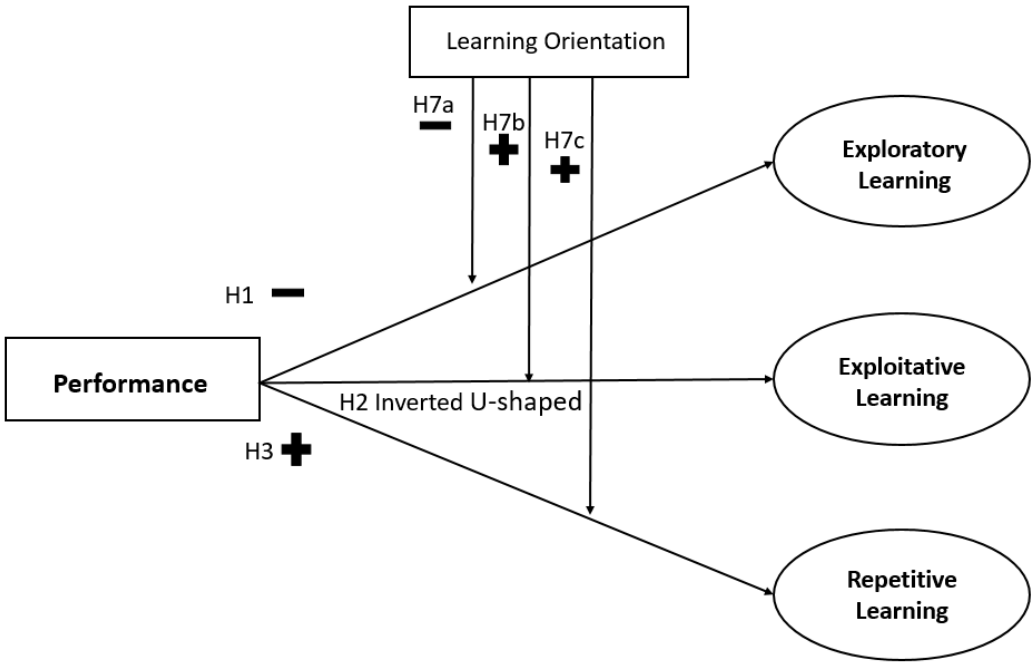

Figure 10: The Hypothesized Role of Learning Orientation on Entrepreneurial Learning

4 RESEARCH METHODS

Chapter 4 details the research plan used to a) advance the conceptual and empirical development of the entrepreneurial learning constructs, b) examine the impact of prior outcomes on an individual's behaviors associated with entrepreneurial learning, and c) investigate organizational factors and individual cognitive characteristics which may moderate these relationships. The methodology utilized in this stream of research consists of a multi-study format employing pilot interviews, statistical concepts and tools, descriptive statistics, Q-Sort methodology, expert review, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Hierarchical Linear Regression. Specifically, this chapter describes the research plan, sampling frame, research instrument, data collection procedures, and presents the descriptive statistics of the sample.

4.1 Research Plan

The research plan utilized in this study is employed in two stages. In Stage 1, I work to build and validate a measure of entrepreneurial learning at the individual level of analysis. In Stage 2, I then use these measures of entrepreneurial learning from Stage 1 to assess the research questions and test the study hypotheses. Figure 11 outlines the overall research design.

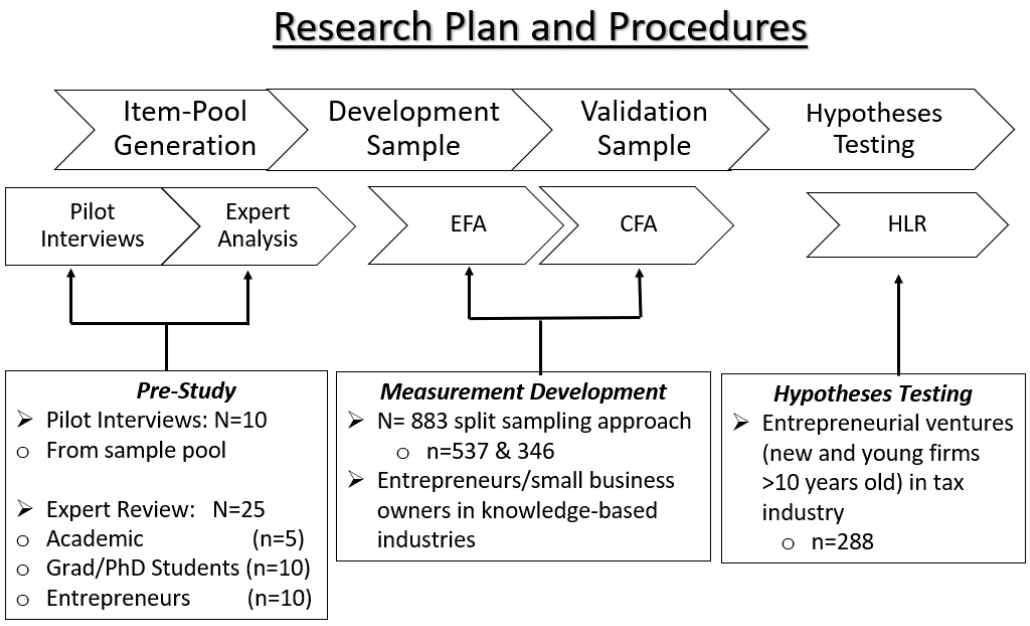

Figure 11: Research Plan

Stage 1 focuses on the development of a 3-factor measure of entrepreneurial learning. First, I conducted a pre-study employing inductive and deductive item building, Q-Sort methodology, and expert analysis to develop and narrow an initial item pool. Next, the initial pool of items was administered to a developmental sample in a questionnaire which collected the items developed in the pre-study along with scales measuring the previously hypothesized variables, as well as several variables intended for the examination of validity. Finally, I use a split sampling approach to conduct a series of exploratory and confirmatory factor analyses to develop and validate a measure of entrepreneurial learning.

Stage 2 assesses the overall research question by examining the series of previously discussed hypotheses. In Stage 2, I utilize hierarchical linear regression to examine the study hypotheses. The three measures of entrepreneurial learning from Stage 1 serve as the dependent variables in this study.

In the proceeding sections, I first describe the sampling frame and research instrument, and then outline the data collection procedures and sample descriptive statistics.

4.2 Sampling Frame

The primary sample for this research is drawn from the population of Authorized Internal Revenue Service (IRS) e-file providers engaged in the United States tax preparation industries. Simply put, an Authorized IRS e-file provider is any business or organization—which meets the eligibility criteria and passes a suitability check—authorized by the IRS to participate in IRS e-file services (Department of the Treasury (Internal Revenue Service), 2013). This includes income tax preparation firms as well as firms in adjacent industries which also serve this market (accounting, law, human resources, payroll, etc.). The income tax preparation industry is unique in that in the United States it is strictly regulated and closely monitored by the IRS. In order to remain compliant with the IRS e-file mandate, which went into effect on January 1st, 2012, any firm that prepares and files 11 or more individual income tax returns during a calendar year must register as an Electronic Return Originator (ERO). The IRS manages the E-file application process through a database and web-based application known as the Third-Party Data Store (TPDS).

TPDS data includes information on each IRS authorized e-file provider from the initial (or a revised) application for ERO registration such as the organization's name, DBA (doing business as), address, and telephone number; as well as information pertaining to the number of partners with equity. TPDS data also includes contact information such as the responsible official's name, address, telephone number, and professional background.

Additionally, TPDS data includes information concerning the type of services each IRS authorized e-file provider has been approved to offer (i.e. individual tax preparation, partnership tax preparation, corporate tax preparation, non-profit tax preparation, etc.), along with the number of returns transmitted, accepted, and rejected for each of the previous three years. Total return counts are a standard measure of performance within the industry and are often used as a benchmark of health and performance, providing valuable longitudinal performance data that is often difficult to collect and compare for firms in the pre-IPO stage of their life cycle.

TPDS data is categorized as sensitive, but unclassified, as it contains personal identifiable information, and is available under the Freedom of Information Act. I obtained the list of Electronic Return Originators as of December 31, 2016.

Because the ERO database is delineated by Electronic Return Originators and their responsible partners, and not at the firm level, it was necessary to match and aggregate EROs to make firm level observations. Therefore, to make firm level observations, EROs were matched by partner name and legal name, DBA (doing business as) name, mailing address, phone number, and partner email.

Following aggregation, the ERO database contains information on 296,954 responsible individuals from 259,355 firms. However, some of these firms operated as nonprofits (n=95), while others served this market from locations outside the U.S. (n=357), or both (n=27). Furthermore, narrowing firms in the ERO database to those which would be required to have an ERO (transmitted 11 or more income tax returns during calendar year 2016) I consider 215,001 firms (represented by 249,408 responsible individuals) actively engaged in the income tax preparation industry as of the beginning of 2017.

Because data is collected through an email sample, and due to the degradation of email addresses over time, I focused the sampling frame to firms that had applied for an ERO application within the past 10 years. Of the active firms, 127,264 firms (with 141,290 responsible individuals) applied for at least one EROs within the past 10 years (between January 1st, 2007 and December 31, 2016). Among these, 117,031 responsible individuals from 108,005 firms provided a complete email address. Email addresses were validated using NeverBounce, a third-party email validation service. Email addresses which were determined to be disposable (n= 24) or invalid (n=10,416) were discarded, resulting in an initial sampling frame of 106,591 partners from 98,456 firms. Thus, my initial sampling frame is responsible individuals with valid email addresses from for-profit firms actively operating within the United States tax preparation industry who were issued at least one ERO within the past 10 years.

4.3 Research Instrument

The research instrument used for data collection consisted of approximately 115 items. Survey items were presented in blocks of four to six questions in order to make the survey manageable for participants. Both blocks and questions within blocks were randomized to control for order effects (Krosnick & Alwin, 1987). The survey contained:

- 42 items intended to measure learning related behaviors,
- 7 items that measure managerial ties (Atuahene-Gima & Murray, 2007),
- 10 items that measure an individual's entrepreneurial orientation (Langkamp Bolton, 2012; Langkamp Bolton & Lane, 2012), and
- 6 items that measure learning orientation (De Clercq et al., 2012), along with

- 20 items capturing organizational and demographic variables.

Additionally, the survey also included a number of factors intended to assess convergent, divergent, and criterion validity. Participants were randomly assigned to one of three sections capturing these variables. Version 1 included:

- 19 items capturing entrepreneurial self-efficacy (McGee, Peterson, Mueller, & Sequeira, 2009) and
- 13 items capturing entrepreneurial empowerment (Digan, Sahi, Mantok, & Patel, n.d.).

The second version of the instrument included:

- 17 items captured individual absorptive capacity (Ter Wal, Criscuolo, & Salter, 2011) and
- 12 items capturing cognitive flexibility (Martin & Rubin, 1995).

The third version of the instrument included:

- 16 items capturing goal orientation (Van Yperen & Janssen, 2002) and
- 12 items capturing entrepreneurial passion (Cardon, Gregoire, Stevens, & Patel, 2013).

4.3.1 Dependent Variables

The intended dependent variables in this research are exploratory, exploitative, and efficiency learning. Exploratory learning refers to "learning which is new to the actor, broadening existing knowledge and competencies." Exploitative learning refers to "learning which builds upon existing knowledge, deepening and refining existing knowledge and competencies." And, efficiency learning refers to "learning which

cultivates expertise and effectiveness in existing knowledge and competencies, often resulting from the routine and repetitive application of existing knowledge."

The development of the initial and final item sets is described in *Chapter 5: Measurement Development*. Following Q-Sort analysis, expert analysis, and initial screening, the remaining items are subjected to exploratory factor analysis to be eventually used as the dependent variable. To capture each of the types of entrepreneurial learning, respondents were asked to indicate, on a 7-point scale, the amount of time spent in the past 12 months on each of the related items. Response options ranged from (1) Never to (7) Always. Items included questions such as, "To what extent have you engaged in activities in the past 12 months related to your venture creating products or services that are innovative to the firm", "To what extent have you engaged in activities in the past 12 months related to your venture which focused on innovating", and "To what extent have you engaged in activities in the past 12 months related to your venture which you carry out as if it were routine".

4.3.2 Independent Variables

Independent variables include prior performance, top management team size, intra- and extra-industry managerial ties, entrepreneurial orientation, and learning orientation. All independent variables were measured on a 6-point Likert-type scale.

Prior Performance

Measures of success and failure were self-reported. Subjective assessments of prior year performance were collected in the survey instrument. Respondents were asked to reflect on the relative performance of their organization—as compared with their own performance in the previous year. Seven items were chosen to capture subjective measures

of performance. Three items were chosen to represent financial performance and three items were chosen to represent learning performance from Marsick and Watkins (2003). The last item captured a general measure of performance. Participants were asked to rate their agreement with a series of statements such as, "In my organization, revenues were greater than last year" and "In my organization, market share is greater than last year" on a 6-point scale ranging from (1) Strongly Agree to (6) Strongly Disagree. Items used to measure subjective performance may be found in Table 4-1, below.

Table 4-1: Subjective Measures of Performance

Performance Items
In my organization, sales revenues were greater than last year.
In my organization, return on investment was greater than last year.
In my organization, market share was greater than last year.
In my organization, the number of suggestions implemented was greater than last year.
In my organization, the number of products or services is greater than last year.
In my organization, the number of individuals learning new skills is greater than last year.
I view my organization as successful.

Top Management Team Size

Top management team size refers to the number of organizational members in an entrepreneur's top management team. Top management team size is captured by a single survey item asking, "How many members are in your top management team, not including you?"

Intra- and Extra-Industry Managerial Ties

Managerial ties refer to an organization's top management team's (TMT's) interactions with executives from outside of the organization. Interactions outside of the

organization may be characterized as intra-industry managerial ties (i.e. ties within an organization's industry) and extra-industry managerial ties (i.e. ties outside of an organization's industry) (Geletkanycz & Hambrick, 1997). Intra- and extra-industry managerial ties are measured using Atuahene-Gima and Murray's (2007) four and three item scales. Intra-industry ties are measured using four items, and extra-industry ties are measured using three items. Table 4-2 provides the items used to assess managerial ties. Again, responses were measured on a 6-point scale ranging from (1) Strongly Agree to (6) Strongly Disagree.

Table 4-2: Intra- and Extra-Industry Managerial Ties Scale

Intra- and Extra- Managerial Ties Items
Intra-Industry Managerial Ties
TMT members maintain close contact with founders of other firms in our industry.
TMT members learn a lot from our interactions with top executives in our industry.
TMT members have social interaction with other founders with knowledge about conditions in our industry.
TMT members put a lot of effort into building relationships with other knowledgeable executives in our industry.
Extra-Industry Managerial Ties
TMT members have good relations with top executives of other firms outside our industry.
TMT members have good relationships with members of outside firms who serve our industry such as vendors, suppliers, and technology providers.
TMT members put allot of effort into maintaining a good relationship with executives of firms outside our industry.

Entrepreneurial Orientation

Individual entrepreneurial orientation (IEO) refers to an individual's proclivity to act entrepreneurially. Recently, scholars have worked to develop and validate individual level measures of entrepreneurial orientation in both student (Langkamp Bolton & Lane, 2012) and non-student samples (Langkamp Bolton, 2012). This research utilizes

Langkamp Bolton and Lane's (2012) 10-item scale representing the three most commonly examined dimensions of entrepreneurial orientation—namely innovativeness, risk-taking, and proactiveness. Table 4-3 provides the 10 items used to assess entrepreneurial orientation, organized by their respective dimensions. Responses were collected on a 6-point scale ranging from (1) Strongly Agree to (6) Strongly Disagree.

Table 4-3: Individual Entrepreneurial Orientation Scale

Individual Entrepreneurial Orientation Items
Innovativeness
I often like to try new and unusual activities that are not typically, but not necessarily, risky.
In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before.
I prefer to try my own unique way when learning new things rather than doing it like everyone else does.
I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems.
Risk-Taking
I like to take bold action by venturing into the unknown.
I am willing to invest a lot of time and/or money on something that might yield a high return.
I tend to act "boldly" in situations where risk is involved.
Proactiveness
I usually act in anticipation of future problems, needs or changes.
I tend to plan ahead on projects.
I prefer to "step-up" and get things going on projects rather than sit and wait for someone else to do it.

Learning Orientation

Learning orientation refers to an individual's inclination to regularly update his or her knowledge sets (Kolb, 1984; VandeWalle et al., 1999). Learning orientation is measured utilizing VandeWalle and colleagues (Vandewalle, 1997; VandeWalle et al.,

1999) measures, as adapted by De Clercq, Honig, and Martin (2013). Table 4-4 provides the items used to measure learning orientation. Responses were collected on a 6-point Likert-type scale ranging from (1) Strongly Agree to (6) Strongly Disagree.

Table 4-4: Learning Orientation Scale

Learning Orientation Items
I often read materials (articles, Internet, books, etc.) to improve my abilities.
I like to take on a challenging task that I can learn a lot from.
I often look for opportunities to develop new skills and knowledge.
I enjoy challenging and difficult tasks through which I can learn new skills.
For me, developing my abilities is important enough to take risks.
I prefer to work in situations that require a high level of ability and talent.

4.4 Data Collection and Descriptive Statistics

4.4.1 Data Collection

Data for the primary studies was collected through e-mail surveys administered to the responsible individuals of active firms participating in the U.S. income tax preparation industry.

Dillman's Tailored Design Method (Dillman, Smyth, & Christian, 2014) and current best practices were followed to provide the maximum response rate. Individuals within the sampling frame were contacted multiple times including introductory e-mails, survey invitations, and reminders. The first contact occurred three days prior to the survey date. Individuals within the sampling frame received an introductory e-mail to inform them of the purpose of the study, introduce the researcher, and a request to watch for the study to arrive within the next few days. Emails were personally addressed to the responsible individuals of ventures indicated by the IRS's ERO database. Within the introductory e-

mail, individuals were provided with a link to opt out and unsubscribe from future emails, as required by law. Invalid email addresses and participants who opted out following the introductory or follow-up e-mails were removed from the mailing list.

Three days following the introductory email, participants received the survey email. This email reintroduced the researcher, further highlighted the contribution of participants, and provided a link to the online survey instrument (administered through Qualtrics). Four days later, non-respondents were sent a reminder email reiterating the importance of participation and requesting that recipients participate in the survey. A third reminder followed one week after the second request for participation, and a final reminder was sent on the final day of the survey.

4.4.2 Sample and Descriptive Statistics

In total, email invitations were sent to 106,591 responsible individuals as indicated by the IRS ERO database. However, 3,989 email invitations were returned as undeliverable, leaving a potential sampling frame of 102,602 delivered survey invitations. 1136 individuals started the survey; however, 219 respondents did not complete the survey resulting in 917 completed responses (completion rate = 80.7 percent). Incomplete surveys were discarded from further analyses. Of the 917 completed responses, 883 indicated that they had ownership stake in their organization. Because this research is focused on the learning behaviors of entrepreneurs and small business owners, 34 responses from non-owners were also discarded. Table 4-5, below, provides a comparison of the characteristics of all active for-profit firms in the population, firms in the sampling frame (those who applied for at least 1 new ERO within the past 10 years), and the firms of study participants. The firms of respondents completing the survey did not appear to significantly differ from

non-respondents in the sampling frame in terms of number of EROs, the mean number of partners, nor the number of returns transmitted.

Table 4-5 Sample Characteristics

	Active Population (*N*=215,001)			**Sampling Frame (*N*=98,456)**			**Sample (*N*=883)**		
	Max	***Mean***	***S.D.***	***Max***	***Mean***	***S.D.***	***Max***	***Mean***	***S.D.***
# of Partners	23	1.40	0.80	21	1.04	0.38	6	1.07	0.40
# of EROs	7,373	1.27	17.42	403	1.18	2.55	71	1.21	2.40
2016 Returns	8,079,649	566.55	25,154.93	198,447	296.78	1,202.77	36,790	350.05	1320.54
2017 Returns	8,569,108	495.61	24,241.89	188,353	260.72	1,001.10	25,107	292.63	940.50

Next, as stated in my research plan, I take a split-sampling approach to measurement development. Prior literature recommends that exploratory factor analysis and confirmatory factor analysis are not performed on the same sample (DeVellis, 2017; Hinkin, Tracey, & Enz, 1997). In this research, the development of these measures involves the establishment of each construct in a developmental sample and the confirmation of the measure in a second sample. Therefore, I take a purposive approach to splitting my sample. Respondents who indicated that their primary industry is tax preparation (*n*=537) were separated from those engaged in adjacent industries (*n*=346). Table 4-6 provides an overview and comparison of respondents in the sample.

Table 4-6 Descriptive Statistics

		Developmental Sample		**Confirmatory Sample**		**Overall**	
		n	***%***	***n***	***%***	***n***	***%***
Respondents		537	47.73*	346	30.23*	883	100
Gender	Female	179	33.3	113	32.7	292	33.1
	Male	354	65.9	230	66.5	584	66.1
	Prefer not to answer	4	0.7	3	0.9	7	0.8

Race	American Indian or Alaska Native	5	.9	3	0.9	8	0.9
	Asian	26	4.8	17	4.9	43	4.9
	Black/African American	47	8.8	24	6.9	71	8.0
	Native Hawaiian or Pacific Islander	0	0.00	1	0.3	1	0.1
	White/Caucasian	429	79.9	285	82.4	714	80.9
	Prefer not to answer	30	5.6	16	4.6	46	5.2
Ethnicity	Hispanic or Latino	45	8.4	21	6.1	66	7.5
	Not Hispanic or Latino	470	87.5	314	90.8	784	88.8
	Prefer not to answer	22	4.1	11	3.2	33	3.7
Education	< High School	1	0.2	0	0.00	1	0.1
	High School	3	0.6	6	1.7	9	1.0
	Some College	39	7.3	16	4.6	55	6.2
	2-year Degree	33	6.1	12	3.5	45	5.1
	4-year Degree	258	48.0	133	38.4	391	44.3
	Master's Degree	159	29.6	106	30.6	265	30.0
	Doctorate or Professional Degree	40	7.4	72	20.8	112	12.7
	Prefer not to answer	4	0.7	1	0.3	5	0.6
Family Firm	Yes	266	49.5	141	40.8	407	46.1
	No	271	50.5	205	59.2	476	53.9
Owned by 1 Family	Yes	228	42.5	140	40.5	368	41.7
	No	309	57.5	205	59.2	514	58.3
Franchise	Yes	18	3.4	7	2.0	25	2.8
	No	519	96.6	339	98.0	858	97.2

* = percentage of overall

Table 4-6 Descriptive Statistics (Cont)

	Developmental Sample			Confirmatory Sample			Overall		
	Max	**Mean**	**S.D.**	**Max**	**Mean**	**S.D.**	**Max**	**Mean**	**S.D.**
Age	88	56.79	12.61	93	57.85	10.89	93	57.21	11.97
Work Exp	70	34.67	13.89	66	35.96	11.44	70	35.18	12.97
Ind Exp	65	25.23	14.00	64	28.69	12.39	65	26.59	13.49
Firm Age	77	15.60	13.79	165	20.43	19.34	165	17.49	16.35
# Owners	9	1.34	0.80	1M	5,788	75,918	1M	2,269	47,565
TMT Size	10	1.52	0.94	15	2.11	1.77	15	1.75	1.36

5 MEASUREMENT DEVELOPMENT

Chapter 5 recounts the procedures used in developing the measures of entrepreneurial learning typology theorized to occur within the context of organizations. Following the guidelines for measurement development specified by DeVellis (2012), I incorporate the following steps to advance the conceptual and empirical development of the entrepreneurial learning construct: (1) a clear articulation what is being measured, (2) development of a comprehensive item pool (3) a determination of the measurement format, (4) expert assessment of the content and face validity of initial items (5) the inclusion of validation items, (6) the administration of items to a development sample, (7) an evaluation of the results, (8) an assessment of dimensionality and a reduction of the items to optimize the length of the scale, (9) an assessment of the scales reliability, and (10) an examination of scale validity. The proceeding sections describe these steps, as suggested by DeVellis (2017), in developing measures accounting for the three hypothesized dimensions of entrepreneurial learning serving as the dependent variables in this research. Figure 12 provides an overview of the measurement development process.

Step 1: Defining the Dimensions of Entrepreneurial Learning

- Theorize and operationalize a three-dimensional conceptualization of organizational learning at the level of the individual entrepreneur

Step 2: Item Generation

- Review of extant entrepreneurial and organizational learning literature
- Adaption of items from existing scales and qualitative research
- Semi-structured interviews with practitioners

Step 3: Response Format

- Self-reported survey of engagement in learning related behaviors in the past 12 months
- 7-point Likert-type scale

Step 4: Content Validity

- Q-methodology
- Expert review of items

Step 5: Consideration of Validation Items

- Inclusion of 6 additional constructs to examine convergent and discriminant validity

Step 6: Administration to Developmental Sample

- Data collected from 883 owners of micro and small enterprises
- Owners of firms whose primary service is tax preparation (n=537) purposively split for developmental samples
- Owners of firms whose primary service is outside the tax preparation industry (n=346) withheld for confirmatory sample

Step 7: Evaluation of Items

- Item Purification

Step 8: Optimization of Scale Length

- Exploratory factor analysis of items
- Determination of factor structure
- Deletion of problematic items and items with minimal contribution to the overall model

Step 9: Reliability Assessment
• Confirmatory factor analyses on remaining sample of firms

Step 10: Validity Assessment
• Establish construct validity—concurrent and discriminant validity—by examining the relationships between each of the dimensions of learning with related constructs. • Establish external validity by examining the three-factor model in the sample of firms whose primary industry is *not* tax preparation.

Figure 12: Measurement Development Procedures

5.1 Defining Three Dimensions of Entrepreneurial Learning

The first step in measurement development involves specifying, as clearly as possible, the domains of which the instrument is intended to measure. However, although there is general agreement concerning the importance of clearly defining the domains of the construct, this step is often overlooked. DeVellis (2017) suggests that in defining the construct clearly, researchers should consider theory and specificity.

The theorized entrepreneurial learning measures are based on Piao and Zajac's (2015) three-factor conceptualization of organizational learning composing of exploratory learning, exploitative learning, and efficiency (or repetitive) learning. In Chapter 2, an extensive literature review was conducted in order to develop strong, theoretically derived definitions of each dimension of entrepreneurial learning. Therein, I define exploratory learning as "learning which is new to the actor, broadening existing knowledge and competencies." Exploitative learning is defined as "learning which builds upon existing knowledge, deepening and refining existing knowledge and competencies." And,

efficiency learning is defined as "learning which cultivates expertise and effectiveness in existing knowledge and competencies, often resulting from the routine and repetitive application of existing knowledge."

For the purposes of item development, I also provide operational definitions of each of the constructs. Operationally, exploratory learning refers to "The degree to which behaviors and aspects of behavior are likely to lead to knowledge which corresponds with the characterization of learning related to 'search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation'." Exploitative learning refers to "The degree to which behaviors and aspects of behavior are likely to lead to knowledge which corresponds with the characterization of learning related to 'evaluation, refinement, and selection'." Finally, efficiency learning refers to "The degree to which behaviors and aspects of behavior are likely to lead to knowledge which corresponds with the characterization of learning related to 'production, execution, and efficiency'." Table 5-1, below, provides the conceptual and operational definitions of each of the three dimensions of entrepreneurial learning.

Table 5-1 Conceptual and Operational Definitions of Entrepreneurial Learning

Dimension	Conceptual and Operational Definitions
Exploration	*Conceptual*- Learning which is new to the actor, broadening existing knowledge and competencies. *Operational*- The degree to which behaviors and aspects of behavior are likely to lead to knowledge which corresponds with the characterization of learning related to search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation.
Exploitation	*Conceptual*- Learning which builds upon existing knowledge, deepening and refining existing knowledge and competencies.

	Operational- The degree to which behaviors and aspects of behavior are likely to lead to knowledge which corresponds with the characterization of learning related to evaluation, refinement, and selection.
Efficiency	*Conceptual*- Learning which cultivates expertise and effectiveness in existing knowledge and competencies, often resulting from the routine and repetitive application of existing knowledge. *Operational*- The degree to which behaviors and aspects of behavior are likely to lead to knowledge which corresponds with the characterization of learning related to production, execution, and efficiency.

5.2 Item Generation

The second step in measurement development is the generation and compilation of an item pool to be considered for inclusion in measurement. The aim of this initial item generation was to generate a large compilation of items representing each of the three dimensions of entrepreneurial learning, favoring over-inclusiveness to under-inclusiveness (DeVellis, 2017). Therefore, several methods were employed in building an initial item pool, including both deductive and inductive approaches (Hinkin, 1995). Deductive item building refers to generating items based on extant literature and existing scales. Inductive item building refers to generating items based on the qualitative assessment of information provided by members of the target population.

5.2.1 Deductive Item Generation

First, a review of the existing literature revealed several scales and variations of these scales which attempt to measure exploration and exploitation at the individual and organizational levels of analyses. These scales tend to draw upon March's (1991)

foundational work conceptualizing exploration and exploitation from an organizational learning perspective.

Drawing from March (1991), He and Wong (2004) developed an 8-item measure of exploration and exploitation in order to conduct an empirical test of the hypothesis that organizational ambidexterity jointly influence firm performance. These measures of exploration and exploitation were conceptualized at the organizational-level and operationalized as the proximity to current technological or product trajectories. While He and Wong's (2004) measure of exploration and exploitation informed future research, it has been criticized for only capturing a technological or product trajectory dimension of strategic orientation (Lubatkin et al., 2006).

Lubatkin and colleagues (2006) built upon the work of He and Wong (2004) by incorporating an additional dimension to their concepts of exploration and exploitation. Informed by Benner and Tushman's (2003) conceptualization, Lubatkin and colleagues (2006) adapted He and Wong's (2004) 8-item measure capturing the technological or product trajectory dimension of organizational ambidexterity and incorporated Benner and Tushman's (2003) customer or market segment dimension. Lubatkin et al. (2006) developed a 12-item measure of exploration and exploitation which they used to assess ambidexterity at the organizational level which future work has drawn upon heavily (e.g. Patel, Messersmith, & Lepak, 2013; Patel, Terjesen, & Li, 2012; Sirén et al., 2012).

Investigating learning at the individual level of analysis, Mom, van den Bosch, and Volberda (2007, 2009) developed a 12-item measure of exploration and exploitation of managers within large firms based on March's (1991) depictions. Although we know that

managers and entrepreneurs make decisions differently (Busenitz & Barney, 1997), this measure is the closest individual-level measure available in the current literature.

Finally, Mueller, Volery and Siemens (2012; Volery et al., 2013) conducted qualitative research on the everyday behavior of entrepreneurs. Through their observational work on the entrepreneurs of small- and medium-sized growth enterprises, Volery, Mueller, and Siemens (2013) observe and characterize a number of activities associated with exploration and exploitation. A third set of items is adapted from the behavioral observations in this research.

In total, 38 items were identified from extant literature, some of which were slightly adapted to fit the entrepreneurial context at the individual level of analysis.

5.2.2 Inductive Item Generation

Next, to ensure the sufficiency of the deductive approach, I also employ an inductive approach to item generation. During the summer of 2017, I conducted semi-structured interviews with 10 small business owners from within the sample population. The goal of these interviews was to gain insights into gaps in the representation of the three dimensions of entrepreneurial learning and to build items inductively in order to fill these gaps. Each interview lasted between 20 and 30 minutes. The interviews were semi-structured in that each interviewee was asked the same set of open-ended questions. Sample interview questions included questions such as “What skills or knowledge do you (or do you need to) update on a regular basis?”, “How do you keep up on the latest technological trends in your field?”, “How do you keep up on the latest customer trends in your field?”, and “Can you describe the sources you use to gain more information about

your organization and industry? How do you choose these?". The pilot interview protocol and list of interview questions may be found in Appendix A.

The pilot interviews were used to generate additional items in order to capture the full components of each of the three dimensions of entrepreneurial learning. Due to the high importance of confidentiality and privacy, the pilot interviews were not recorded nor transcribed. However, I did take notes during the interviews, which served as the basis for additional item development. From the pilot interviews and these notes, I developed a collection of 37 additional items concerning entrepreneurial behaviors as they relate to learning.

Clear, concise, and readable items are desirable (DeVellis, 2017). Prior to finalizing the initial item pool, the reading level of the item stems were assessed using the Flesch Reading Ease score and the Flesch-Kincaid Grade level. The Flesh Reading Ease score of 38.1 and Flesch-Kincaid Grade Level of 9.7 both suggest that the reading level of the item stems are appropriate for this sample.

Including the items adapted from the prior literature (n=38), the initial number of items considered is 75. Although the intention is to develop a parsimonious scale consisting of four to six items for each of the three dimensions of entrepreneurial learning, initial item pools of two to four times the intended number of items in a construct are not uncommon (DeVellis, 2017; Worthington & Whittaker, 2006). A comprehensive list of both deductively and inductively generated items in the initial item pool, the dimensions which they are intended to represent, and the sources from which they were adapted or generated are provided in Appendix D, Table D-1.

5.3 Response Format

The third step in measurement development is the determination of the response format. It is necessary to determine the response format (DeVellis, 2017) in concurrence with item generation. In this research, the item response format asks participants to assess the extent they have engaged in various activities as they relate to knowledge and learning. Questions begin with the root query, "To what extent have you engaged in activities within the past 12 months…". Responses are measured on a 7-point Likert-type scale ranging from "Never" to "Always". Although in some cases an odd number of response options may encourage equivocation, this is less of a concern as the response options in this research solicit the extent of engagement rather than agreement or disagreement with statements or opinions. The response options in this research include "Never", "Very Rarely", "Rarely", "Occasionally", "Frequently", "Very Frequently", and "Always".

5.4 Validity

The forth step in measurement development is the examination of the face and content validity of the items to be included in the instrument. Face validity refers to the extent to which each item accurately reflects the construct being measured (Hardesty & Bearden, 2004). Content validity refers to "the extent to which a specific set of items reflects a content domain"(DeVellis, 2017, pp. 84). Simply put, the content of the items should adequately reflect the full domain of the construct being measured. Face and content validity are often assessed through the use of experts. In this study, I employ Q-Methodology and expert analyses to establish face and content validity.

5.4.1 Q-Methodology

First, to examine the face and content validity of the initial item pool, I utilize Q-Methodology. Q-Methodology, or Q-Sort tasks, ask participants to sort or rank a series of items or statements into pre-defined categories (Block, 1961; Nahm, Rao, Solis-Galvan, & Ragu-Nathan, 2002). In this research, five independent PhD researcher raters, working separately, were tasked with grouping each of the 75 proposed items into one of four categories. Raters were presented with definitions of the three dimensions of learning. The fourth category "Non-Applicable" was also presented for items which "(a) cannot be placed into any of the entrepreneurial learning categories or (b) can be placed into multiple categories of learning". The raters were then provided with 75 index cards containing the items in the initial item pool and were asked to sort the items into one of the four categories. Items with less than 60 percent inter-rater agreement (n=14) were discarded. Additionally, based on feedback received from the independent raters, 3 additional items were re-written. Following Q-sort analyses, 61 items were retained for further consideration. These items are presented in Table 5-2, below.

5.4.2 Expert Analysis

Next, to further examine the face and content validity of the initial item pool, I employed an expert judging task following the methods employed by Zaichkowsky (1985) and others (e.g. Bearden & Netemeyer, 1999). Twenty-five expert judges, including small business owners (n=10), Ph.D. & graduate students (n=10), and academic subject-matter experts (n=5), were recruited to assess the face and content validity of the remaining items. Expert judges were presented with descriptive definitions of each of the three learning constructs and asked to determine if, and how well, each of the remaining 61 items

represent *each* dimension. Judges were asked to assess whether each item was "Not Representative", "Somewhat Representative", or "Clearly Representative" for each of the three types of learning. The three learning dimensions each appeared in a separate section, beginning with an entire page devoted to the definition of the relevant construct. This was followed by three pages of items. To reduce the chance of errors in judging, the definition was repeated at the top of each page of items. Space was also provided on each page soliciting comments or feedback on the items. Particular attention was focused on the experts' feedback concerning the clarity and relevance of the items, and representativeness of the constructs in order to ensure face validity.

In order to identify items for retention, I implemented a sum-score decision rule. Although there is no clear criteria for the inclusion of items in an instrument, Hardesty and Bearden (2004) show that sum-score inclusion criteria better predict the inclusion of items in the final instrument than other methods. Sum-score decision rules refer to item selection criteria which rely on an item's total score of expert assessments across all judges whereas "Not Representative" equates to a score of one, "Somewhat Representative" equates to a score of two, and "Clearly Representative" equates to a score of three. I selected a sum-score criteria of at least 75 percent of the 75 points possible (57 points or greater) in determining which items to retain. Thirteen items which did not attain a sum-score of 57 on any of the three types of learning were dropped from the final set of items to be included in the instrument. Of the remaining 48 items being considered, expert judges' assessments indicated that eleven additional items were representative of more than one construct. One of these items was found to be a compound item. Based on comments and feedback collected from the judges, this item was split into two separate items and retained. The

remaining ten items which were identified as representative of more than one construct were dropped. In total, 42 items were retained for deployment in a developmental sample and are presented along with their sum scores and intended constructs in Table 5-2, below. Among these included 17 items representing exploratory learning, 11 items representing exploitative learning, and 14 items representing efficiency learning.

Table 5-2 Initial Consideration Set and Sum Scores from Expert Analysis

	1	**2**	**3**
Exploratory Learning (1)			
looking for novel technological ideas by thinking "outside the box"?	69	46	42
creating products or services that are innovative to the firm?	63	44	41
looking for creative ways to satisfy customer needs?	58	51	46
searching for new possibilities with respect to products & services, processes, or markets?	64	48	40
searching for new norms, routines, structures, or systems?	58	51	49
experimenting with new approaches toward technology, processes, or markets?	68	41	40
focusing on innovating?	64	44	41
experimenting with technological trends?	62	42	40
searching for your next big idea?	66	45	40
transforming and sharing what you learn with others?	57	52	44
reading (books, newsletters, internet, etc..) about things that I do not know much about?	57	45	42
experimenting reaching out to new markets?	62	43	36
expanding your product or service offerings?	57	54	36
requiring you to learn new skills or knowledge?	62	45	42
creating variety in your experience?	58	47	45
broadening your knowledge bases?	61	51	44
reconsidering existing beliefs and decisions?	60	47	39
Exploitative Learning (2)			
surveying existing customers' satisfaction?	46	60	50
penetrating more deeply into your existing customer base?	43	58	51
optimizing firm routines, structures, or systems?	n/a		
further developing existing competences, technologies, processes, or products?	49	63	51

updating your knowledge on laws and regulations?	50	61	50
focusing on improving current business practices?	48	63	56
updating and improving current products or services?	51	61	55
receiving feedback from your current customers?	43	58	49
reading (books, newsletters, internet, etc..) that builds on or updates your current knowledge?	55	60	53
searching online for information to build on and update your current knowledge?	51	59	53
deepening your existing knowledge base?	52	62	46
Efficiency Learning (3)			
stabilizing firm routines, structures, or systems?	n/a		
increasing the levels of automation in your operations?	48	54	59
fine-tuning existing offerings to keep customers satisfied?	40	56	59
performing the day-to-day tasks of the firm?	37	51	60
solving problems that arise in the day-to-day operation of your firm?	47	55	59
focusing on the daily tasks of your firm?	37	52	61
managing the day-to-day operations of the firm?	37	47	58
you have already acquired a lot of experience?	39	54	58
you carried out as if they were routine?	36	51	60
which were clear to you how to conduct?	38	52	57
you could properly conduct using your present knowledge?	38	52	59
creating reliability in experience?	41	53	66
solving problems that come up in your routine work?	45	52	61
focused on the elimination of errors?	39	55	59

5.5 Inclusion of Validation Items

The fifth step in measurement development is the consideration of the inclusion of validation items to test for construct validity- or the extent to which the measurement model measures the constructs it was designed to measure (Hair, Black, Babin, Anderson, & Tatham, 2010; Netemeyer, Bearden, & Sharma, 2003). To assess construct validity, this study examines the convergent and discriminant validity of the entrepreneurial learning measures. Convergent validity refers to the extent to which two constructs that should be

theoretically related are, in fact, related (Schwab, 1980). Discriminant validity refers to the extent to which two constructs that should not be theoretically related are, in fact, unrelated (D. T. Campbell & Fiske, 1959; DeVellis, 2017).

Six external measures were included to establish convergent and discriminant validity. Individual entrepreneurial orientation (Langkamp Bolton, 2012; Langkamp Bolton & Lane, 2012) and learning orientation (Vandewalle, 1997) serve as the independent variables in the main study and will also be used to assess convergent and discriminant validity. Additionally, the survey procedure also randomly assigned respondents to one of three versions of the survey collecting a number of peripheral variables included to assess validity including entrepreneurial passion (Cardon et al., 2013), goal orientation (Van Yperen & Janssen, 2002), individual absorptive capacity (Ter Wal et al., 2011), and cognitive flexibility (Martin & Anderson, 1998; Martin & Rubin, 1995). Table 5-3 provides the list of validation variables along with their sub-components, the number of responses which include that variable, the number of items, and their reliability (Cronbach's alpha).

Table 5-3 Reliability of Validation Variables

Validation Variables	**Original Scale**	***n***	**Items**	***Cronbach's Alpha***
Entrepreneurial Orientation	Langkamp Bolton, 2012; Langkamp Bolton & Lane, 2012	883	10	.874
Innovativeness			4	.853
Risk Taking			3	.764
Proactiveness			3	.799
Learning Orientation	Vandewalle, 1997	883	6	.900
Entrepreneurial Passion	Cardon et al., 2013	291	13	.922
for Inventing			5	.855
for Founding			4	.786
for Developing			4	.797

Goal Orientation	Van Yperen & Janssen, 2002	291	16	-
Mastery Orientation			8	.901
Performance Orientation			8	.891
Absorptive Capacity	De Clercq et al., 2012; Ter Wal et al., 2011	260	18	.923
Identify			3	.707
Assimilate			10	.900
Utilize			4	.780
Cognitive Flexibility	Martin & Anderson, 1998; Martin & Rubin, 1995	260	12	.793

5.6 Developmental Sample

The sixth step in measurement development is the administration of items to a developmental sample to assess the dimensionality of entrepreneurial learning- or the number of latent factors required to account for item correlations among the underlying constructs (Netemeyer et al., 2003). As discussed in Section 4.4.2, I utilize a split-sampling approach to measurement development. To account for industry effects, entrepreneurs who identified their primary industry as personal or business tax preparation (n=537) were split from entrepreneurs in adjacent industries and used as the developmental sample.

5.6.1 Data Cleaning- Developmental Sample

Prior to statistical analysis, the data was screened to ensure that response sets provide reliable information and that responses meet the underlying assumptions required for statistical analysis. To accomplish this, I examined descriptive statistics and inter-item correlations, as well as checked for univariate and multivariate outliers. I also examine the assumptions of adequate sample size and multivariate normality.

First, the data were examined for outliers. Osborne (2014) points out that respondents who fall outside of the target population may have significant effects on the

results of factor analysis. Therefore, I examined key variables for participants falling outside of the sample population. Because the size of the firm is likely to influence how an entrepreneur or business owner spends his or her time, I examined the number of owners of respondent's firms, the size of the top management team, and the number of employees as proxies for firm size. The number of owners ranged from 1 to 9, with a mean of 1.34 and a standard deviation of 0.80. Top management team sizes ranged from 1 to 10, with a mean of 1.52 and a standard deviation of 0.94. I also examined the number of employees as a proxy for firm size. Among respondents who reported the number of employees (n= 201), total employees in 2017 ranged from 0 to 32, with a mean of 2.89 and a standard deviation of 4.56. Due to the small range in the number of owners and the size of top management teams, as well as the small range in the number of employees, the data suggests that all firms were within the range of micro- and small- firms in terms of size. Therefore, no outliers were discarded based on these criteria.

Next, univariate outliers were identified by examining the z-scores of each of the 42 items representing entrepreneurial learning. Using the cutoff criteria of $|z| > 3.29$, 22 participants with item responses falling further than 3.29 standard deviations from the mean were identified as univariate outliers.

Multivariate outliers were identified by examining Mahalanobis Distance. Using the criterion of $\alpha = .001$, an additional 24 participants that fell outside of the critical chi-square value were identified as multivariate outliers. In total, 46 participants that were identified as univariate or multivariate outliers were discarded. Following the removal of outliers, the developmental sample consisted of 491 respondents.

In terms of sample size, one rule of thumb is that samples greater than N=300 are generally considered adequate (Worthington & Whittaker, 2006). However, absolute sample size may be an improper indicator of the adequacy of the sample for factor analysis. Rather, the proportion of respondents per item has been proposed as a more appropriate criterion. Recommendations of respondent-to-item ratios typically range from 5:1 (Gorsuch, 1983; Hatcher, 1994; Stevens, 2012) to 20:1 (Osborne, 2014; Stevens, 2012), and the widely accepted rule of thumb is a minimum of 10 respondents per item (Jöreskog & Sörbom, 1996; Osborne, 2014). The final sample of 491 respondents results in an 11.7 respondent-to-item ratio and exceeds most conventional sample size guidelines for exploratory factor analysis.

Finally, following the recommendations of DeCarlo (1997), I tested multivariate normality by examining Small's test (Small, 1980), Srivastava's test (Srivastava, 1984), and Mardia's test (Mardia, 1970). Small's test and Srivastava's test for multivariate skewness were both statistically significant ($p < .001$), indicating multivariate skewness had been violated. Additionally, Srivastava's test and Mardia's test for multivariate kurtosis were also both statistically significant ($p < .001$), indicating multivariate kurtosis had also been violated. Finally, the Omnibus test of multivariate normality based on Small's test was also statistically significant, further indicating multivariate normality had been violated.

5.6.2 Demographics, Descriptive Statistics, and Bivariate Correlations

Demographic data collected from respondents includes age, gender, ethnicity, race, level of education, along with the number of years of employment and the number of years

of industry experience. Organizational data includes the organization's age, number of owners, perception of a family firm, family ownership, whether the firm is part of a franchise system, the size of top management team, and the number of employees. Descriptive statistics are reported following the removal of outliers.

Table 5-4 presents the demographic and descriptive statistics for the developmental sample. Overall, respondents were overwhelmingly male (66.4 percent) and Caucasian (80.7 percent). They were also highly educated (85.3 percent had a 4-year degree or greater) and older (*mean* = 57.10; *S.D.* = 12.51). Correspondingly, they also had a relatively high number of years of work (*mean* = 34.89; *S.D.* = 13.67) and industry experience (*mean* = 25.36; *S.D.* = 13.94).

Table 5-4 Demographic and Descriptive Statistics- Developmental Sample

Gender *n* = 491	Frequency	Percentage
Male	326	66.4
Female	163	33.2
Prefer not to answer	2	.4
Race *n* = 491	Frequency	Percentage
American Indian or Alaskan	4	.8
Asian	26	5.3
Black or African American	39	7.9
White	396	80.7
Prefer not to answer	26	5.3
Ethnicity *n* = 491	Frequency	Percentage
Hispanic or Latino	40	8.1
Not Hispanic or Latino	431	87.8
Prefer not to answer	20	4.1
Level of Education *n* = 491	Frequency	Percentage
Less than high school	1	.2
High school or equivalent	3	.6
Some college	36	7.3
2-year degree	29	5.9

4-year degree	238	48.5
Master's Degree	145	29.5
Doctorate or professional degree	36	7.3
Prefer not to answer	3	.6

Table 5-4 Demographic and Descriptive Statistics Developmental Sample (Cont.)

	n	***Min***	***Max***	***Mean***	***S.D.***
Age	488	22	88	57.10	12.51
Work Experience	489	2	70	34.89	13.67
Industry Experience	490	0	65	25.36	13.94

Table 5-5 provides the descriptive statistics of the firms operated by respondents in this sample. Firms owned by respondents in the developmental sample ranged from 0 to 77 years in age (*mean* = 15.71; *S.D.* = 13.91). Respondents' firms were relatively small, with between 1 and 9 owners (*mean* = 1.32; *S.D.* = 0.74), managed by up to 10 members of a top management team (*mean* = 1.52; *S.D.* = 0.91), with up to 32 employees (*mean* = 3.01; *S.D.* = 4.67). Nearly half of respondents considered their firm a family firm (48.1 percent), and 41.3 percent of respondents reported that a family or family group holds majority ownership of the firm.

Table 5-5: Organizational Descriptives- Developmental Sample

	n	***Max***	***Mean***	***S.D.***
Firm Age	491	77	15.71	13.91
# of Owners	491	9	1.32	0.73
TMT Size	491	10	1.52	.91
# of Employees	189	32	3.01	4.67

Table 5-5 Organizational Descriptives (Cont.)

Family Firm *n* = 491		Frequency	Percentage
	Yes	236	48.1
	No	255	51.9
Family Ownership *n* = 491		Frequency	Percentage
	Yes	203	41.3
	No	288	58.7
Franchise *n* = 491		Frequency	Percentage
	Yes	15	3.1
	No	476	96.9

5.7 Evaluation of Items

The seventh step in measurement development is the evaluation of the items in the developmental sample. To evaluate items, I examine means, standard deviations, and the correlations of items, as well as the initial Cronbach's alpha, item-to-total correlations, and Alpha-if-item-deleted for each of the hypothesized learning constructs.

5.7.1 Initial Examination of Item Performance

The first task in the evaluation of items is an initial examination of item performance. DeVellis (2017) suggests that desirable items should be highly intercorrelated, with relatively high variance, and a mean near the center of the range. For the items developed to reflect exploratory learning, item means ranged from 3.66 to 5.45 with a mean item mean of 4.43. For the items developed to reflect exploitative learning, item means ranged from 3.70 to 5.83 with a mean item mean of 4.94. And, for the items developed to reflect efficiency learning, item means ranged from and 4.35 to 5.98 with a mean item mean of 5.45. Standard deviations for the items capturing exploratory,

exploitative, and efficiency learning ranged from 1.113 to 1.626 with a mean standard deviation of 1.401, 1.030 to 1.711 with a mean standard deviation of 1.289, and 0.967 to 1.383 with a mean standard deviation of 1.158, respectively. Therefore, since all items have a mean near the center of the range and a relatively high variance, the items were determined appropriate for further analysis. Tables 5-6 to 5-8 provide the means, standard deviations, and inter-item correlations for the items in each of the entrepreneurial learning constructs administered to the developmental sample.

Table 5-6 Exploratory Learning Items-Descriptives & Bivariate Correlations

	Mean	***S.D.***	**L1**	**L2**	**L3**	**L9**	**L10**	**L11**	**L12**	**L15**	**L20**	**L22**	**L26**
Learning1	4.42	1.549	1										
Learning2	3.99	1.560	.749**	1									
Learning3	4.87	1.355	.710**	.689**	1								
Learning9	4.22	1.527	.655**	.712**	.584**	1							
Learning10	4.37	1.412	.656**	.642**	.602**	.624**	1						
Learning11	4.32	1.368	.663**	.658**	.561**	.631**	.782**	1					
Learning12	4.24	1.423	.707**	.698**	.660**	.649**	.790**	.815**	1				
Learning15	4.39	1.265	.588**	.571**	.457**	.552**	.595**	.671**	.637**	1			
Learning20	3.96	1.565	.624**	.664**	.568**	.680**	.593**	.554**	.636**	.529**	1		
Learning22	4.65	1.430	.446**	.517**	.462**	.479**	.461**	.414**	.471**	.399**	.499**	1	
Learning26	5.13	1.207	.435**	.387**	.407**	.398**	.471**	.455**	.448**	.432**	.379**	.382**	1
Learning29	3.66	1.626	.592**	.665**	.579**	.692**	.574**	.560**	.607**	.496**	.670**	.460**	.391**
Learning30	3.99	1.543	.616**	.671**	.588**	.697**	.591**	.559**	.611**	.523**	.669**	.452**	.397**
Learning31	4.91	1.229	.486**	.496**	.516**	.448**	.487**	.468**	.496**	.463**	.368**	.440**	.489**
Learning36	4.51	1.328	.619**	.644**	.591**	.569**	.595**	.592**	.647**	.514**	.567**	.505**	.418**
Learning37	5.45	1.113	.475**	.479**	.524**	.451**	.467**	.466**	.485**	.431**	.426**	.427**	.544**
Learning38	4.30	1.323	.486**	.513**	.501**	.442**	.484**	.523**	.535**	.441**	.459**	.403**	.321**

	L29	**L30**	**L31**	**L36**	**L37**
Learning29	1				
Learning30	.786**	1			
Learning31	.448**	.477**	1		
Learning36	.587**	.611**	.524**	1	
Learning37	.426**	.452**	.560**	.570**	1
Learning38	.452**	.466**	.451**	.615**	.425**

Table 5-7 Exploitative Learning Items- Descriptives & Bivariate Correlations

	Mean	***S.D.***	**L6**	**L8**	**L13**	**L14**	**L16**	**L17**	**L19**	**L24**	**L25**	**L27**	**L40**
Learning6	3.70	1.711	1										
Learning8	4.15	1.443	.616**	1									
Learning13	4.70	1.368	.475**	.570**	1								
Learning14	4.78	1.357	.402**	.557**	.682**	1							
Learning16	5.83	1.030	.312**	.398**	.412**	.471**	1						
Learning17	5.18	1.205	.517**	.592**	.636**	.573**	.580**	1					
Learning19	4.89	1.283	.481**	.590**	.601**	.593**	.516**	.668**	1				
Learning24	4.51	1.397	.642**	.484**	.425**	.342**	.310**	.482**	.439**	1			
Learning25	5.55	1.104	.277**	.318**	.380**	.443**	.633**	.435**	.416**	.320**	1		
Learning27	5.38	1.183	.297**	.373**	.438**	.459**	.546**	.488**	.438**	.300**	.574**	1	
Learning40	5.62	1.099	.369**	.478**	.464**	.491**	.666**	.539**	.524**	.363**	.616**	.573**	1

Table 5-8 Efficiency Learning Items- Descriptives & Bivariate Correlations

	Mean	***S.D.***	**L4**	**L5**	**L7**	**L18**	**L21**	**L23**	**L28**	**L32**	**L33**	**L34**	**L35**	**L39**	**L41**
Learning4	4.77	1.355	1												
Learning5	4.35	1.373	.493**	1											
Learning7	4.70	1.383	.568**	.509**	1										
Learning18	5.96	1.117	.304**	.185**	.262**	1									
Learning21	5.46	1.245	.468**	.353**	.400**	.549**	1								
Learning23	5.78	1.160	.375**	.234**	.310**	.647**	.570**	1							
Learning28	5.98	1.125	.333**	.207**	.273**	.700**	.553**	.607**	1						
Learning32	5.73	0.977	.292**	.238**	.271**	.459**	.449**	.405**	.405**	1					
Learning33	5.52	0.967	.288**	.194**	.246**	.462**	.413**	.420**	.385**	.617**	1				
Learning34	5.53	1.029	.304**	.236**	.270**	.383**	.385**	.355**	.374**	.666**	.596**	1			
Learning35	5.58	1.077	.354**	.230**	.250**	.340**	.352**	.322**	.291**	.422**	.399**	.439**	1		
Learning39	5.53	1.187	.551**	.416**	.513**	.426**	.504**	.456**	.438**	.415**	.367**	.422**	.475**	1	
Learning41	5.64	1.106	.503**	.348**	.438**	.479**	.661**	.517**	.491**	.457**	.396**	.404**	.400**	.693**	
Learning42	5.70	1.115	.498**	.327**	.432**	.430**	.524**	.466**	.408**	.420**	.347**	.388**	.345**	.704**	.687**

5.7.2 Scale Purification

The next step in the evaluation of items is scale purification. Following the recommendations of Churchill (1979), I examined Cronbach's coefficient alpha for each of the entrepreneurial learning constructs. Cronbach's coefficient alphas were calculated separately for each of the three domains of entrepreneurial learning. The initial coefficient alphas were 0.953 for exploratory learning, 0.907 for exploitative learning, and 0.907 for efficiency learning. Results indicate that the items in each of the three domains all have high internal consistency.

More specifically, I assessed corrected item-total correlations and alpha-if-deleted in order to identify problematic items for deletion. For exploratory learning, the reliability of the 17 items administered to the developmental sample was assessed. Corrected item-total correlations ranged from 0.545 to 0.818, indicating that all items were appropriate for retention. Additionally, Cronbach's alpha-if-deleted indicated that there were no items whose removal would increase the internal consistency of the construct. Therefore, all 17 items developed to reflect exploratory learning were retained for further analysis.

For exploitative learning, the reliability of the 11 items administered to the developmental sample was assessed. Corrected item-total correlations ranged from 0.572 to 0.764, indicating that all items were appropriate for retention. Cronbach's alpha-if-deleted indicated that there were no items whose removal would increase the internal consistency of the construct. Therefore, all 11 items developed to reflect exploitative learning were retained for further analysis.

Finally, for efficiency learning, corrected item-total correlations were again examined to determine items appropriate for retention. The reliability of the 14 items

administered to the developmental sample was assessed. Corrected item-total correlations ranged from 0.454 to 0.744, with one item falling below the recommended cutoff value of 0.5. Cronbach's alpha-if-deleted indicated that the removal of this item would increase the internal consistency of the construct. Therefore, this item was deleted, and Cronbach's alpha was recalculated on the 13 remaining items. Cronbach's alpha on the remaining items slightly improved to 0.908. Corrected item-total correlations ranged from 0.510 to 0.749, indicating that the remaining items were appropriate for retention. Cronbach's alpha-if-deleted indicated that there were no additional items whose removal would increase the internal consistency of the construct. Therefore, 13 of the 14 items developed to reflect efficiency learning were retained for further analysis.

Table 5-9 provides the scale mean-if-deleted, corrected item-total correlation, and Cronbach's alpha-if-deleted for the 41 items retained through scale purification.

Table 5-9 Internal Consistency of Entrepreneurial Learning Dimensions

Exploration				Exploitation				Efficiency			
Item	Scale mean if deleted	Corrected item-total correlation	Alpha if deleted	Item	Scale mean if deleted	Corrected item-total correlation	Alpha if deleted	Item	Scale mean if deleted	Corrected item-total correlation	Alpha if deleted
Learning1	70.96	0.794	0.949	Learning6	50.58	0.610	0.904	Learning4	67.10	0.587	0.904
Learning2	71.38	0.818	0.948	Learning8	50.13	0.698	0.896	Learning7	67.17	0.510	0.908
Learning3	70.50	0.748	0.950	Learning13	49.58	0.705	0.896	Learning18	65.91	0.646	0.900
Learning9	71.15	0.777	0.949	Learning14	49.51	0.686	0.897	Learning21	66.41	0.705	0.898
Learning10	71.00	0.783	0.949	Learning16	48.45	0.642	0.900	Learning23	66.08	0.652	0.900
Learning11	71.05	0.779	0.949	Learning17	49.10	0.764	0.893	Learning28	65.89	0.627	0.901
Learning12	71.13	0.826	0.948	Learning19	49.39	0.728	0.895	Learning32	66.13	0.618	0.902
Learning15	70.98	0.684	0.951	Learning24	49.78	0.572	0.904	Learning33	66.35	0.575	0.903
Learning20	71.41	0.743	0.950	Learning25	48.74	0.577	0.903	Learning34	66.34	0.580	0.903
Learning22	70.73	0.590	0.953	Learning27	48.91	0.591	0.902	Learning35	66.29	0.514	0.906
Learning26	70.24	0.545	0.953	Learning40	48.67	0.681	0.898	Learning39	66.34	0.728	0.897
Learning29	71.71	0.752	0.950					Learning41	66.23	0.749	0.896
\Learning30	71.38	0.768	0.949					Learning42	66.16	0.686	0.899
Learning31	70.46	0.619	0.952								
Learning36	70.86	0.759	0.950								
Learning37	69.92	0.618	0.952								
Learning38	71.08	0.615	0.952								
Standardized Alpha = .953				Standardized Alpha = .911				Standardized Alpha = .910			

5.8 Dimensionality and Optimization of Scale Lengths

The next step in measurement development is an assessment of dimensionality and optimization of scale length through exploratory factor analysis.

5.8.1 Exploratory Factor Analysis

The 41 items remaining, after purification of the scale, were subjected to exploratory factor analysis using SPSS Version 25. Factors were extracted using principal axis factoring—which is the preferred method of extraction when the data violates the assumption of multivariate normality (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Because the factors are expected to be correlated, Promax rotations was selected. Orthogonal rotations, such as Promax, allow for correlation among the latent factors as well as aid in interpretability (Fabrigar et al., 1999).

Several indicators were examined to determine sampling adequacy including the Kaiser-Meyer-Olkin (KMO) test for sampling adequacy (Kaiser, 1970; Kaiser & Rice, 1974) and Bartlett's test of sphericity (Bartlett, 1950). The Kaiser-Meyer-Olkin test measures the sampling adequacy of each variable in the model. The KMO ranges from 0 to 1, with values above .60 being deemed acceptable (Hair et al., 2010; Tabachnick & Fidell, 2007). The KMO measure for the items composing entrepreneurial learning was .966, which far exceeds the recommended value of .60. Bartlett's test of sphericity tests whether the correlation matrix has an identity matrix. In order for the items to be suitable for factor analysis, Bartlett's test of sphericity should be statistically significant. In the developmental sample, Bartlett's test of sphericity was statistically significant (χ^2 (820) =

15,589.55, $p < .001$). Therefore, the results of these tests suggest that the items developed to reflect entrepreneurial learning are appropriate for factor analysis.

Eigenvalues, scree plots (Cattell, 1966), parallel analysis (Horn, 1965), and Velicer's (1976) minimum average partial (MAP) correlations were examined to determine the dimensionality, or underlying number of factors. While the Scree Plot (Figure 13) and parallel analysis suggest a 3-factor solution is appropriate, Kaiser's (1960) criterion of Eigenvalues greater than one and Velicer's MAP correlation test suggest a 6-factor solution.

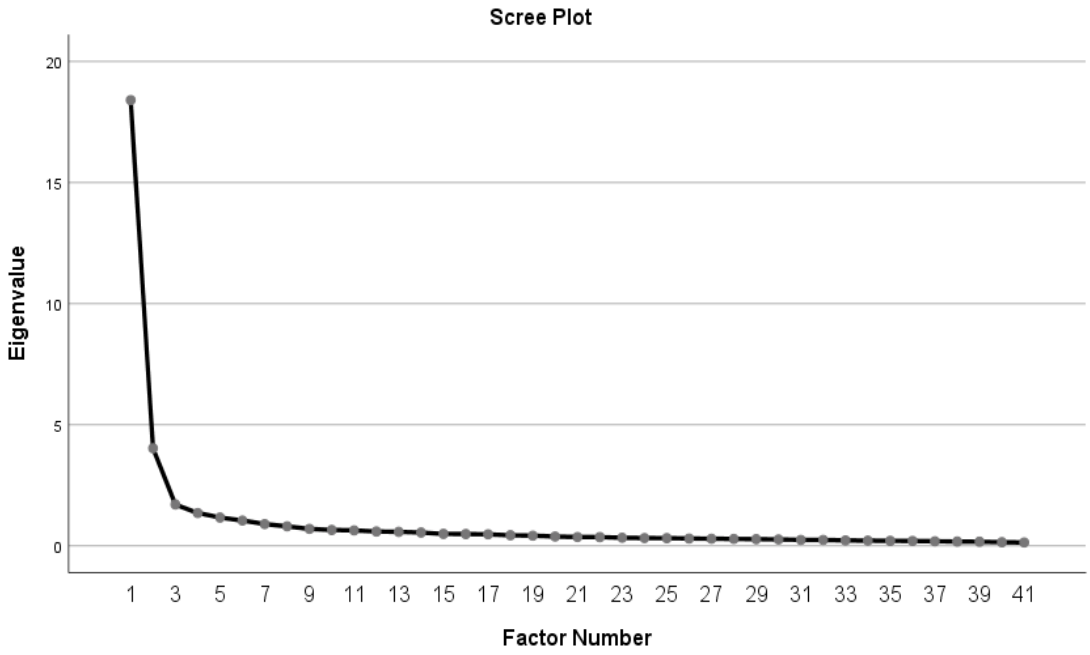

Figure 13 Scree Plot- Principal Axis Factoring

Do to the unclear guidance of assessments of dimensionality, I examined the 3-, 4-, 5-, and 6-factor solutions. Each solution was analyzed following the same procedure. First, communalities were examined to identify items which did not correlated with the set of items. Items with low communalities (those below .40) were removed iteratively. Next, I examined the pattern matrix to identify problematic items. Problematic items are items

which cross-loaded (loaded on more than 1 factor ≥ .3) or items which failed to significantly contribute to the factor solution (did not load on any factor ≥ .5). Problematic items were iteratively removed. Following the removal of each item, communalities were examined again before re-examining the pattern matrix.

Each of the initial 3-, 4-, 5-, and 6-factor solutions produce similar results. The results reported begin by examining the initial 6-factor solution (allowing the number of factors to be determined using Kaiser's criterion of eigenvalues greater than 1). However, following the removal of problematic items, the 6-factor solutions is reduced to a 3-factor solution. Table 5-10 and 5-11 provide the Communalities, Pattern Matrix, and Factor Correlation Matrix for the initial 6-factor solution. In the Pattern Matrix, factor loadings have been sorted by size and those < .30 were suppressed.

Table 5-10 Principal Axis Factoring- Pattern Matrix

	Comm	Factor					
		1	2	3	4	5	6
Experimenting reaching out to new markets?	.734	.974					
Expanding your product or service offerings?	.694	.885					
Searching for new possibilities with respect to products and services, processes, or markets?	.773	.851					
Searching for your next big idea?	.621	.837					
Creating products or services that are innovative to the firm?	.721	.803					
Penetrating more deeply into your existing customer base?	.646	.747					
Surveying existing customer satisfaction?	.531	.689					
Looking for novel technological ideas by thinking "outside the box"?	.665	.604					.305
Fine-tuning existing offerings to keep current customers satisfied?	.608	.587				.333	
Focusing on innovating?	.786	.546					.508
Creating variety in your experience?	.574	.532					
Updating and improving current products or services?	.620	.511					
Experimenting with technological trends?	.524	.488					
Looking for creative ways to satisfy customer needs?	.649	.478				.380	

Receiving feedback from your current customers?	.461	.474				.405	
Focusing on improving current business practices?	.635	.445					
Transforming and sharing what you learn with others?	.425	.419					
Reconsidering existing beliefs and decisions?	.401	.362					
Reading (books, newsletters, internet, etc.) that builds on or updates your current knowledge?	.666		.873				
Reading (books, newsletters, internet, etc.) about things that you do not know much about?	.552		.716				
Updating your knowledge on laws and regulations?	.641		.715				
Deeping your existing knowledge?	.703		.639			.408	
Broadening your knowledge bases?	.627		.607				
Searching online for information to build on or update your current knowledge?	.500		.599				
Requiring you to learn new skills or knowledge?	.489		.381				
Performing the day-to-day tasks of the firm?	.700			.790			
Managing the day-to-day operations of your firm?	.626			.761			
Focusing on the daily tasks of your firm?	.619			.688			
Solving problems that arise in the day-to-day operation of your firm?	.582			.471		.310	
Which were clear to you how to conduct?	.652				.850		
You have already acquired a lot of experience?	.676				.808		
You carried out as if they were routine?	.569				.723		
You could properly conduct using your present knowledge?	.373				.381		

Focused on the elimination of errors?	.611					.672	
Creating reliability in experience?	.679					.645	
Solving problems that come up in your routine work?	.660					.617	
Stabilizing firm routines, structures, or systems?	.644					.498	.315
Experimenting with new approaches toward technology, processes, or markets?	.770	.461					.595
Searching for new norms, routines, structures, or systems?	.773	.435					.588
Further developing existing competencies, technologies, processes, or markets?	.680						.513
Optimizing firm routines, structures, or systems?	.713					.360	.496
Eigenvalue		18.403	4.028	1.705	1.353	1.166	1.043
Percentage of Total Variance		44.886	9.825	4.159	3.299	2.844	2.544
Cumulative Variance Explained		44.886	54.711	58.869	62.169	65.013	67.557

Table 5-11 Principal Axis Factoring- Factor Correlation Matrix

Factor	1	2	3	4	5
1	1				
2	.572	1			
3	.258	.429	1		
4	.310	.512	.581	1	
5	.600	.607	.541	.578	1
6	.555	.542	.258	.348	.468

Prior to determining the underlying factor structure, I checked for problematic items. First, I checked for items which did not share a minimal amount of variance with the other items in the analysis (*communalities* < .40). Items with communalities < .40 were removed and the analysis was re-calculated. Next, if all communalities met the minimum required threshold of .40, I checked for items which cross-loaded (loaded >.30 on more than one item). Items which cross-loaded were removed iteratively—i.e. those with the greatest secondary loading were removed first. Finally, I removed items which failed to contribute to the factor solution (items which did not load on any factor with a factor loading of at least .50). Following the removal of each item, communalities and cross-loadings were examined again before proceeding.

Following the procedures described above, two items with low communalities, five items that cross-loaded on more than one factor, and three items which did not significantly contribute to the factor solution were identified as problematic and discarded. Factor structure was reanalyzed. Although Kaiser's criterion of Eigenvalues greater than one suggests a four-factor solution, the Scree Plot, parallel analysis, and Velicer's MAP correlation test suggest a 3-factor solution is most appropriate. Examining the four-factor

solution, the items developed to represent efficiency learning break apart into two separate factors—one of which appears to reflect behaviors related to efficiency learning, and one which reflects the knowledge related aspects of efficiency learning. When forcing the items to three factors, these items collapse on one construct; however, the communalities for the three items representing the knowledge relatedness aspect of efficiency learning fall below the recommended threshold of .40. Therefore, these items were dropped, and the data was re-analyzed.

Upon theoretical examination, two additional items aligned on factors where they did not have a good theoretical fit. These two items (fine-tuning products and services to meet customer's needs and creating variability in your experience) were discarded. Examining the remaining items, Factor 1 contains 15 items, Factor 2 contains six items, and Factor 3 contains five items. Due to the number of items representing Factor 1, a cutoff criterion of no component loading < .60 was chosen to identify items which failed to significantly contribute to Factor 1 of the solution. Four additional items which failed to significant contribute to the factor solution were iteratively removed. The remaining 22 items compose the final solution.

The Kaiser-Meyer-Olkin measure of sampling adequacy for the 22 items comprising the final solution was .947, exceeding the recommended value of .60. Bartlett's test of sphericity was also statistically significant (χ^2 (231) = 7,446.68, $p < .001$), indicating the set of items is appropriate for factor analysis.

The final solution resulted in the emergence of three factors. Kaiser's criterial of Eigenvalues greater than one, the Scree Plot, and parallel analysis all suggest a 3-factor solution accounting for 65.80 percent of the variance. The first factor (*Eigenvalue* = 10.09)

was composed of 11 items and accounted for 45.88 percent of the variance. The second factor (*Eigenvalue* = 2.95) was composed of six items and accounted for 13.39 percent of the variance. The third factor (*Eigenvalue* = 1.44) was composed of five items and accounted for 6.54 percent of the variance. The results of the final solution are presented in Tables 5-12 and 5-13, below.

Factor 1: Experiential Learning

Interpreting the three factors from the learning lens, Factor 1 is composed of 11 items, and accounts for 45.88 percent of the variance. Item factor loadings ranged from .608 to .894. Interpreting the items in the first factor, these items appear to reflect activities geared toward learning through experience. Therefore, Factor 1 is named experiential learning. The five items which load highest on experiential learning include: (1) creating products or services that are innovative to the firm (*factor loading* = .894), (2) experimenting reaching out to new markets (*factor loading* = .888), (3) searching for new possibilities with respect to products and services, processes, or markets (*factor loading* = .859), (4) expanding your product or service offerings (*factor loading* = .854), and (5) searching for your next big idea (*factor loading* = .843).

Factor 2: Passive Learning

Factor 2 is comprised of six items and accounts for 13.39 percent of the variance. Factor loadings ranged from .480 to .854. Factor 2 appears to reflect behaviors associated with carrying out the daily activities of the organization and routine problem solving. Therefore, Factor 2 is named passive learning. Passive learning is closely associated with efficiency learning as hypothesized in the background and theory development of this study. However, whereas efficiency learning refers to the learning outcome, passive

learning refers to the learning process. Therefore, a distinction is made in naming the second factor passive learning. The five items which load highest on passive learning include: (1) performing the day-to-day tasks of the firm (*factor loading* = .854), (2) focusing on the daily tasks of your firm (*factor loading* = .833), (3) managing the day-to-day operations of your firm (*factor loading* = .806), (4) solving problems that arise in the day-to-day operation of your firm (*factor loading* = .731), and (5) solving problems that come up in your routine work (*factor loading* = .595).

Factor 3: Vicarious Learning

Factor 3 is comprised of five items and accounts for 6.54 percent of the variance. Factor loadings ranged from .478 to .917. Factor 3 appears to reflect behaviors geared toward learning vicariously (through the experience of others, i.e. reading and searching for information). Therefore, Factor 3 is named vicarious learning. The five items which load on vicarious learning include: (1) reading that builds on or updates your current knowledge (factor loading = .931), (2) reading about things you do not know much about (factor loading = .789), (3) updating your knowledge on laws and regulations (factor loading = .735), (4) searching online for information to build on or update your current knowledge (factor loading = .647), and (5) broadening your knowledge bases (factor loading = .628).

Table 5-12: Final Solution- Pattern Matrix

	Comm	Factor		
		1	2	3
Creating products or services that are innovative to the firm?	.725	.894		
Experimenting reaching out to new markets?	.685	.888		
Searching for new possibilities with respect to products and services, processes, or markets?	.694	.859		
Expanding your product or service offerings?	.673	.854		
Searching for your next big idea?	.618	.843		
Penetrating more deeply into your existing customer base?	.623	.793		
Looking for novel technological ideas by thinking "outside the box"?	.644	.767		
Looking for creative ways to satisfy customer needs?	.605	.686		
Experimenting with new approaches toward technology, processes, or markets?	.563	.654		
Surveying existing customer satisfaction?	.422	.627		
Updating and improving current products or services?	.611	.608		
Focusing on the daily tasks of your firm?	.599		.854	
Performing the day-to-day tasks of the firm?	.622		.833	
Managing the day-to-day operations of your firm?	.572		.806	
Solving problems that arise in the day-to-day operation of your firm?	.605		.731	
Solving problems that come up in your routine work?	.595		.595	
Focused on the elimination of errors?	.495		.480	
Reading (books, newsletters, internet, etc.) that builds on or updates your current knowledge?	.687			.931
Reading (books, newsletters, internet, etc.) about things that you do not know much about?	.573			.789
Updating your knowledge on laws and regulations?	.624			.735
Searching online for information to build on or update your current knowledge?	.493			.647
Broadening your knowledge bases?	.579			.628
Eigenvalue		11.56	3.07	1.48
Percentage of Total Variance		46.24	12.29	5.92
Cumulative Variance		46.24	58.54	64.46

Table 5-13: Final Solution- Factor Correlation Matrix

Factor	1	2
1	1	
2	.425	1
3	.629	.603

Internal reliability was examined using standardized Cronbach's alpha for each of the three dimensions of entrepreneurial learning which emerged. Results indicated good internal reliability. Standardized Cronbach's alpha = .945 for Factor 1 (reflecting experiential learning), indicating good internal reliability. Corrected item-to-total correlations and Cronbach's alpha if item deleted indicate that all 11 items comprising Factor 1 significantly contribute to factor measurement. Standardized Cronbach's alpha = .881 for Factor 2 (reflecting passive learning), again indicating good internal reliability. Corrected item-to-total correlations and Cronbach's alpha if item deleted both indicate that all six items in Factor 2 significantly contribute to measurement. Finally, standardized Cronbach's alpha = .872 for Factor 3 (reflecting vicarious learning), also indicating good internal reliability. Again, corrected item-to-total correlations and Cronbach's alpha if item deleted indicate that all five items in in Factor 3 also significantly contribute to measurement.

Prior to proceeding to confirmatory factor analysis, several alternatives were pursued to determine if the hypothesized factor structure was present within the data. First, to ensure robustness, I attempted extraction using principal component analysis (Promax rotation) with little discernible differences in the results. Although there is extensive debate

on the use of principal component analysis vs. factor analysis, both methods have been shown to produce similar results (Arrindell & Van Der Ende, 1985; Velicer & Jackson, 1990). Further, I also examined the results using a direct Oblimin (Oblique) rotation. Each of the four combinations of extraction and rotation methods produced similar results; however, none of the solutions which emerge from the data fit the hypothesized structure.

Second, prior research has suggested that in some cases exploratory factor analysis conducted on measures that have related sub-components will produce results where the items will hang together on their sub-factors rather than the intended constructs. Therefore, I attempted a more exploratory approach to factor analysis. To identify if subcomponents existed within each learning construct, I examined the unidimensionality of each of the types of learning separately. Although the results suggested that the hypothesized factors may be higher-order factors composed of several subdimensions, upon further inspection the factors in the higher-order model lacked divergent validity. Appendix G provides the details for this analysis.

5.9 Reliability

The ninth step in measurement development is an examination of the reliability of the measures. In this study, reliability is assessed in the second half of the split sample—a more general sample of entrepreneurs in knowledge-based industries.

5.9.1 Data Cleaning- Confirmatory Sample

Data was cleaned to ensure that response sets provide reliable information and that responses meet the underlying assumptions required for statistical analysis. I examined descriptive statistics and inter-item correlations and checked for univariate and multivariate

outliers. I also examined the assumptions of confirmatory factor analysis by considering sample size and testing for multivariate normality.

First, the data were examined for outliers. Again, I examined the number of owners, the size of the top management team, and the number of employees as proxies for firm size. The number of owners ranged from one to one million (*mean* = 5,787.99; *S.D.* = 75,917.77). The number of members in the top management team ranged from one to 15 (*mean* = 2.11; *S.D.* = 1.77). The number of employees ranged from 0 to 9,500 (*mean* = 79.42; *S.D.* = 835.97). Visual inspection of the data confirmed several outliers. Six responses which reported 100 or more owners were identified as outliers and discarded.

Univariate outliers were identified by examining the z-scores of each of the items representing entrepreneurial learning. Using the cutoff criteria of $|z| > 3.29$, 13 participants with item responses falling further than 3.29 standard deviations from the mean were identified as univariate outliers.

Multivariate outliers were identified by examining Mahalanobis Distance. Using the criterion of $\alpha = .001$, an additional 3 participants that fell outside of the critical chi-square value were identified as multivariate outliers. In total, 16 participants that were identified as univariate or multivariate outliers were discarded. Following the removal of outliers, the confirmatory sample consisted of 324 respondents.

The final confirmatory sample consisted of 324 respondents. Although there are no absolute guidelines determining sample size, the literature offers several recommendations. The general rule of thumb is that samples over 300 are considered adequate (Worthington & Whittaker, 2006). Some scholars recommend that the number of participants per item is a more adequate measure of adequate sample size. The final sample size of 324 respondents

to 22 items reflects a respondent-to-item ration of 14.73-to-1, exceeding, most recommendations of adequate sample size (DeVellis, 2017; Hair et al., 2010).

I tested multivariate normality in this sample by examining Small's test (Small, 1980), Srivastava's test (Srivastava, 1984), and Mardia's test (Mardia, 1970). Small's test and Srivastava's test were both statistically significant ($p < .001$), indicating multivariate skewness had been violated. Srivastava's test and Mardia's test were also both statistically significant ($p < .001$), indicating multivariate kurtosis had also been violated. Finally, the Omnibus test of multivariate normality based on Small's test was also statistically significant, further indicating violations of multivariate normality.

5.9.2 Descriptive Statistics

Descriptive statistics are reported following the removal of outliers. Again, respondents were overwhelmingly male (65.4 percent) and Caucasian (82.7 percent). They were also highly educated (89.8 percent had a 4-year degree or greater) and older (*mean* = 57.77; *S.D.* = 11.00). Consequently, they also had a relatively high number of years of work (*mean* = 35.74; *S.D.* = 11.33) and industry experience (*mean* = 28.56; *S.D.* = 12.28). Demographic and descriptive statistics for this sample are presented in Table 5-14 below.

Table 5-14 Demographic and Descriptive Statistics- Confirmatory Sample

Gender *n* = 324	Frequency	Percentage
Male	212	65.4
Female	109	33.6
Prefer not to answer	3	.9
Race *n* = 324	**Frequency**	**Percentage**
American Indian or Alaskan	3	.9
Asian	16	4.9
Black or African American	23	7.1
Native Hawaiian or Pacific Islander	1	.3

White	268	82.7
Prefer not to answer	13	4.0
Ethnicity *n* = 324	Frequency	Percentage
Hispanic or Latino	20	6.2
Not Hispanic or Latino	294	90.7
Prefer not to answer	10	3.1
Level of Education *n* = 324	Frequency	Percentage
Less than high school	0	0
High school or equivalent	6	1.9
Some college	15	4.6
2-year degree	11	3.4
4-year degree	126	38.9
Master's Degree	96	29.6
Doctorate or professional degree	69	21.3
Prefer not to answer	1	.3

Table 5-14 Demographic and Descriptive Statistics (Cont)

	n	***Min***	***Max***	***Mean***	***S.D.***
Age	324	32	93	57.77	11.00
Work Experience	324	5	66	35.74	11.33
Industry Experience	324	0	64	28.56	12.28

Descriptive statistics of the firms operated by respondents in this sample are presented in Table 5-15. Firms owned by respondents in the confirmatory sample ranged from 0 to 165 years in age (*mean* = 19.85; *S.D.* = 18.08). Respondents' firms were relatively small, owned by up to 20 owners (*mean* = 1.86; *S.D.* = 2.22) and managed by up to nine members of a top management team (*mean* = 1.98; *S.D.* = 1.47), with 50 or fewer employees (*mean* = 5.82; *S.D.* = 9.09). Approximately 40 percent of respondents

considered their firm a family firm (40.4 percent), and a similar percentage of respondents (40.7 percent) reported that a family or family group holds majority ownership of the firm.

Table 5-15 Organizational Descriptives- Confirmatory Sample

	n	***Min***	***Max***	***Mean***	***S.D.***
Firm Age	324	0	165	19.85	18.08
# of Owners	324	1	20	1.86	2.22
TMT Size	324	1	15	1.98	1.47
# of Employees	121	0	50	5.82	9.09

Table 5-15 Organizational Descriptives (Cont)

Family Firm *n* = 324		Frequency	Percentage
	Yes	131	40.4
	No	193	59.6
Family Ownership *n* = 323		Frequency	Percentage
	Yes	132	40.7
	No	191	59.0
Franchise *n* = 324		Frequency	Percentage
	Yes	5	1.5
	No	319	98.5

5.9.3 Confirmatory Factor Analysis

To confirm the factor structure which emerged from the exploratory factor analysis, I examine of a series of structural models. Confirmatory factor analysis was conducted using Maximum Likelihood Estimation in IBM SPSS AMOS (Version 25). The series of structural models that I test include: (1) a unidimensional model with all of the items forced onto one construct, (2) a saturated 3-factor model of the dimensions of entrepreneurial

learning which emerged from exploratory factor analysis, and (3) a modified 3-factor-model.

Model fit is assessed using a number of absolute and incremental fit indices. The absolute fit indices evaluated in the current study include: Likelihood-ratio chi-square ($\chi 2$), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Standardized Root Mean Square Residual (SRMR) Index, and Root Mean Error of Approximation (RMSEA). The incremental fit indices evaluated include the Normed-Fit Index (NFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI),

The Likelihood-ratio chi-square ($\chi 2$) statistic is one of the most important measures of model fit (Hair et al., 2010). The $\chi 2$ statistic tests the fit, whereas a higher $\chi 2$ indicates poorer fit. The significance of the $\chi 2$ statistic is the primary statistic of interest, as a significant $\chi 2$ indicates poor model fit. However, the $\chi 2$ statistic is especially susceptible to sample size (Bentler & Bonett, 1980) and multivariate nonnormality (McIntosh, 2007), whereas in large and multivariate non-normal samples the $\chi 2$ statistic tends to be significant even when the model is specified properly. Thus, while the $\chi 2$ may be useful, it should only be used as a guide, rather than an absolute indicator of model fit.

The Goodness-of-Fit Index (GFI) is a measure of fit between the specified model and the covariance matrix from an estimated population model (Jöreskog & Sörbom, 1996). The GFI statistic ranges from 0 (poor fit) to 1 (perfect fit). GFI statistics greater than .90 generally indicate acceptable model fit, with statistics greater than .95 indicating good model fit (Hooper, Coughlan, & Mullen, 2008).

The Adjusted Goodness-of-Fit Index (AGFI) is an adjusted measure of fit between the specified model and the covariance matrix, correcting for the number of indicators

(Tabachnick & Fidell, 2007). The AGFI statistic also ranges from 0 (poor fit) to 1 (perfect fit). AGFI statistics greater than .90 generally indicate good model fit (Hooper et al., 2008).

The Standardized Root Mean Square Residual (SRMR) Index is a measure of fit between the hypothesized and observed models assessing the average standardized residuals. The SRMR index is relatively independent of sample size, which makes it a preferred fit measure in many studies (F. F. Chen, 2007). SRMR statistics indicate acceptable model fit when they are lower than 0.10 and good model fit lower than 0.05 (Hu & Bentler, 1999; Kline, 2015).

The Root Mean Error of Approximation (RMSEA) is a measure of fit between the specified model and the estimated population covariance model. The RMSEA is, perhaps, "one of the most informative fit indices" (Diamantopoulos & Siguaw, 2000, pp. 85). The RMSEA statistic begins at 0 (perfect fit) and increases as fit decreases. The RMSEA is also less susceptible to fluctuations due to sample size than many other fit indices. Additionally, the RMSEA accounts for large sample sizes. RMSEA statistics less than .08 indicate acceptable model fit and less than .05 indicate good model fit (Hu & Bentler, 1999; Schermelleh-Engel & Moosbrugger, 2003).

The Normed Fit Index (NFI) is a measure of fit between the $\chi 2$ of the specified model and the $\chi 2$ of the null model (Bentler & Bonett, 1980). The NFI ranges from 0 (poor fit) to 1 (perfect fit). NFI statistics with values greater than .90 typically indicate acceptable model fit (Bentler & Bonett, 1980), although Hu and Bentler (1999) suggest that values of .95 are required to indicate good model fit.

The Non-Normed Fit Index (NNFI), also known as the Tucker-Lewis Index (TLI) is also measure of fit between the $\chi 2$ of the specified model and the $\chi 2$ of the null model.

The TLI typically ranges from 0 (poor fit) to 1 (perfect fit); however, because TLI is non-normed it has been noted that values can fall outside of this range. According to Hu and Bentler (1999), TLI statistics greater than .95 indicate good model fit.

The Comparative Fit Index (CFI) is a measure of fit between the specified model and the null model (Bentler, 1990). The CFI statistic ranges from 0 (poor fit) to 1 (perfect fit). CFI statistics greater than .90 typically indicate acceptable model fit, and statistics greater than .95 indicate good model fit (Hu & Bentler, 1999).

In Model 1, all 22 remaining items were loaded onto a single latent variable. Model fit was assessed using a number of fit indices. In an unmodified model, initial indicators of model fit appear to be extremely poor. The chi-square results were statistically significant ($\chi 2 = 1{,}685.61$, $df = 209$, $p < .001$). Additionally, the GFI statistic of .571, AGFI statistic of .481, SRMR statistic of .138, RMSEA statistic of .148, NFI statistic of .628, TLI statistic of .621, and CFI statistic of .657 all indicate poor model fit.

In Model 2, each of the three types of learning were modeled as separate constructs, as suggested by the EFA. The 11 items representing experiential learning were loaded onto one construct. The six items representing passive learning were loaded onto a second construct. And, the five items representing vicarious learning were loaded onto a third construct. Model fit was assessed using a number of fit indices. In an unmodified model, initial indicators of model fit appear to improve toward an adequate range. The chi-square results were statistically significant ($\chi 2 = 747.38$, $df = 206$, $p < .001$); however, chi-square statistics are often significant in large samples. The GFI statistic of .814, AGFI statistic of .771, SRMR statistic of .079, RMSEA statistic of .090, NFI statistic of .835, TLI statistic

of .859, and CFI statistic of .874 all indicate improving model fit. Therefore, Model 2 was chosen over a unidimensional model.

In Model 3, I attempt to improve the fit of the model. First, I examined the modification indices for the covariances. Items which displayed high covariance modification indices (*M.I.* > .15) with other items within the same factor were allowed to covary. Items with the highest modification indices were allowed to covary first, in an iterative pattern. In total, four pairs of items with the experiential learning construct were allowed to covary. Covariances were added to the model to the point where further modification within the passive and vicarious learning constructs might further improve model fit, however the addition of covariance between error terms reduces the average variance extracted during factor analysis—thus reducing divergent validity.

Finally, examining the modification indices for the regression weights and the standardized residual covariance matrix, one item appears to be especially problematic. Therefore, this item ("updating and improving current products and services") was removed.

In Model 3 (the final model), the 10 remaining items representing experiential learning were loaded onto one construct. The six remaining items representing passive learning were loaded onto a second construct. And, the five remaining items representing vicarious learning were loaded onto a third construct. Model fit was assessed using a number of fit indices. Indicators of model fit appear to have improved and are in the range of adequate to good. The chi-square results were statistically significant ($\chi 2 = 565.30$, $df = 182$, $p < .001$); however, chi-square statistics are often significant in large samples. The GFI statistic of .851, AGFI statistic of .811, SRMR statistic of .075, RMSEA statistic of

.081, NFI statistic of .866, TLI statistic of .890, and CFI statistic of .905 all indicate good model fit. Therefore, Model 3 was chosen as the optimal model. Table 5-16 provides a comparison of the models.

Table 5-16 Comparison of Structural Model Fit

Indicator	Model 1	Model 2	Model 3
χ^2	1685.61	747.38	565.3
GFI	.571	.814	.851
AGFI	.481	.771	.811
SRMR	.138	.079	.075
RMSEA	.148	.090	.081
NFI	.628	.835	.866
TLI	.621	.859	.890
CFI	.657	.874	.905

Figure 14 details the final sub-dimensional structural model with standardized estimates.

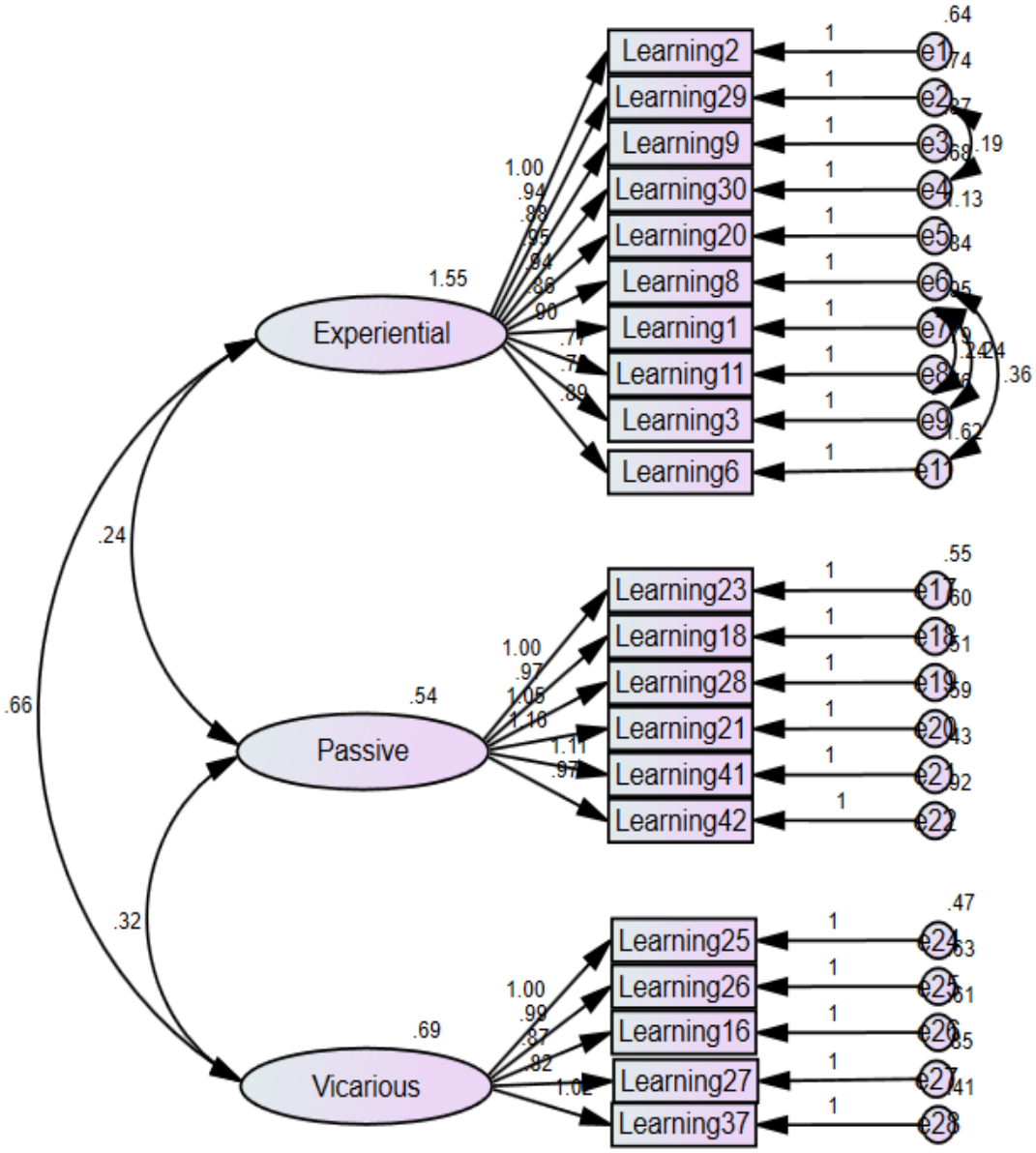

Figure 14 Confirmatory Sub-dimensional Model of Entrepreneurial Learning

5.10 Reliability and Validity

The final step in the measurement development procedure is an assessment of the reliability and validity of the newly created measures. Several methods exist to examine

the reliability and validity of a measure. In this study, I assess the internal reliability as well as the convergent and discriminant validity of the three factors examined in the final structural model.

Reliability is assessed by examining Cronbach's alpha and composite reliability (CR). Cronbach's alpha is the most common method of examining internal reliability. Cronbach's alphas of .933 for experiential learning, .854 for passive learning, and .834 for vicarious learning are well above the recommended cutoffs of 0.7 (Hair et al., 2010) suggesting high reliability. Composite reliability (CR), a technique for assessing internal consistency using factor loadings, is another common method of assessing reliability. Composite reliabilities of .933 for experiential learning, .858 for passive learning, and .839 for vicarious learning are well above the recommended cutoffs of 0.7 (Hair et al., 2010), substantiating the reliability of the measures.

To assess convergent validity, I examine the average variance extracted (AVE) for each of the three learning factors. AVE refers to the variance explained by a factor in comparison with the variance associated with measurement error. Convergent validity exists when AVE is greater than .50 (Fornell & Larcker, 1981; Hair et al., 2010). The AVE of .582 for experiential learning, .504 for passive learning, and .513 for vicarious learning are all above the recommended cutoff of 0.50, suggesting convergent validity.

To assess discriminant validity, I examine average variance extracted (AVE) and minimum shared squared variance (MSV). For discriminant validity to exist MSV must be less than AVE (Hair et al., 2010). As shown in Table 5-17, the three learning factors validated in confirmatory factor analysis exhibit good discriminant validity.

Table 5-17 Assessment of Reliability and Validity

	Cronbach alpha	**CR**	**AVE**	**MSV**
Experiential	.933	0.933	0.582	0.404
Passive	.854	0.858	0.504	0.280
Vicarious	.834	0.839	0.513	0.404

6 ANALYSES & RESULTS

Chapter 6 provides a description of the statistical analyses. Although the hypothesized dependent variables did not emerge in measurement development, in this chapter I carry out post-hoc analysis on a series of related relationships between performance and learning within the entrepreneurial context. I employ hierarchical linear regression to investigating the role of prior outcomes on entrepreneurial learning behaviors and the organizational and personal characteristics which may moderate these effects. In this chapter, I first describe the sample used to conduct post-hoc analysis. I then provide a detailed description of the analysis and results.

6.1 Sample

As outlined in my research plan, I restrict my sample to new and young firms engaged in the tax preparation industry to examine my research questions. I define new and young firms as those under 10 years old. In total, 288 respondents operated firms in the tax preparation industry that were under 10 years old. Descriptive statistics and inter-item correlations were examined and are reported.

Respondents were mostly male (60.8 percent) and Caucasian (75.0 percent). They were also highly educated (81.5 percent had a 4-year degree or greater) and older (*mean* = 51.41; *S.D.* = 12.31). Consequently, they also had a high number of years of work (*mean* = 29.98; *S.D.* = 13.53) and industry experience (*mean* = 18.26; *S.D.* = 11.51). Demographic and descriptive statistics for this sample are presented in Table 6-1, below.

Table 6-1 Demographic and Descriptive Statistics- Final Sample

Gender *n* = 288	Frequency	Percentage
Male	175	60.8
Female	112	38.9
Prefer not to answer	1	.3
Race *n* = 288	Frequency	Percentage
American Indian or Alaskan	3	1
Asian	18	6.3
Black or African American	32	11.1
White	216	75.0
Prefer not to answer	19	6.6
Ethnicity *n* = 288	Frequency	Percentage
Hispanic or Latino	34	11.8
Not Hispanic or Latino	245	85.1
Prefer not to answer	9	3.1
Level of Education *n* = 288	Frequency	Percentage
Less than high school	1	.3
High school or equivalent	2	.7
Some college	25	8.7
2-year degree	23	8
4-year degree	127	44.4
Master's Degree	96	33.3
Doctorate or professional degree	11	3.8
Prefer not to answer	3	1

Table 6-1 Demographic and Descriptive Statistics (Cont.)

	n	***Min***	***Max***	***Mean***	***S.D.***
Age	287	22	82	51.41	12.31
Work Experience	284	2	65	28.98	13.53
Industry Experience	285	0	59	18.26	11.51

Descriptive statistics of the firms operated by respondents in this sample are presented in Table 6-2. Firms owned by respondents in the confirmatory sample ranged

from 0 to 10 years in age (*mean* = 5.85; *S.D.* = 2.76). Respondent's firms were relatively small, with between 1 and 9 owners (*mean* = 1.33; *S.D.* = 0.73), managed by up to 10 members of a top management team (*mean* = 1.53; *S.D.* = 0.96), with up to 30 employees (*mean* = 2.97; *S.D.* = 4.81). More than half of respondents considered their firm a family firm (51.7 percent), and 35.8 percent of respondents reported that a family or family group holds majority ownership of the firm.

Table 6-2 Organizational Descriptives- Final Sample

	n	***Min***	***Max***	***Mean***	***S.D.***
Firm Age	288	0	10	5.85	2.76
# of Owners	288	1	9	1.33	0.73
TMT Size	288	1	10	1.53	0.96
# of Employees	101	0	30	2.97	4.81

Table 6-2 Organizational Descriptives (Cont.)

Family Firm *n* = 288		Frequency	Percentage
	Yes	149	51.7
	No	139	48.3
Family Ownership *n* = 288		Frequency	Percentage
	Yes	103	35.8
	No	185	64.2
Franchise *n* = 288		Frequency	Percentage
	Yes	16	5.6
	No	272	94.4

6.2 Post-hoc Analysis

To conduct post-hoc analysis, I use hierarchical linear regression (HLR) analysis to assess whether and how performance (and its interaction with personal and

organizational characteristics) influences each of the types of entrepreneurial learning. Analysis was performed in SPSS (Version 25).

6.2.1 Data Cleaning, Testing of Assumptions, and Construct Reliability

The data was manually examined for missing data and outliers. Composite variable outliers were identified graphically, through the use of box plots to examine the independent and dependent variables. Thirteen cases were identified as outliers and removed. An additional four cases were missing data and were excluded case-wise. Therefore, the final usable sample was 271 cases.

Next, I examined normality using both manual examination and numerical methods (Park, 2008). Normality was assessed graphically using histograms, Box plots, and Q-Q plots. Numerically, I examined skewness and Kurtosis of the independent and dependent variables. The data are considered to be distributed normally when the skewness and Kurtosis are between -1.0 and 1.0, with values closer to zero being ideal. The skewness of variables in this study ranged from -.566 to .098 and the kurtosis of variables ranged from -.816 to -.063, indicating that the data were distributed normally. Additionally, I examined the Kolmogorov-Smirnov and Shapiro-Wilk tests for normality. The null hypotheses of the Kolmogorov-Smirnov and Shapiro-Wilk tests are that the data is normally distributed (Goodman, 1954; Massey, 1951; Shapiro & Wilk, 1965). The Kolmogorov-Smirnov and Shapiro-Wilk tests indicate that the three learning constructs used as dependent variables and all but one of the independent variables are normally distributed. Although both the Kolmogorov-Smirnov test and the Shapiro-Wilk test indicate that normality of the entrepreneurial orientation construct may be violated, the skewness and kurtosis suggest that it is normally distributed. Therefore, this construct is retained for further analysis.

Table 6-3 Assessment of Normality

			Kolmogorov-Smirnov			Shapiro-Wilk		
	Skewness	**Kurtosis**	**Statistic**	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Experiential Learning	.098	-.174	.050	277	.089	.991	277	.094
Passive Learning	-.532	-.561	.107	277	.000	.942	277	.000
Vicarious Learning	-.225	-.710	.073	277	.001	.971	277	.000
Performance	-.566	-.063	.107	277	.000	.953	277	.000
Entrepr. Orientation	.052	-.146	.029	277	.200*	.995	277	.541
Learning Orientation	-.497	-.371	.092	277	.000	.965	277	.000
Intra-Industry Ties	-.288	-.672	.081	277	.000	.966	277	.000
Extra-Industry Ties	.073	-.816	.091	277	.000	.969	277	.000

Finally, I examine the internal reliability of the constructs used as variables in this study. Cronbach's alpha coefficients were computed to examine internal reliability for the constructs used as dependent and independent variables. Cronbach's alpha for the variables in this study ranged from .728 to .935. Table 6-4 provides the scale means, standard deviations, and Cronbach's alpha coefficients.

Table 6-4 Means, Standard Deviations, & Cronbach's Alpha for Composite Variables

Construct	***Mean***	***SD***	***Cronbach's alpha***
Experiential Learning	4.25	2.45	.934
Passive Learning	5.80	1.39	.881
Vicarious Learning	5.52	1.35	.871
Entrepreneurial Orientation	4.31	1.17	.831
Learning Orientation	4.95	0.91	.882
Intra-Industry Managerial Ties	3.52	2.25	.905
Extra-Industry Managerial Ties	3.20	2.27	.872

6.2.2 Analysis

Post-hoc analysis is conducted using hierarchical linear regression using SPSS (Version 25). Hierarchical linear regression allows independent variables to be regressed against the dependent variable in a series of models, thereby permitting the assessment of change in predictive validity from adding additional predictors to the model. The following composite variables were computed and examined:

Dependent Variables

- Experiential Learning = (Learning2 + Learning29 + Learning9 + Learning30 + Learning20 + Learning8 + Learning1 + Learning11 + Learning3 + Learning6) / 10
- Passive Learning = (Learning23 + Learning18 + Learning28 + Learning21 + Learning41 + Learning42) / 6
- Vicarious Learning = (Learning25 + Learning26 + Learning16 + Learning27 + Learning37) / 5

Independent Variables

- Performance = (Perform1 Perform2 Perform3 Perform4 Perform5 Perform6 Perform7) / 7
- Performance^2 = Performance * Performance
- Entrepreneurial Orientation = (EO1 + EO2 + EO3 + EO4 + EO5 + EO6 + EO7 + EO8 + EO9 + EO10) /10
- Learning Orientation = (LO1 + LO2 + LO3 + LO4 + LO5 + LO6) / 6
- Intra-Industry Managerial Ties * TMTS = ((Ties1 + Ties2 + Ties3 + Ties4) / 4) * TMTS
- Extra-Industry Managerial Ties * TMTS = ((Ties5 + Ties6 + Ties7) / 3) *TMTS.

Because this research is interested in interaction effects, all independent variables were mean centered (IV – *mean*) to reduce the influence of multicollinearity.

In Step 1, the control variables are entered into the model. In Step 2, performance is entered into the model to test the primary research question of how performance influences the engagement in entrepreneurial learning. In Step 3, performance squared is entered into the model to test for nonlinear relationships between performance and the type of entrepreneurial learning. In Step 4, entrepreneurial orientation, learning orientation, and intra- and extra-industry managerial ties are entered as predictors. The model in Step 5 reflects a variation of the hypothesized model. In Step 5, the moderation effects of organizational characteristics (between performance and intra-industry and extra-industry managerial ties) and personal characteristics (between performance and entrepreneurial orientation as well as performance and learning orientation) are entered as predictors.

6.2.3 Results

Tables 6-5 thru 6-10 report the regression statistics from the hierarchical linear regression analysis for each of the three underlying types of entrepreneurial learning.

Tables 6-5 and 6-6 report the regression statistics from the series of hierarchical regression models predicting experiential learning. Block 1 includes only the control variables as predictors. The control variables resulted in a statistically significant amount of variance explained ($R2$ = .085, $F_{5,265}$ = 4.897, p < .001). In the control variable model, both Industry Experience (B= -0.019, t= -2.646, p < .01) and top management team size (B= 0.179, t= 2.115, p < .05) influenced entrepreneurs' engagement in experiential learning. In the next block, performance was included as a predictor. In Block 2, the inclusion of performance (B= 0.479, t= 6.455, p < .001) resulted in a significant increase

in predictive validity of the model, with a change in R*Square of .125 ($F_{6,264}$ = 11.652, p < .001). In the third block, a squared performance term is entered in the model. In Block 3, the inclusion of a curvilinear term for performance (B= 0.041, t= 0.624, p > .5) does not result in a significant increase in predictive validity (*change in* R^2 = .001, $F_{7,263}$ = 10.020, p > .5). These results indicate that performance shares a linear, rather than curvilinear, relationship with experiential learning.

In Block 4, entrepreneurial orientation (B= 0.708, t= 6.696, p < .001), learning orientation (B= 0.309, t= 3.424, p = .001), intra-industry managerial ties (B= 0.479, t= 6.455, p < .001), and extra-industry managerial ties (B= -0.019, t= -0.517, p > .5) were entered into the model. The results show a significant increase in predictive validity (*change in* R^2 = .287, $F_{11,259}$ = 23.270, p < 001). These results indicate that entrepreneurial orientation, learning orientation, and intra-industry managerial ties act as predictors of experiential learning.

In Block 5, the moderating relationships of entrepreneurial orientation and performance (B= -.004, t= -0.034, p > .5), learning orientation and performance (B= 0.109, t= 1.110, p > .5), intra-industry managerial ties and performance (B= 0.062, t= 1.506, p > .5), and extra-industry managerial ties and performance (B= -0.050, t= -1.218, p > .5) did not result in a significant increase in predictive validity (*change in* R^2 = .009, $F_{15,255}$ = 17.424, p > .1). The results indicate that relationships between performance and experiential learning is not moderated by entrepreneurial orientation, learning orientation, intra-industry managerial ties, or extra-industry managerial ties.

Table 6-5 Hierarchical Regression Analysis Results Experiential Learning

		Unstandardized		**Standardized**		
Model	***VIF***	***B***	***SE***	***Beta***	***t***	***Sig.***

1	(Constant)		4.764	0.362		13.169	0.000
	Age	1.381	-0.008	0.007	-0.081	-1.167	0.244
	Work Experience	1.023	0.001	0.001	0.116	1.955	0.052
	Industry Experience	1.330	-0.019	0.007	-0.179	-2.646	0.009
	TMTS	1.021	0.179	0.085	0.126	2.115	0.035
	Organization Age	1.055	-0.012	0.027	-0.028	-0.464	0.643
2	(Constant)		4.558	0.338		13.469	0.000
	Age	1.382	-0.007	0.007	-0.073	-1.142	0.254
	Work Experience	1.034	0.001	0.001	0.079	1.426	0.155
	Industry Experience	1.391	-0.010	0.007	-0.092	-1.432	0.153
	TMTS	1.035	0.119	0.079	0.083	1.499	0.135
	Organization Age	1.068	0.005	0.025	0.012	0.206	0.837
	Performance	1.111	0.479	0.074	0.372	6.455	0.000
3	(Constant)		4.533	0.341		13.288	0.000
	Age	1.391	-0.007	0.007	-0.070	-1.085	0.279
	Work Experience	1.067	0.001	0.001	0.073	1.292	0.197
	Industry Experience	1.391	-0.010	0.007	-0.092	-1.418	0.157
	TMTS	1.035	0.119	0.079	0.083	1.497	0.136
	Organization Age	1.077	0.007	0.025	0.015	0.262	0.794
	Performance	54.961	0.156	0.523	0.121	0.299	0.765
	Performance^2	55.683	0.041	0.065	0.255	0.624	0.533
4	(Constant)		4.470	0.310		14.421	0.000
	Age	1.457	0.004	0.005	0.038	0.714	0.476
	Work Experience	1.110	2.404E-06	0.000	0.000	0.005	0.996
	Industry Experience	1.404	-0.008	0.006	-0.071	-1.361	0.175
	TMTS	2.729	-0.203	0.104	-0.142	-1.953	0.052
	Organization Age	1.089	0.004	0.020	0.008	0.174	0.862
	Performance	55.650	0.299	0.423	0.232	0.707	0.480
	Performance^2	56.598	-0.002	0.053	-0.012	-0.038	0.970
	Entrepr. Orientation	1.688	0.708	0.106	0.383	6.696	0.000
	Learning Orientation	1.586	0.309	0.090	0.190	3.424	0.001
	Intra-industry Ties	5.541	0.101	0.035	0.296	2.853	0.005
	Extra-industry Ties	6.073	-0.019	0.037	-0.056	-0.517	0.606
5	(Constant)		4.514	0.313		14.437	0.000
	Age	1.492	0.003	0.005	0.025	0.463	0.643
	Work Experience	1.269	0.000	0.001	-0.018	-0.357	0.721
	Industry Experience	1.423	-0.007	0.006	-0.063	-1.201	0.231
	TMTS	2.747	-0.191	0.104	-0.134	-1.839	0.067
	Organization Age	1.095	0.003	0.020	0.006	0.139	0.889
	Performance	100.033	-0.117	0.566	-0.091	-0.207	0.836
	Performance^2	65.939	-0.024	0.057	-0.151	-0.422	0.673
	Entrepr. Orientation	34.549	0.711	0.478	0.385	1.489	0.138

Learning Orientation	32.546	-0.119	0.409	-0.073	-0.291	0.771
Intra-industry Ties	142.003	-0.162	0.179	-0.476	-0.908	0.365
Extra-industry Ties	147.168	0.191	0.180	0.564	1.057	0.291
Performance*EO	133.326	-0.004	0.111	-0.017	-0.034	0.973
Performance*LO	132.571	0.109	0.098	0.563	1.110	0.268
Performance*IntraTies	187.960	0.062	0.041	0.909	1.506	0.133
Performance*ExtraTies	194.403	-0.050	0.041	-0.747	-1.218	0.224

a Dependent Variable: Experiential Learning

Table 6-6 Model Comparison Experiential Learning

Model	R Square	Adj R*Square	SE	R*Square Change	F	Sig.
1	.085	.067	1.189	.085	4.897	.000
2	.209	.191	1.107	.125	41.672	.000
3	.211	.190	1.108	.001	0.390	.553
4	.497	.476	0.892	.287	36.886	.000
5	.506	.477	0.890	.009	1.175	.322

Tables 6-7 and 6-8 report the regression statistics from the series of hierarchical regression models predicting passive learning. Block 1 includes only the control variables as predictors. The inclusion of the control variables did not result in a statistically significant amount of variance explained ($R2$ = .031, $F_{5,265}$ = 1.718, p > .10). In the control variable model, none of the controls statistically significantly contributed to the model (p < .05). In the next block, performance was included as a predictor. In Block 2, the inclusion of performance (B= 0.262, t= 4.318, p < .001) resulted in a significant increase in predictive validity of the model, with a change in R*Square of .064 ($F_{6,264}$ = 4.634, p < .001). In the third block, a squared performance term was entered in the model. In Block 3, the inclusion of a curvilinear term for performance (B= -0.025, t= -0.473, p > .5) does not result in a significant increase in predictive validity (*change in* R^2 = .001, $F_{7,263}$ = 3.993, p > .5). The

results of Models 2 and 3 indicate that performance shares a linear, rather than curvilinear, relationship with passive learning.

In Block 4, the inclusion of entrepreneurial orientation (B= 0.118, t= 1.169, p > .10), learning orientation (B= 0.335, t= 3.890, p = .001), intra-industry managerial ties (B= 0.016, t= 0.479, p > .5), and extra-industry managerial ties (B= 0.028, t= 0.803, p > .10) resulted in a significant increase in predictive validity (*change in* R^2 = .120, $F_{11,259}$ = 6.490, p < 001). However, these results indicate that only learning orientation acts as an additional predictor of passive learning.

In Block 5, the moderating relationships of entrepreneurial orientation and performance (B= -.128, t= -1.210, p > .10), learning orientation and performance (B= 0.011, t= 0.115, p > .5), intra-industry managerial ties and performance (B= 0.044, t= 1.110, p > .1), and extra-industry managerial ties and performance (B= -0.035, t= -0.886, p > .10) did not result in a significant increase in predictive validity (*change in* R^2 = .010, $F_{15,255}$ = 4.970, p > .5). These results indicate that relationships between performance and passive learning is not moderated by entrepreneurial orientation, learning orientation, intra-industry managerial ties, or extra-industry managerial ties.

Table 6-7 Hierarchical Regression Analysis Results Passive Learning

			Unstandardized		Standardized		
Model		***VIF***	***B***	***SE***	***Beta***	***t***	***Sig.***
1	(Constant)		5.271	0.284		18.543	0.000
	Age	1.381	0.006	0.005	0.078	1.103	0.271
	Work Experience	1.023	0.001	0.000	0.082	1.338	0.182
	Industry Experience	1.330	-0.001	0.006	-0.007	-0.094	0.925
	TMTS	1.021	-0.032	0.066	-0.029	-0.481	0.631
	Organization Age	1.055	0.041	0.021	0.121	1.944	0.053
2	(Constant)		5.158	0.276		18.656	0.000
	Age	1.382	0.006	0.005	0.083	1.213	0.226
	Work Experience	1.034	0.000	0.000	0.055	0.931	0.353

	Industry Experience	1.391	0.005	0.006	0.056	0.807	0.421
	TMTS	1.035	-0.065	0.065	-0.060	-1.000	0.318
	Organization Age	1.068	0.051	0.021	0.149	2.466	0.014
	Performance	1.111	0.262	0.061	0.266	4.318	0.000
3	(Constant)		5.174	0.279		18.555	0.000
	Age	1.391	0.006	0.005	0.081	1.168	0.244
	Work Experience	1.067	0.000	0.000	0.060	0.999	0.319
	Industry Experience	1.391	0.005	0.006	0.055	0.796	0.427
	TMTS	1.035	-0.065	0.065	-0.060	-0.998	0.319
	Organization Age	1.077	0.050	0.021	0.147	2.409	0.017
	Performance	54.961	0.462	0.427	0.470	1.082	0.280
	Performance^2	55.683	-0.025	0.053	-0.207	-0.473	0.636
4	(Constant)		5.216	0.296		17.645	0.000
	Age	1.457	0.010	0.005	0.135	2.035	0.043
	Work Experience	1.110	0.000	0.000	0.022	0.379	0.705
	Industry Experience	1.404	0.005	0.005	0.060	0.916	0.361
	TMTS	2.729	-0.229	0.099	-0.211	-2.319	0.021
	Organization Age	1.089	0.050	0.020	0.146	2.547	0.011
	Performance	55.650	0.470	0.403	0.478	1.164	0.246
	Performance^2	56.598	-0.040	0.051	-0.329	-0.795	0.427
	Entrepr. Orientation	1.688	0.118	0.101	0.084	1.169	0.244
	Learning Orientation	1.586	0.335	0.086	0.269	3.890	0.000
	Intra-industry Ties	5.541	0.016	0.034	0.062	0.479	0.632
	Extra-industry Ties	6.073	0.028	0.035	0.109	0.803	0.423
5	(Constant)		5.251	0.299		17.566	0.000
	Age	1.492	0.010	0.005	0.124	1.838	0.067
	Work Experience	1.269	0.000	0.000	0.027	0.442	0.659
	Industry Experience	1.423	0.006	0.005	0.068	1.033	0.303
	TMTS	2.747	-0.233	0.099	-0.215	-2.349	0.020
	Organization Age	1.095	0.050	0.020	0.148	2.563	0.011
	Performance	100.033	0.787	0.542	0.800	1.452	0.148
	Performance^2	65.939	-0.023	0.055	-0.190	-0.426	0.671
	Entrepr. Orientation	34.549	0.653	0.457	0.463	1.429	0.154
	Learning Orientation	32.546	0.280	0.391	0.225	0.717	0.474
	Intra-industry Ties	142.003	-0.168	0.171	-0.645	-0.982	0.327
	Extra-industry Ties	147.168	0.177	0.172	0.686	1.026	0.306
	Performance*EO	133.326	-0.128	0.106	-0.769	-1.210	0.228
	Performance*LO	132.571	0.011	0.094	0.073	0.115	0.909
	Performance*IntraTies	187.960	0.044	0.040	0.839	1.110	0.268
	Performance*ExtraTies	194.403	-0.035	0.039	-0.681	-0.886	0.376

a Dependent Variable: Passive Learning

Table 6-8 Model Comparison Passive Learning

Model	R Square	Adj R*Square	SE	R*Square Change	F	Sig.
1	.031	.013	.934	.031	1.718	.131
2	.095	.075	.905	.064	18.645	.000
3	.096	.072	.906	.001	0.224	.636
4	.216	.183	.850	120	9.914	.000
5	.226	.181	.851	.010	0.833	.505

Tables 6-9 and 6-10 report the regression statistics from the series of hierarchical regression models predicting vicarious learning. Block 1 includes only the control variables as predictors. The inclusion of the control variables did not result in a statistically significant amount of variance explained ($R2$ = .014, $F_{5,265}$ = 0.759, p > .5). In the control variable model, none of the controls exhibited statistically significantly contribution to the model (p < .05). In the next block, performance was included as a predictor. In Block 2, the inclusion of performance (B= 0.152, t= 2.439, p < .05) resulted in a statistically significant increase in predictive validity of the model, with a change in R*Square of .022 ($F_{6,264}$ = 1.636, p < .05). In the third block, a squared performance term wass entered in the model. In Block 3, the inclusion of a curvilinear term for performance (B= -0.021, t= -0.389, p > .5) does not result in a significant increase in predictive validity (*change in* R^2 = .001, $F_{7,263}$ = 1.420, p > .5). The results of Models 2 and 3 indicate that performance again shares a linear, rather than curvilinear, relationship with vicarious learning.

In Block 4, the inclusion of entrepreneurial orientation (B= 0.060, t= 0.667, p > .5), learning orientation (B= 0.668, t= 8.760, p < .001), intra-industry managerial ties (B= 0.057, t= 1.891, p > .05), and extra-industry managerial ties (B= 0.005, t= 0.177, p > .5) resulted in a significant increase in predictive validity (*change in* R^2 = .342, $F_{11,259}$ =

14.328, $p < 001$). However, these results indicate that only learning orientation acts as an additional predictor of vicarious learning.

In Block 5, the moderating relationships of entrepreneurial orientation and performance (B= -.107, t= -1.140, $p > .10$), learning orientation and performance (B= 0.093, t= 1.122, $p > .10$), intra-industry managerial ties and performance (B= 0.032, t= 0.921, $p > .10$), and extra-industry managerial ties and performance (B= -0.016, t= -0.460, $p > .5$) were entered into the model; however, they did not result in a significant increase in predictive validity (*change in* R^2 = .008, $F_{15,255}$ = 10.713, $p > .10$). These results indicate that relationships between performance and passive learning is not moderated by entrepreneurial orientation, learning orientation, intra-industry managerial ties, or extra-industry managerial ties.

Table 6-9 Hierarchical Regression Analysis Results Vicarious Learning

			Unstandardized		Standardized		
Model		***VIF***	***B***	***SE***	***Beta***	***t***	***Sig.***
1	(Constant)		5.548	0.285		19.454	0.000
	Age	1.381	0.003	0.006	0.035	0.485	0.628
	Work Experience	1.023	0.001	0.000	0.100	1.618	0.107
	Industry Experience	1.330	-0.004	0.006	-0.050	-0.711	0.478
	TMTS	1.021	-0.051	0.067	-0.047	-0.759	0.448
	Organization Age	1.055	-0.010	0.021	-0.030	-0.483	0.630
2	(Constant)		5.482	0.284		19.316	0.000
	Age	1.382	0.003	0.005	0.038	0.532	0.595
	Work Experience	1.034	0.001	0.000	0.084	1.374	0.171
	Industry Experience	1.391	-0.001	0.006	-0.014	-0.193	0.847
	TMTS	1.035	-0.070	0.067	-0.064	-1.047	0.296
	Organization Age	1.068	-0.005	0.021	-0.014	-0.219	0.827
	Performance	1.111	0.152	0.062	0.155	2.439	0.015
3	(Constant)		5.495	0.286		19.198	0.000
	Age	1.391	0.003	0.005	0.035	0.497	0.620
	Work Experience	1.067	0.001	0.000	0.089	1.419	0.157
	Industry Experience	1.391	-0.001	0.006	-0.014	-0.200	0.841
	TMTS	1.035	-0.070	0.067	-0.064	-1.045	0.297

	Organization Age	1.077	-0.005	0.021	-0.016	-0.253	0.800
	Performance	54.961	0.321	0.439	0.328	0.731	0.465
	Performance^2	55.683	-0.021	0.055	-0.176	-0.389	0.697
4	(Constant)		5.557	0.262		21.228	0.000
	Age	1.457	0.008	0.005	0.106	1.791	0.074
	Work Experience	1.110	0.000	0.000	0.035	0.675	0.500
	Industry Experience	1.404	-9.507E-05	0.005	-0.001	-0.020	0.984
	TMTS	2.729	-0.304	0.088	-0.281	-3.475	0.001
	Organization Age	1.089	-0.002	0.017	-0.006	-0.123	0.902
	Performance	55.650	0.244	0.357	0.250	0.683	0.495
	Performance^2	56.598	-0.034	0.045	-0.281	-0.762	0.446
	Entrepr. Orientation	1.688	0.060	0.089	0.042	0.667	0.505
	Learning Orientation	1.586	0.668	0.076	0.540	8.760	0.000
	Intra-industry Ties	5.541	0.057	0.030	0.218	1.891	0.060
	Extra-industry Ties	6.073	0.005	0.031	0.021	0.177	0.860
5	(Constant)		5.610	0.265		21.196	0.000
	Age	1.492	0.007	0.005	0.093	1.552	0.122
	Work Experience	1.269	0.000	0.000	0.023	0.411	0.681
	Industry Experience	1.423	0.000	0.005	0.003	0.060	0.952
	TMTS	2.747	-0.304	0.088	-0.281	-3.459	0.001
	Organization Age	1.095	-0.003	0.017	-0.010	-0.187	0.852
	Performance	100.033	0.264	0.480	0.270	0.551	0.582
	Performance^2	65.939	-0.046	0.048	-0.381	-0.957	0.340
	Entrepr. Orientation	34.549	0.502	0.404	0.358	1.242	0.215
	Learning Orientation	32.546	0.291	0.346	0.235	0.841	0.401
	Intra-industry Ties	142.003	-0.078	0.152	-0.300	-0.513	0.609
	Extra-industry Ties	147.168	0.070	0.153	0.274	0.461	0.645
	Performance*EO	133.326	-0.107	0.094	-0.645	-1.140	0.255
	Performance*LO	132.571	0.093	0.083	0.634	1.122	0.263
	Performance*IntraTies	187.960	0.032	0.035	0.619	0.921	0.358
	Performance*ExtraTies	194.403	-0.016	0.035	-0.314	-0.460	0.646

a Dependent Variable: Vicarious Learning

Table 6-10 Model Comparison Vicarious Learning

Model	R Square	Adj R*Square	SE	R*Square Change	F	Sig.
1	.014	-.004	.937	.014	0.759	.580
2	.036	.014	.929	.022	5.949	.015
3	.036	.011	.930	.001	0.152	.697
4	.378	.352	.753	.342	35.610	.000
5	.378	.350	.754	.008	0.857	.490

7 DISCUSSION & CONCLUSION

Chapter 7 provides a discussion of the findings of this research. The purpose of this research was to advance the literature on entrepreneurial learning by examining the conditions under which entrepreneurs engage in differing types of learning. The findings and implications are discussed in four sections. First, I discuss the results of the measurement development and the factor structure of the learning constructs identified through exploratory factor analysis. Second, I provide a discussion of insights from post-hoc analysis. Third, I discuss how the findings of this study contribute to the literature. Fourth, I discuss the limitations of this study and provide suggested avenues for future research.

7.1 Factor Structure

In this research I hypothesized an entrepreneurial learning typology consisting of three distinct types of learning: exploratory learning, exploitative learning, and passive learning. However, the data did not support the hypothesized model. Although the results of exploratory and confirmatory factor analysis do support a 3-factor conceptualization of entrepreneurial learning, the hypothesized factor structure could not be meaningfully extracted from the data. Rather, the three factors which emerge appear to be related to behaviors associated with experiential learning, vicarious learning, and passive learning. Although these are similar and related to the hypothesized exploration, exploitation, and efficiency learning typology; the hypothesized conceptual structure focuses on learning

outcomes while the emergent conceptual structure focuses on the learning process. Experiential learning refers to learning through one's own actions and experience. Kolb (1984) describes experiential learning as "a process whereby knowledge is created through the transformation of experience" (pp. 38). According to Sadler-Smith, Spicer, and Chaston (2001), an active, experiential approach to learning is higher-level, transformational, and focused on improving. In other words, experiential learning is the acquisition of knowledge about doing things better and challenging what is assumed to be known.

Vicarious learning refers to learning through (observing) the actions of others. According to Holcomb and colleagues (2009), "vicarious learning occurs when a person pays attention to someone else's behaviors or actions, retains the information, and assimilates and organizes it in memory" (pp. 175). Vicarious learning may occur through directly observing others; however, vicarious learning may also occur through reading about or watching the stories and prescribed knowledge of others. At the organizational level, it has often been noted that organizations learn vicariously (Ingram & Baum, 1997; J.-Y. Kim & Miner, 2007). One form of vicarious learning is scanning the environment. Scanning the environment is an important "stimulator" in the processes of learning and change (Zollo & Winter, 2002). Vicarious learning allows entrepreneurs to set benchmarks, learn from failure, initiate change, and reduce uncertainty (Holcomb et al., 2009; J.-Y. Kim & Miner, 2007; Zollo & Winter, 2002).

Passive learning refers to learning that occurs through the engagement in routines and routine problem-solving. Sadler-Smith, Spicer, and Chaston (2001) describe a passive approach to learning as lower-level, incremental, and focused on implementing. More simply, passive learning is the acquisition of knowledge about doing things well based on

what is already known. Because many entrepreneurs of small businesses spend a great deal of their time involved in the day-to-day activities of the organization (through which passive learning occurs), the behaviors associated with passive learning are likely to account for a great deal of an entrepreneur's time. However, as Piao and Zajac (2015) note, passive learning (which they associate with repetitive exploration) is often missing in the dialogue of entrepreneurial learning.

The emergent factor structure suggests that entrepreneurial learning typology is more closely related to how knowledge and information is acquired (through new experience, vicariously through others, or through the engagement in routines and routine problem-solving), rather than how the knowledge and information acquired is related to one's current knowledge. There is a long line of research on the processes of organizational and entrepreneurial learning (Argyris & Schön, 1978; Fiol & Lyles, 1985), and this is consistent with the views of Dewey (1897), Kolb (1984) and others (Corbett, 2005; Politis, 2005) who suggest that learning is best understood as a process rather than in terms of its outcomes.

7.2 Post hoc Analysis

The purpose of this study was to examine the influence of performance on entrepreneurial learning. More specifically, I attempted to examine the influence of performance on the *types* of entrepreneurial knowledge acquired, extending research in organizational learning, and examining a series of hypotheses related to the phenomenon of learning traps. However, rather than finding evidence of the exploration-exploitation based factor structure, as hypothesized, the constructs that emerged appear to be related to the learning process not learning outcomes.

Post hoc analysis was conducted on the learning process constructs which emerged in exploratory factor analysis in order to provide some insights to the primary research questions. Post hoc analysis suggests that several factors predict *how* entrepreneurs learn and spend their time within their organizations. Figure 15 presents the relationships examined in post hoc analysis.

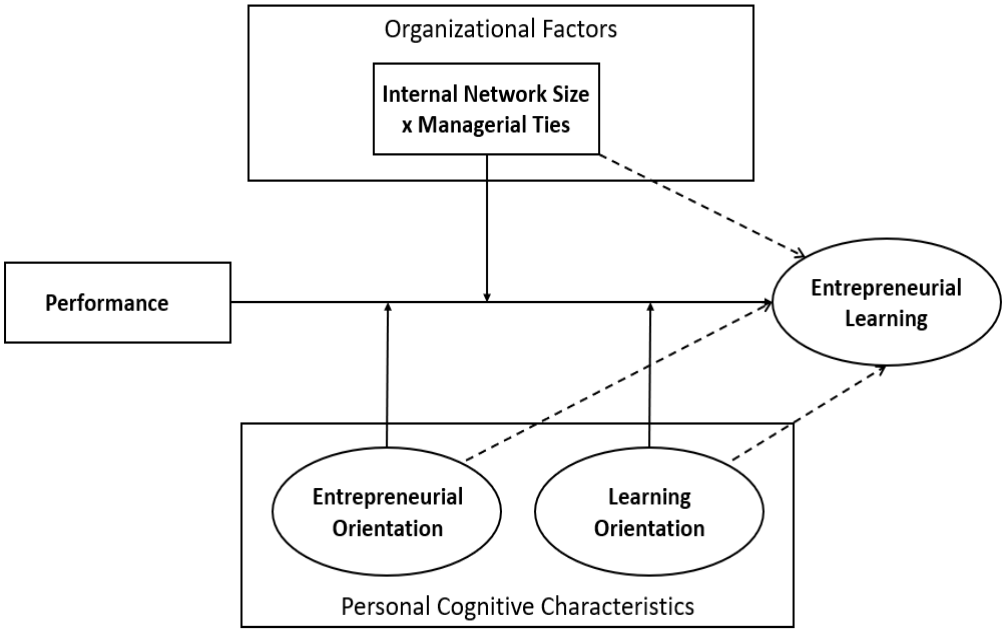

Figure 15: Overview of Post hoc Analysis

Table 7-1 reports the unstandardized *B* of the statistically significant predictors for each of the three methods of entrepreneurial learning.

Table 7-1 Predictors of Entrepreneurial Learning Methods

	Experiential	**Passive**	**Vicarious**
Controls	---	---	---
Industry Experience	-0.019	---	---
Top Management Team Size	0.179	---	---
Independent Variables	---	---	---
Performance	0.479	0.262	0.152
Entrepreneurial Orientation	0.708	---	---
Learning Orientation	0.309	0.335	0.668
Intra-Industry Managerial Ties	0.101	---	---

Experiential Learning

The results suggest that several factors are related to an entrepreneur's engagement in experiential learning. The results show that two of the control variables (industry experience and top management team size) and four predictors (performance, entrepreneurial orientation, learning orientation, and intra-industry managerial ties) influence an entrepreneur's engagement in behaviors related to experiential learning.

In terms of control variables, industry experience was negatively related to experiential learning. In other words, the more experience an individual has in an industry, the less he or she engages in activities or tasks in which new learning is taking place. On the other hand, top management team size was positively related to experiential learning. Entrepreneurs with more members in their top management team were more likely to engage in activities related to experiential learning.

Performance was positively related to experiential learning. As performance increases, entrepreneurs are more likely to engage in activities related to experiential

learning. This result is surprising considering the arguments hypothesized concerning the influence of performance on learning. According to the literature on learning traps, as performance increases actors are more likely to imitate past actions and less likely to search for alternatives (Levinthal & March, 1993). This can likely be attributed to several factors. Sitkin (1992) notes that successful performance builds self-efficacy, confidence, and persistence. Therefore, rather than falling into a learning trap, an entrepreneur's self-efficacy, confidence, and persistence could contribute to increasing efforts. Another contributing factor could be the size of the organizations in this sample. In new and small organizations, the entrepreneur may initially carry out the bulk of the organizational tasks. However, as performance increases and he or she is able to hire an (additional) employee, entrepreneurs gain the flexibility to focus on developing and growing their business as opposed to carrying out the day-to-day tasks of the organization.

Additionally, entrepreneurial orientation, learning orientation, and intra-industry managerial ties are all also related to experiential learning. Entrepreneurial orientation has a positive relationship with experiential learning. At higher levels of entrepreneurial orientation, entrepreneurs are also more likely to engage in activities related to experiential learning. This is consistent with prior research connecting entrepreneurial orientation, learning, and firm performance (Alegre & Chiva, 2013; Wang, 2008). Actors with high entrepreneurial orientation are proactive, innovative, and risk seeking (or at least less risk averse) (Covin & Slevin, 1991; Langkamp Bolton, 2012; Lumpkin & Dess, 1996). As experiential learning is focused on improving, often through challenging one's assumptions, it requires a proactive and innovative approach and involves considerable risk.

Learning orientation also has a positive relationship with experiential learning. At higher levels of learning orientation, entrepreneurs are again more likely to engage in activities related to experiential learning. This finding is not surprising, as learning orientation has often been connected to behaviors related to experiential learning. Individuals with high learning orientation are open to new experiences (Brett & VandeWalle, 1999), and are often drawn to novel, complex, and challenging tasks where they will have the ability to learn (Ames & Archer, 1988).

Finally, intra-industry managerial ties have a positive relationship with experiential learning. At higher levels of intra-industry managerial ties, entrepreneurs are also more likely to engage in activities related to experiential learning. Although the influence of the structure of social capital has received scant scholarly attention, according to social capital theory one's social relationships play an important role in learning (Burt, 1982; Granovetter, 1973, 1985). Individuals with larger top management teams with more intra-industry managerial ties are informed of more alternatives and have a wider breadth of experience than individuals with smaller top management teams with fewer intra-industry managerial ties. One explanation for this is that intra-industry ties could provide entrepreneurs with more information that can be transformed, applied, and put into action.

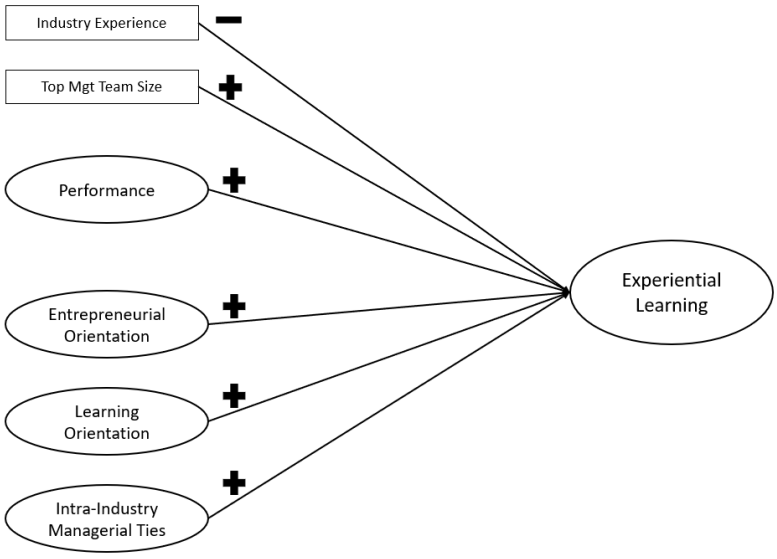

Figure 16 Predictors of Experiential Learning

Passive Learning

The results suggest that two of the factors examined in this research are related to an entrepreneur's engagement in passive learning. The results show that no controls and two of the five independent variables work to influence an entrepreneur's engagement in behaviors associated with passive learning such as the engagement in routines and routine problem-solving.

Performance was positively related to passive learning. As performance increases, entrepreneurs are more likely to engage in activities related to passive learning. This is consistent with the hypothesized arguments in Chapter 3 concerning learning traps and the relationship between performance and learning. As performance increases and actions are attributed to increasing performance, these actions become embedded within individuals as norms, routines, and procedures (Blackler, 1995; Levinthal & March, 1993; Levitt &

March, 1988). As a result, learning takes a more passive form, somewhat incompatible with change (Hannan & Freeman, 1984).

Perhaps surprisingly, learning orientation is also related to passive learning. At higher levels of learning orientation, the data suggests that entrepreneurs are also more likely to engage in activities related to passive learning such as routines and routine problem-solving. Sinkula and colleagues (1997) describe learning orientation as "a set of organizational values that influence the propensity of the firm to create *and use* knowledge" (pp. 309). Furthermore, learning orientation has also been connected to effort and motivation (Steele-Johnson et al., 2000; Vandewalle, Brown, Cron, & Slocum, 1999). Hence, one explanation for why learning orientation was found to be associated with passive learning is that individuals with a high learning orientation put more effort into both learning *and* applying the knowledge they accumulate.

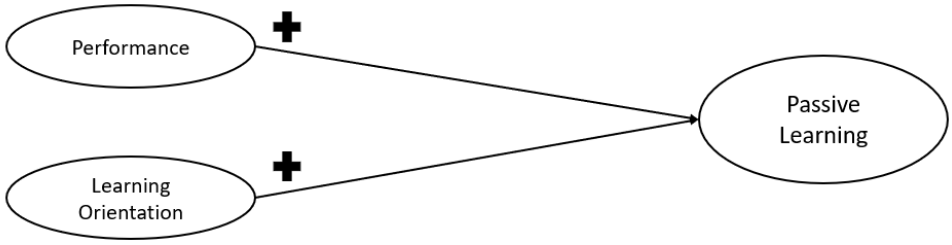

Figure 17 Predictors of Passive Learning

Vicarious Learning

The results suggest that two of the factors examined in this research are also related to an entrepreneur's engagement in vicarious learning. First, performance was positively related to vicarious learning. As performance increases, entrepreneurs are more likely to

engage in activities related to vicarious learning. Considering the arguments in the literature on learning traps which suggest that as performance increases and successful performance is attributed to past actions and behaviors, experimenting with alternatives becomes riskier and less attractive. Therefore, as searching for alternatives becomes riskier, entrepreneurs could seek additional information by scanning the environment and searching for general (vs. tacit) information via learning vicariously before experimenting with alternatives.

Additionally, learning orientation is also related to vicarious learning. At higher levels of learning orientation, entrepreneurs are more likely to engage in vicarious learning. Again, this result is not surprising. As individuals with a high learning orientation have a high motivation to continuously learn and update their knowledge sets (Colquitt & Simmering, 1998; Vandewalle et al., 1999), this also includes learning vicariously through the experiences of others.

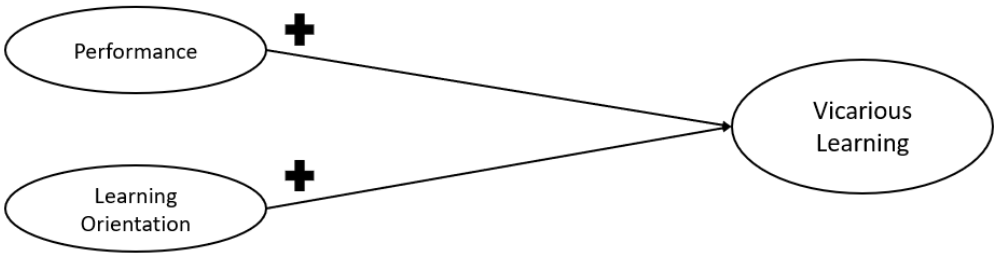

Figure 18 Predictors of Vicarious Learning

7.3 Contribution to the Literature

This research contributes to the literature in several ways. First, this study contributes to the scant literature on entrepreneurial learning by more closely examining

entrepreneurial learning among individuals. Although there is a great deal of literature on learning at the organizational level, learning at the individual level has received little scholarly attention. Extending the current literature on entrepreneurial learning, I argued for, and attempted to distinguish between three types of entrepreneurial learning outcomes: exploratory learning, exploitative learning, and efficiency learning. Prior research has found support for an exploration-exploitation based measurement of entrepreneurial learning among individuals (Mom et al., 2015, 2007, 2009). However, I failed to replicate these results in this data. One problem that emerged in this research is that although several models in line with the hypothesized factor structure emerged; however the constructs in these models failed to show discriminant validity. This is notable considering the robust measurement development undertaken in this study and the vast amount of literature on the exploration-exploitation framework of organizational learning.

This research also contributes to the scant literature on the relationship between performance and learning, and more specifically the relationship of performance on learning. The relationship between performance and learning is a highly understudied phenomenon considering an entrepreneur's ability to learn is critically important for firm performance and survival. This study adds to this literature, finding that performance is positively associated with all three types of entrepreneurial learning I was able to examine: experiential learning, vicarious learning, and passive learning. Understanding how (and what) entrepreneurs learn remains a critical research question (Cope, 2005). Moreover, understanding both the learning processes and learning outcomes is necessary to advance a framework of entrepreneurial learning.

Another contribution of this study is extending the literature on learning orientation. Although learning orientation has been connected to effort, motivation, and organizational performance (Steele-Johnson et al., 2000; Vandewalle, Brown, Cron, & Slocum, 1999), there is less research connecting learning orientation with how individuals acquire information in the learning process. This research suggests that although learning orientation exhibits its strongest relationship with vicarious learning, it is positively associated with each of the three types of learning. This provides further evidence of the links between learning orientation, entrepreneurial effort, and performance.

7.4 Limitations and Suggestions for Future Research

As with all research, this study has several limitations. First and foremost, despite a rigorous approach to measurement development, the hypothesized measurement model failed to emerge. Although the new measurement model which emerged in exploratory factor analysis was used to draw some insights on the primary research questions, this model was not subject to a-prior theoretical scrutiny nor assessed for content validity or content adequacy. In order to advance a framework of entrepreneurial learning accounting for experiential, vicarious, and passive learning, future research should develop and subject these constructs following a rigorous measurement development procedure such as that carried out on the hypothesized factor structure in this study.

Second, there may be some concern over the "entrepreneurial" nature of the firms in this study. The primary sample was drawn from firms competing at some level in the U.S. income tax preparation industry. Although the income tax preparation industry is a highly competitive industry and has undergone numerous disruptions in the past few years, it might not be thought of as a particularly innovative industry. Future research could

investigate these findings among firms based outside of knowledge-based service industries.

Third, there are also sampling and methodological limitations that are important to discuss. The response rate for this study (approximately one percent) is below commonly reported response rates for similar studies and more closely represents the response rates of cold marketing emails. A number of contributing factors likely explain the low response rate. The first involves the age and reliability of the data. The contact information in the TPDS database was collected by the IRS at the time of the initial ERO application or updated by the applicant in a revised application. Therefore, some of the email addresses in the primary sample were up to 10 years old. As the deliverability of email addresses degrade over time, this makes understanding how many entrepreneurs were actually reached and the reporting of an accurate response rate difficult.

Additionally, in the months directly proceeding data collection, the IRS changed their policies and procedures to make the TPDS database available online without filing a formal request through the Freedom of Information Act. As this information entered the public domain, several scams and hacking attempts were targeting at this industry. In response to these, the IRS published several notices warning EROs of scams and hacking attempts via email. I spoke to numerous individuals who reached out to me to verify the validity of my survey/research.

The age and degradation of email addresses as well as the general suspicion within the industry due to these recent events are suspected of severely adversely affecting the response rate in this study. Future research could attempt to further model learning behaviors in a more representative sample or within another industry.

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APPENDICES

APPENDIX A: Pilot Interview Protocol

PRE-INTERVIEW DATA

Date & Time: _____ Interview ID: _____

Instructions:

- Explain the purpose of the study to the participant.
- Assure confidentiality and provide the participant with the release form.
- Audio-record each interview utilizing a digital recording device.
- Record participant ID number (01-10) on each page and note at the beginning of the recorded interview.
- Ask semi-structured interview questions. Follow-up, probing participants' answers.
- Thank the participant for his/her participation.

INTRODUCTION & RESEARCH STUDY OVERVIEW

Hello, my name is Shaun Digan. Thank you for taking the time to talk with me today.

--Brief Pausation--

Let me begin by tell you about the purpose of this study. I am a PhD Candidate in Entrepreneurship at the University of Louisville and I am studying how the owners of small firms spend their time within their businesses and how this converts to learning within and about their business. This interview, along with a number of others from entrepreneurs like yourself, will be used to understand how learning occurs among entrepreneurs within the tax preparation industry. The information you provide will help us understand how entrepreneurs in your industry learn. Your identity, of course, will be held in confidentiality. Your privacy is highly important, therefore even here within my notes I will not be taking names or writing down any other type of information which could potentially identify you personally or your organization. What we learn from these interviews will be used to develop a large-scale questionnaire studying learning in firms across the industry.

--Brief Pausation--

Ok, I am going to ask you a series of questions about how you learn in relation to your business. The purpose of this interview is to help me understand how you think about and engage in learning in your business.

--Brief Pausation--

There are no right or wrong answers. What I am trying to do here is to understand how an entrepreneur's learning occurs in the tax preparation industry. When I ask a question, it is fine to respond in your own words. Also, please take as much time as you like before you respond.

--Brief Pausation--

So that I ask everyone I talk to the same questions, I will ask you the questions as they are written down. After that, I may ask some follow up questions to try to understand more.

--Brief Pausation--

Do you have any questions before we begin?

Introductory Questions	Before I begin with my questions, maybe you can take a few minutes and tell me a little bit about your role in your business and what your role typically entails, and how you spend your time within your organization.

Introductory Questions	Alright, now that I understand a little more about what you do, I would like you to tell me a little bit more about how you schedule time to learn more about your business, or business opportunities, or strategies in general, within your day or week.
	What skills or knowledge do you (or do you need to) update on a regular basis? How do you decide to spend time carry out the day to day functions of your business vs. learning?

Trends	How do you keep up on the latest technological trends in your field?
Probing Tell me more about… I believe I heard you say… Can you expand on… What happens when… What's another way you might… You said… How would you refer to… What was your intention when… If time were not an issue… If someone else in your organization did not do that…	What are the ways you keep up on the latest product trends in your field?
	What are the ways you keep up on the latest service trends in your field?

Probing Tell me more about… I believe I heard you say… Can you expand on… What happens when… What's another way you might… You said… How would you refer to… What was your intention when… If time were not an issue… If someone else in your organization did not do that…	What are the ways you keep up on the latest consumer trends in your field?
	How do you adapt and utilize what you learn in your business?
	How do you communicate new knowledge to others in your firm?

Follow-Up Questions	Can you tell me what percentage of your work week revolves around routines and routine problem-solving? How do you problem-solve and learn while engaged in routine activities within your organization?
Probing Tell me more about… I believe I heard you say… Can you expand on… What happens when… What's another way you might… You said… How would you refer to… What was your intention when… If time were not an issue… If someone else in your organization did not do that…	Do you spend time reading (i.e. trade publications, newsletters, newspapers, message boards, blogs, the internet) to learn more about your business? Can you describe the sources you use to gain more information about your organization and industry? How you choose these?

Follow-Up Questions	How (and how much) do you communicating with others within your industry which may lead to learning more in relation to your business?
Probing Tell me more about… I believe I heard you say… Can you expand on… What happens when… What's another way you might… You said… How would you refer to… What was your intention when… If time were not an issue… If someone else in your organization did not do that…	How (and how much) do you communicating with other executives outside your industry which may lead to learning more in relation to your business?

Follow-Up Questions	Do you have any other relevant thoughts or idea on how you learn within the context of your business?
Probing Tell me more about… I believe I heard you say… Can you expand on… What happens when… What's another way you might… You said… How would you refer to… What was your intention when… If time were not an issue… If someone else in your organization did not do that…	

APPENDIX B: Pilot Interviews Informed Consent

UofL Institutional Review Boards
IRB NUMBER: 16.0596
IRB APPROVAL DATE: 08/09/2016
IRB EXPIRATION DATE:

08/08/2017

A Framework for Entrepreneurial Learning

Dear Participant,

You are being invited to participate in a research study by participating in the following interview about *how you learn in your organization.* This interview will be audio recorded. There are no known risks for your participation in this research study. The information collected may not benefit you directly. The information learned in this study may be helpful to others. The information you provide will *allow us to understand how learning occurs among entrepreneurs in your industry.* Your completed survey will be stored at *The University of Louisville College of Business –located 110 W. Brandeis Louisville, Ky. 40292.*

Individuals from the Department of *Entrepreneurship,* the Institutional Review Board (IRB), the Human Subjects Protection Program Office (HSPPO), and other regulatory agencies may inspect these records. In all other respects, however, the data will be held in confidence to the extent permitted by law. Should the data be published, your identity will not be disclosed.

Taking part in this study is voluntary. By answering interview questions, you agree to take part in this research study. You may choose not to take part at all. If you decide to be in this study, you may stop taking part at any time. Important note- If you decide not to be in this study, you may choose not to answer any research question.

If you have any questions, concerns, or complaints about the research study, please contact:
*Mr. Shaun P. Digan ----502-852-5053 (*shaun.digan@louisville.edu*).*

If you have any questions about your rights as a research subject, you may call the Human Subjects Protection Program Office at (502) 852-5188. You can discuss any questions about your rights as a research subject, in private, with a member of the Institutional Review Board (IRB). You may also call this number if you have other questions about the research, and you cannot reach the research staff, or want to talk to someone else. The IRB is an independent committee made up of people from the University community, staff of the institutions, as well as people from the community not connected with these institutions. The IRB has reviewed this research study.

If you have concerns or complaints about the research or research staff and you do not wish to give your name, you may call 1-877-852-1167. This is a 24-hour hot line answered by people who do not work at the University of Louisville.

Sincerely,

Robert P. Garrett,
Associate Professor of Entrepreneurship

Ph.D. Shaun P. Digan
PhD Candidate, Entrepreneurship

University of Louisville

University of Louisville

APPENDIX C: IRB Approval: Pilot Interviews

UNIVERSITY OF LOUISVILLE

Human Subjects Protection Program Office
MedCenter One – Suite 200
501 E. Broadway
Louisville, KY 40202-1798
Office: 502.852.5188 Fax: 502.852.2164

DATE:	August 09, 2016
TO:	Robert P Garrett, Ph.D.
FROM:	The University of Louisville Institutional Review Board
IRB NUMBER:	16.0596
STUDY TITLE:	Balancing Exploration, Exploitation, and the Routine: A Framework of Entrepreneurial Learning
REFERENCE #:	570600
IRB STAFF CONTACT:	Name: Jacqueline S. Powell, CIP Phone: 852-4101 Email: jspowe01@Louisville.edu

This study was reviewed on 08/09/2016 by the Chair of the Institutional Review Board and approved through the Expedited Review Procedure, according to 45 CFR 46.110(b), since this study falls under Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies

This study was also approved through 45 CFR 46.116 (C), which means that an IRB may waive the requirement for the investigator to obtain a signed informed consent form for some or all subjects if it finds either:

- That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or
- That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

The following items have been approved:

Submission Components			
Title	Version #	Version Date	Outcome
Interview Questions	Version 1.0	06/14/2016	Approved
Study Protocol	Version 1.0	07/06/2016	Approved
Preamble Consent Interviews	Version 2.2	07/19/2016	Approved

This study now has final IRB approval from 08/09/2016 through 08/08/2017.

APPENDIX D: Initial Item Pool

Table D-1: Initial Item Pool, Dimension, and Source of Item

Item	Dimension	Source
looking for novel technological ideas by thinking "outside the box"?	Exploration	Lubatkin et al. (2006)
creating products or services that are innovative to the firm?	Exploration	Lubatkin et al. (2006)
looking for creative ways to satisfy customer needs?	Exploration	Lubatkin et al. (2006)
aggressively venturing into new markets?	Exploration	Lubatkin et al. (2006)
actively targeting new customer groups?	Exploration	Lubatkin et al. (2006)
improving the reliability of your products and services?	Exploitation	Lubatkin et al. (2006)
increasing the levels of automation in your operations?	Efficiency	Lubatkin et al. (2006)
surveying existing customers' satisfaction?	Exploitation	Lubatkin et al. (2006)
fine-tuning offerings to keep current customers satisfied?	Efficiency	Lubatkin et al. (2006)
penetrating more deeply into your existing customer base?	Exploitation	Lubatkin et al. (2006)
searching for new possibilities with respect to products and services, processes, or markets?	Exploration	Mom et al. (2009)
evaluating diverse options with respect to products and services, processes, or markets?	Exploitation	Mom et al. (2009)
serving existing customers with existing products or services?	Efficiency	Mom et al. (2009)
searching for new norms, routines, structures, and systems?	Exploration	Vollery et al. (2013)
experimenting with new approaches toward technology, processes, or markets?	Exploration	Vollery et al. (2013)
focusing on innovating?	Exploration	
optimizing and stabilizing firm routines, structures, or systems?	Split	Vollery et al. (2013)
further developing existing competences, technologies, processes, or products?	Exploitation	Vollery et al. (2013)
which focused on production?	Efficiency	Vollery et al. (2013)
experimenting with technological trends?	Exploration	Vollery et al. (2013)

updating your knowledge on laws and regulations?	Exploitation	Inductively
updating your knowledge regarding technology?	Exploration	
interacting with other entrepreneurs in your industry?	Exploitation	Inductively
communicating with vendors, suppliers, and service providers?	Exploitation	Inductively
exchanging ideas with others in your firm?	Exploitation	Inductively
listening to customers?	Exploitation	Inductively
focusing on improving current business practices?	Exploitation	Inductively
performing the day-to-day tasks of the firm?	Efficiency	Inductively
creating related products or services?	Efficiency	Inductively
exchanging ideas within industry or professional groups?	Exploitation	Inductively
focusing on adopting to the needs of clients?	Exploitation	Inductively
updating and improving current products or services?	Exploitation	Lubatkin et al. (2006)
sharing new knowledge among others in your firm?	Exploration	Inductively
exchanging ideas with government officials?	Exploitation	Inductively
solving problems that arise in the day-to-day operation of your firm?	Efficiency	Inductively
transforming and sharing what you learn with others?	Exploration	Inductively
focusing on the daily tasks of your firm?	Efficiency	Inductively
improving business operations?	Exploitation	Inductively
receiving feedback from your current customers?	Exploitation	Inductively
reading (books, newsletters, internet, etc..) that build on or update your current knowledge?	Exploitation	Inductively
reading (books, newsletters, internet, etc..) about things that I do not know much about?	Exploration	Inductively
reading and reviewing promotional material from sales people?	Exploitation	Inductively
searching online for information to build on and update your current knowledge?	Exploitation	Inductively

searching online for information unrelated to what I already know?	Exploration	Inductively
managing the day-to-day operations of the firm?	Efficiency	Inductively
experimenting reaching out to new markets?	Exploration	Vollery et al. (2013)
observing the business practices of other firms in your industry?	Exploitation	Inductively
observing the practices of firms outside your industry?	Exploration	Inductively
expanding your product or service offerings?	Exploitation	Inductively
which the associated costs or returns are currently unclear?	Exploration	Mom et al. (2009)
requiring quite some adaptability of you?	Exploration	Mom et al. (2009)
requiring you to learn new skills or knowledge?	Exploration	Mom et al. (2009)
which are not (yet) clearly existing company policy?	Exploration	Mom et al. (2009)
which you have already acquired a lot of experience?	Efficiency	Mom et al. (2009)
which you carried out as if they were routine?	Efficiency	Mom et al. (2009)
which it was clear to you how to conduct them?	Efficiency	Mom et al. (2009)
primarily focused on reaching short-term goals?	Efficiency	Mom et al. (2009)
which you could properly conduct using your present knowledge?	Efficiency	Mom et al. (2009)
which clearly fit existing company policy?	Efficiency	Mom et al. (2009)
creating variety in your experience?	Exploration	Vollery et al. (2013)
broadening your existing knowledge base?	Exploration	Vollery et al. (2013)
reconsidering existing beliefs and decisions?	Exploration	Vollery et al. (2013)
creating reliability in experience?	Efficiency	Vollery et al. (2013)
deepening your existing knowledge base?	Exploitation	Vollery et al. (2013)
elaborating on existing beliefs or decisions?	Exploitation	Vollery et al. (2013)
revolving around things you already knew?	Efficiency	Inductively
involving learning by doing?	Efficiency	Inductively
requiring solving problems that come up in your routine work?	Efficiency	Inductively
focused on the elimination of errors?	Efficiency	Inductively

which you already have an expertise?	Efficiency	Inductively
working in your firm?	Efficiency	Inductively
working on your firm?	Exploitation	Inductively
refining your existing knowledge?	Exploitation	Vollery et al. (2013)
focused on achieving long-term goals?	Exploration	Mom et al. (2009)
searching for your next big idea?	Exploration	Inductively

APPENDIX E: Research Instrument

Dear [Participant]:

Mr. Shaun Digan, a Doctoral candidate of Entrepreneurship, invites you to participate in his Doctoral research study about entrepreneurial behavior and strategy. You are being invited to participate in this research study by answering the attached survey. There are no known risks for your participation in this study. The information collected may not benefit you directly. The information learned in this study may be helpful to others. The information you provide will be used to examine how entrepreneurial strategy might be influenced by individual differences. Your completed survey will be stored at the University of Louisville, College of Business, Office 398. The survey will take approximately *20-25 minutes* to complete.

Individuals from the Department of Entrepreneurship, the Institutional Review Board (IRB), the Human Subjects Protection Program Office (HSPPO), and other regulatory agencies may inspect these records. In all other respects, however, the data will be held in confidence to the extent permitted by law. Should the data be published, your identity will not be disclosed. Taking part in this study is voluntary. By completing this survey, you agree to take part in this research study. You may choose not to take part at all. If you decide to be in this study, you may stop taking part at any time.
Important note: If you initially decide to be in this study, you may choose not to answer any research question, however failure to respond to any question will result in administrative withdrawal from the study.

If you have any questions, concerns, or complaints about the research study, please contact Dr. Robert Garrett Jr. at (502) 852-4790 or Mr. Shaun Digan at (502) 852-5053, both from the University of Louisville.

If you have any questions about your rights as a research subject, you may call the Human Subjects Protection Program Office at (502) 852-5188. You can discuss any questions about your rights as a research subject, in private, with a member of the Institutional Review Board (IRB). You may also call this number if you have other questions about the research, and you cannot reach the research staff, or want to talk to someone else. The IRB is an independent committee made up of people from the University community, staff of the institutions, as well as people from the community not connected with these institutions. The IRB has reviewed this research study.

If you have concerns or complaints about the research or research staff and you do not wish to give your name, you may call 1-877-852-1167. This is a 24-hour hot line answered by people who do not work at the University of Louisville.

Thank you for your time and attention,

Dr. Robert Garrett Jr. Mr. Shaun Paul Digan

Thank you for your willingness to participate in this research study. As mentioned in your invitation email, the survey should take approximately 20-25 minutes to complete; however, this is not a time limit. Please take your time and answer every question to the best of your ability. If a question is difficult to answer, please provide the best response you can. There are no right or wrong answers.

Qualifying Questions

- Are you a founding entrepreneur of your organization? *Yes* ____ *No* ____
- Do you have an ownership stake in your firm? *Yes* ____ *No* ____
- How would you characterize your role or position? Please check *any* that apply.

□ Lead Entrepreneur □ Owner/CEO □ Non-Owner CEO

□ Founding Entrepreneur □ Owner/General Manager □ Non-Owner General Manager

□ Non-Founder Entrepreneur □ Owner/Manager □ Non-Owner Middle Manager

□ ERO Responsible Individual Only □ Owner/Non-Manager □ Non-Owner Store Manager

Thank you, the survey will now begin.

Section 1: A Little About You

In this first section, please answer a few classification questions about yourself.

- In what year did you start with this organization? _____
- Is this business the first new venture you have participated in? Yes ____ No ____
- Not including your current venture, how many ventures have you participated in? _____
- How many years of total prior work experience (including self-employment) do you have? _____
- Before starting this business, how many years of total prior work experience (including self-employment) did you have in your current industry? _____
- Please indicate your highest level of education completed:

  _____ *Less than high school*
  _____ *High school diploma or equivalent*
  _____ *Some college, no degree*
  _____ *Post-secondary non-degree award*
  _____ *Associate Degree*
  _____ *Bachelor's Degree*
  _____ *Master's Degree*
  _____ *Doctoral or professional degree*

- In what year were you born? _____
- Please indicate whether you are:

  *Male*_____ *Female*_____ *Neither Male nor Female* _____ *Prefer not to answer*_____

- Please indicate your ethnicity:

  _____ *Hispanic or Latino*
  _____ *Not Hispanic or Latino*
  _____ *I prefer not to answer*

- Please indicate your race:

  _____ *American Indian or Alaska Native*
  _____ *Asian*
  _____ *Black or African American*
  _____ *Native Hawaiian or Pacific Islander*
  _____ *White*
  _____ *I prefer not to answer*

Section 2: Information about Your Organization

In this section, you are asked to answer several questions about your organization and its characteristics.

- In what year was your current firm established? _____

- Which products or services does your organization provide? (please check all that apply)

o Attorney and Legal Service	o Insurance Services	o Real Estate Services
o Auditing	o Investment Services	o Retail Sales
o Auto Sales & Service	o Notary	o Retirement Services
o Bookkeeping	o Payroll Services	o Security and Commodity Services
o Business Accounting Services	o Personal Accounting Services	o Other Business Services
o Business Lending	o Personal Financial Services	o Other Personal Services
o Business Tax Preparation	o Personal Tax Preparation	o Other _____
o Check Cashing	o Rental Services	

- What is your organization's primary product or service? (please indicate only one option)

o Attorney and Legal Service	o Insurance Services	o Real Estate Services
o Auditing	o Investment Services	o Retail Sales
o Auto Sales & Service	o Notary	o Retirement Services
o Bookkeeping	o Payroll Services	o Security and Commodity Services
o Business Accounting Services	o Personal Accounting Services	o Other Business Services
o Business Lending	o Personal Financial Services	o Other Personal Services
o Business Tax Preparation	o Personal Tax Preparation	o Other _____
o Check Cashing	o Rental Services	

- Do you perceive your firm to be a family firm? *Yes* _____ *No* _____

- Is there a family/family group that holds majority ownership in your firm? _____

- Is your firm part of a franchise system? *Yes* _____ *No* _____

- Including yourself, how many individuals have an ownership stake in your organization? (If the organization is a sole proprietorship owned by one individual, you would put 1.) _____

- How many employees were in your organization <u>one year ago</u>?
  a. *Full-time Permanent* _____ *Part-time Permanent* _____
  b. *Full-time Seasonal* _____ *Part-time Seasonal* _____

- How many employees are in your organization <u>today</u>?

c. *Full-time Permanent* _____ *Part-time Permanent* _____

d. *Full-time Seasonal* _____ *Part-time Seasonal* _____

Performance

Now, you are asked to reflect on the relative performance of your organization. Please rate the extent to which each of the following statements is accurate about your venture's performance when compared to the previous year.

Please indicate your level of agreement with each of the following statements on the following scale:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

In my organization, sales revenues were greater than last year.
In my organization, return on investment is greater than last year.
In my organization, market share is greater than last year.
In my organization, the number of suggestions implemented is greater than last year.
In my organization, the number of products or services is greater than last year.
In my organization, the number of individuals learning new skills is greater than last year.
I view my organization as successful.

Section 3: Entrepreneurial Behavior

In this section, you are asked to think about how ***you spend your time*** working within in your organization.

Please think about the activities in which <u>you have engaged in the past 12 months</u> in your current venture endeavors when answering the following questions. Using the following scale, please indicate *"To what extent have you engaged in activities in the past 12 months related to your venture which…"*.

Never	Very Rarely	Rarely	Occasionally	Frequently	Very Frequently	Always
1	2	3	4	5	6	7

Items: Entrepreneurial Learning

"To what extent have you engaged in activities in the past 12 months related to your venture which…"

… looked for novel technological ideas by thinking "outside the box"

… based your success on the ability to explore new technologies

… created products or services that are innovative to the firm

… looked for creative ways to satisfy its customers' needs

… aggressively ventured into new markets

… actively targeted new customer groups

… committed to improve quality and lower cost

… continuously improved the reliability of your products and services

… increased the levels of automation in your operations

… constantly surveyed existing customers' satisfaction

… fine-tuned offerings to keep its current customers satisfied

… penetrated more deeply into its existing customer base

… searched for new possibilities with respect to products/services, processes, or markets

… evaluated diverse options with respect to products/services, processes, or markets

… focused on strong renewal of products/services or processes

… the associated yields or costs are currently unclear

… required quite some adaptability of you

… requiring you to learn new skills or knowledge

… are not (yet) clearly existing company policy

… a lot of experience has been accumulated by yourself

… you carried out as if they were routine

… served existing (internal) customers with existing services/products

… it is clear to you how to conduct them

… primarily focused on achieving short-term goals

… you can properly conduct by using your present knowledge
… clearly fit into existing company policy
… created variety in experience
… broadened existing knowledge base
… searched for new organizational norms, routines, structures, & systems
… experimented with new approaches toward technologies, processes, or markets
… innovating and adopting a long-term orientation
… reconsidered existing beliefs and decisions
… created reliability in experience
… deepened and refined your existing knowledge base (leverage existing knowledge)
… optimized and stabilized organizational routines, structures, & systems
… applied and improved existing competences, technologies, processes, and products
… focused on production and adopting a rather short-term orientation
… elaborated on existing beliefs and decisions

Section 4: Information About Your Organization

In this section, you are asked to think about the other members of your organization, specifically members of the top management team (TMT). The TMT refers to key decision makers who are responsible for firm strategy.

- How many members are in your top management team, not including yourself: _____
- Are you the sole decision maker for all decisions related to your business? *Yes* _____ *No* _____
- Please indicate on the following scale your level of agreement with each of the following statements:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items: Managerial Ties (Atuahene-Gima & Murray, 2007)

Intra-Industry Managerial Ties

TMT members maintain close contact with founders of other firms in our industry.

TMT members learn allot from founders of other firms in our industry through social interactions.

TMT members have social interaction with other founders with knowledge about conditions in our industry.

TMT members put allot of effort into building relationships with other knowledgeable executives in our industry.

Extra-Industry Managerial Ties

TMT members have good relations with top executives of other firms outside our industry.

TMT members have good relationships with members of outside firms who serve our industry such as vendors, suppliers, and technology providers.

TMT members puts allot of effort into maintaining a good relationship with executives of firms outside our industry.

Section 5: Attitudes and Preferences

We greatly appreciate your help. You are nearly done!
In this section, you are asked to reflect on your personal characteristics and preferences.

Individual Entrepreneurial Orientation (Langkamp Bolton, 2012; Langkamp Bolton & Lane, 2012)
Please indicate on the following scale your level of agreement with each of the following statements:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:
Innovativeness
I often like to try new and unusual activities that are not typically but not necessarily risky.
In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before.
I prefer to try my own unique way when learning new things rather than doing it like everyone else does.
I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems.
Risk-Taking
I like to take bold action by venturing into the unknown.
I am willing to invest a lot of time and/or money on something that might yield a high return.
I tend to act "boldly" in situations where risk is involved.
Proactiveness
I usually act in anticipation of future problems, needs or changes.
I tend to plan ahead on projects.
I prefer to "step-up" and get things going on projects rather than sit and wait for someone else to do it.

Learning Orientation (De Clercq et al., 2012; Vandewalle, 1997)
Please indicate on the following scale your level of agreement with each of the following statements:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:
I often read materials (articles, Internet, books, etc.) to improve my abilities.
I like to take on a challenging task that I can learn a lot from.
I often look for opportunities to develop new skills and knowledge.
I enjoy challenging and difficult tasks through which I can learn new skills.
For me, developing my abilities is important enough to take risks.
I prefer to work in situations that require a high level of ability and talent.

Section 6: Personal Considerations

Thank you for your patience. You are almost done.
In this final section, you are asked to continue thinking about your personal characteristics and preferences.

VERSION 1 ONLY

Entrepreneurial Self-Efficacy (McGee et al., 2009)
Please indicate on the following scale your level of agreement with the following statement: "*How much confidence do you have in your ability to…?"*

None at all	A Little	Some	Quite a bit	Very much
1	2	3	4	5

Items:

Searching
… brainstorm (come up with) a new idea for a product or service.
… identify the need for a new product or service.
… design a product or service that will satisfy customer needs and wants.

Planning
… estimate customer demand for a new product or service.
… determine a competitive price for a new product or service.
… estimate the amount of startup funds and working capital necessary to start my business.
… design an effective marketing/advertising campaign for a new product or service.

Marshalling
… get others to identify with and believe in my vision and plans for a new business.
… network, i.e. make contact with and exchange information with others.
… clearly and concisely explain verbally/in writing my business idea in everyday terms.

Implementing human resources
… supervise employees.
… recruit and hire employees.
… delegate tasks and responsibilities to employees in my business.
… deal effectively with day-to-day problems and crises.
… inspire, encourage, and motivate my employees.
… train employees.

Implementing financial resources
… organize and maintain the financial records of my business.
… manage the financial assets of my business.
… read and interpret financial statements.

Entrepreneurial Empowerment (Digan et al., 2018)
Please indicate on the following scale your level of agreement with the following statement:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:
Competence
I am confident in my ability to do my job.
I am self-assured about my capabilities to perform my work activities.
I have mastered the skills necessary for my job.
Self-Determination
I have significant autonomy in determining how I do my job.
I can decide on my own how to go about doing my work.
I have considerable opportunity for independence and freedom in how I do my job.
Impact
My impact on what happens in my firm is large.
I have full control over what happens in my firm.
I have significant influence over what happens in my firm.

VERSION 2 ONLY

Absorptive Capacity (Ter Wal et al., 2011)

Please indicate on the following scale your level of agreement with each of the following statements:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:

When interacting with others, I always actively try to obtain information about emerging market needs or new technologies.

I read magazines and newspapers every day to keep up-to-date on our markets.

I frequently read scientific journals, trade publications, or patents to keep track of emerging trends.

I work hard to critically assess the potential value of external knowledge against our business needs.

I am deeply involved in appraising the usefulness of external ideas.

I often analyze the way expertise of external contacts could be related to our business needs.

I spend time processing external knowledge to get a sense of how it might be meaningful for our business.

I strive to comprehend how external knowledge connects to our ongoing research and development activity.

I try to excite my colleagues about novel external ideas or technologies.

I frequently meet up with colleagues to explain and discuss new knowledge I obtained externally.

I perform a central role in diffusing externally sourced knowledge to others in the organization.

I take the time to "translate" external knowledge to ensure it is properly understood by my colleagues.

I make an effort to "repackage" external knowledge to make sure it gets the attention it deserves.

When an external idea appeals to me, I work vigorously to make sure it is implemented, even if the idea was not originally mine.

When new external ideas I believe in meet resistance within my firm, I put in a great deal of effort to guarantee the idea is brought to fruition.

I would do almost anything to have my external ideas taken up by my organization.

I am willing to take action to make sure that the potential of external ideas I believe in will be realized.

Cognitive Flexibility (Martin & Rubin, 1995)
Please indicate on the following scale your level of agreement with each of the following statements:

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:
I can communicate an idea in many different ways.
I avoid new and unusual situations.
I feel like I never get to make decisions.
I can find workable solutions to seemingly unsolvable problems.
I seldom have choices when deciding how to behave.
I am willing to work at creative solutions to problems.
In any given situation, I am able to act appropriately.
My behavior is a result of conscious decisions that I make.
I have many possible ways of behaving in any given situation.
I have difficulty using my knowledge on a given topic in real life situations.
I am willing to listen and consider alternatives for handling a problem.
I have the self-confidence necessary to try different ways of behaving.

VERSION 3 ONLY

Personal Considerations (Continued)

Goal Orientation (Van Yperen & Janssen, 2002)

Please indicate on the following scale your level of agreement with each of the following statements as they apply to the question "*I feel most successful in my job when:*"

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:

"I feel most successful in my job when…"

…I am the best
…others cannot do as well as me
…I perform better than my colleagues
…I can clearly demonstrate that I am the best qualified person
…others mess up and I do not
…I accomplish something where others failed
…I am the only one who knows about particular things or who has a particular skill
…I am clearly the most productive employee
…I improve on particular aspects
…I feel I am improving
…I acquire new knowledge or master a new skill which was difficult for me in the past
…I learn something that motivates me to continue
…I acquire new knowledge or learn a new skill by trying hard
…I get the maximum out of myself
…I learn something new that is fun to do
…I learn something that makes me want to practice more

Entrepreneurial Passion (Cardon et al., 2013)
Please indicate on the following scale your level of agreement with each of the following statements.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Items:
It is exciting to figure out new ways to solve unmet market needs that can be commercialized
Searching for new ideas for products/services to offer is enjoyable to me.
I am motivated to figure out how to make existing products/services better.
Scanning the environment for new opportunities really excites me.
Inventing new solutions to problems is an important part of who I am.
Establishing a new company excites me.
Owning my own company energizes me.
Nurturing a new business through its emerging success is enjoyable.
Being the founder of a business is an important part of who I am.
I really like finding the right people to market my product/service to.
Assembling the right people to work for my business is exciting.
Pushing my employees and myself to make our company better motivates me.
Nurturing and growing companies is an important part of who I am.

APPENDIX F: Validation Items

Table F-1: Entrepreneurial Self-Efficacy Items

Entrepreneurial Self-Efficacy Dimensions and Items
Searching
Brainstorm (come up with) a new idea for a product or service
Identify the need for a new product or service
Design a product or service that will satisfy customer needs and wants
Planning
Estimate customer demand for a new product or service
Determine a competitive price for a new product or service
Estimate the amount of start-up funds and working capital necessary to start my business
Design an effective marketing/advertising campaign for a new product or service
Marshaling
Get others to identify with and believe in my vision and plans for a new business
Network- i.e. make contact with and exchange information with others
Clearly and concisely explain verbally/in writing my business idea in everyday terms
Implementing People
Supervise employees
Recruit and hire employees
Delegate tasks and responsibilities to employees in my business
Deal effectively with day-to-day problems and crises
Inspire, encourage, and motivate my employees
Train employees
Implementing Financial
Organize and maintain the financial records of my business
Manage the financial assets of my business
Read and interpret financial statements

Table F-2: Entrepreneurial Empowerment Items

Entrepreneurial Empowerment Dimensions and Items
Competence
I am confident in my ability to do my job.
I am self-assured about my capabilities to perform my work activities.
I have mastered the skills necessary for my job.
Self-Determination
I have significant autonomy in determining how I do my job.
I can decide on my own how to go about doing my work.
I have considerable opportunity for independence and freedom in how I do my job.
Impact
My impact on what happens in my firm is large.
I have full control over what happens in my firm.
I have significant influence over what happens in my firm.

Table F-3: Individual Absorptive Capacity Items

Absorptive Capacity Dimensions and Items
Identify New Knowledge
When interacting with others, I always actively try to obtain information about emerging market needs or new technologies
I read magazines and newspapers every day to keep up-to-date on our markets
I frequently read scientific journals, trade publications or patents to keep track of emerging trends
Assimilate New Knowledge
I work hard to critically assess the potential value of external knowledge against our business models
I am deeply involved in appraising the usefulness of external ideas
I often analyze the way expertise of external contacts could be related to our business model
I spend little time processing external knowledge to get a sense of how it might be meaningful to our business
I strive to comprehend how external knowledge connects to our ongoing research and development activity
I try to excite my colleagues about novel external ideas or technologies
I frequently meet up with colleagues to explain and discuss new knowledge I obtained externally
I perform a central role in diffusing externally sourced knowledge to others in the organization
I take the time to "translate" external knowledge to ensure it is properly understood by my colleagues
I make an effort to "repackage" external knowledge to make sure it gets the attention it deserves
Utilize External Knowledge
When an external idea appeals to me, I work vigorously to make sure it is implemented, even if the idea was not originally mine
When new external ideas I believe in meet resistance within my firm, I put in a great deal of effort to guarantee the idea is brought to fruition
I would do almost anything to have my external ideas taken up by my organization
I am willing to take action to make sure that the potential of external ideas I believe in will be realized

Table F-4: Cognitive Flexibility Items

Cognitive Flexibility Items	
I can communicate an idea in many different ways	
I avoid new and unusual situations	-R
I feel like I never get to make decisions	-R
I can find workable solutions to seemingly unsolvable problems	
I seldom have choices when deciding how to behave	-R
I am willing to work at creative solutions to problems	
In any given situation, I am able to act appropriately	
My behavior is a result of conscious decisions that I make	
I have many possible ways of behaving in any given situation	
I have difficulty using my knowledge on a topic in real life situations	-R
I am willing to listen and consider alternatives for handling a problem	
I have the self-confidence necessary to try different ways of behaving	

-R indicates reverse scoring

Table F-5: Goal Orientation Items

Goal Orientation Dimensions and Items
Performance Orientation Dimension
I am the best
others cannot do as well as me
I perform better than my colleagues
I can clearly demonstrate that I am the best qualified person
others mess up and I do not
I accomplish something where others failed
I am the only one who knows about particular things or who has a particular skill
I am clearly the most productive employee
Mastery Orientation Dimension
I improve on particular aspects
I feel I am improving
I acquire new knowledge or master a new skill which was difficult for me in the past
I learn something that motivates me to continue
I acquire new knowledge or learn a new skill by trying hard
I get the maximum out of myself
I learn something new that is fun to do
I learn something that makes me want to practice more

Table F-6: Entrepreneurial Passion Items

Entrepreneurial Passion
Passion for Inventing
It is exciting to figure out new ways to solve unmet market needs that can be commercialized.
Searching for new ideas for products/services to offer is enjoyable to me.
I am motivated to figure out how to make existing products/services better.
Scanning the environment for new opportunities really excites me.
Inventing new solutions to problems is an important part of who I am.
Passion for Founding
Establishing a new company excites me.
Owning my own company energizes me.
Nurturing a new business through its emerging success is enjoyable.
Being the founder of a business is an important part of who I am.
Passion for Developing
I really like finding the right people to market my product/service to.
Assembling the right people to work for my business is exciting.
Pushing my employees and myself to make our company better motivates me.
Nurturing and growing companies is an important part of who I am.

APPENDIX G: Exploratory Factor Analysis- Alternative Approaches

Examining the results from principal axis factoring (from Section 5.8.1), several clues indicated that higher-order constructs may explain why the theorized structure did not emerge in factor analysis. First, the items developed to represent both exploratory learning and exploitative learning loaded together in each of the solutions examined. Prior research has noted that if higher-order constructs are present when conducting factor analysis, then items may pool together under related subconstructs rather than on the intended construct. Therefore, to examine the unidimensionality (or dimensionality as the results of principal axis factoring suggest) of each of the three theorized dimensions of entrepreneurial learning, I pursued a more exploratory approach to factor analysis. In this approach, I first conducted principal component analysis on each hypothesized dimensions of entrepreneurial learning separately to determine if the hypothesized constructs were composed of several subcomponents. PCA is often recommended in identifying preliminary solutions (Pett, Lackey, & Sullivan, 2003). Next, I examined the higher order factor structure which emerged in confirmatory factor analysis. The results are presented below.

EFA-Exploratory Learning

Principal component analysis (PCA) using SPSS Version 25 was performed on the 17 remaining items developed to represent exploratory learning. The data were rotated with an oblique (Oblimin) rotation to account for the fact that the components are likely to be correlated. The Kaiser-Meyer-Olkin measure of sampling adequacy was .96, which far exceeds the recommended value of .60. Bartlett's test of sphericity was statistically

significant (χ^2 (136) = 6,180.76, p < .001). KMO and Bartlett's test of sphericity both indicate the items are appropriate for factor analysis.

Examination of the initial Eigenvalues suggest a two-component solution based on Kaiser's criterion of Eigenvalues greater than one. Additionally, the scree plot confirmed that a 2- component solution also seemed to fit this data. The pattern matrix was considered to examine component structure. In the initial solution, several items cross-loaded (items loaded on more than one component > .30) or failed to significantly contribute to the component solution (did not load at least .40 on any component). Due to the number of items representing exploratory learning, a cutoff criterion of no component loading < .60 was chosen to identify items which failed to significantly contribute to the component solution. Problematic items were identified and removed in an iterative series of analyses. Items which cross-loaded were removed first, followed by items which failed to contribute to the component solution. In total, four problematic items were discarding before arriving at an optimal solution. The Kaiser-Meyer-Olkin measure of sampling adequacy for the 13 remaining items was .949, which exceeds the recommended value of .60. Bartlett's test of sphericity was also statistically significant (χ^2 (78) = 4,891.82, p < .001), indicating these 13 items are appropriate for component analysis.

The optimal solution resulted in the emergences of two components accounting for 69.01 percent of the variance. The first component (Eigenvalue= 7.907) was comprised of 10 items and accounted for 60.83 percent of the variance. The second component (Eigenvalue= 1.064) was comprised of 3 items and accounted for an additional 8.18 percent of the variance. The correlation between the components was .603. Table G-1, below, provides the items, communalities, and pattern matrix for the 2-component solution.

Table G-1 Principal Component Analysis- Pattern Matrix Exploration

Item	Comm.	Components	
		1	**2**
searching for your next big idea?	.682	.901	
experimenting reaching out to new markets?	.691	.885	
searching for new possibilities with respect to products and services, processes, or markets?	.721	.885	
expanding your product or service offerings	.695	.865	
creating products or services that are innovative to the firm?	.751	.862	
looking for novel technological ideas by thinking "outside the box"?	.703	.766	
focusing on innovating?	.742	.765	
searching for new norms, routines, structures, or systems?	.681	.692	
experimenting with new approaches toward technology, processes, or markets?	.665	.690	
looking for creative ways to satisfy customers' needs?	.630	.638	
reading (books, newsletters, internet, etc.) about things you do not know much about?	.669		.839
broadening your knowledge bases?	.695		.799
requiring you to learn new skills or knowledge	.647		.740

Component 1: Exploration Behaviors

In the final solution, Component 1 consisted of 10 items with component loadings of at least .60 and no cross-loadings greater than .30 on any other component. Item component loadings ranged from .638 to .901. Interpreting the items identified in the first component, these items reflect behaviors related with exploratory learning such as searching for your next big idea; experimenting reaching out to new markets; and searching for new possibilities with respect to products and services, processes, or markets. The three items which loaded highest on the behavioral component included (1) searching for your next

big idea (*component loading* = .901); (2) experimenting reaching out to new markets (*component loading* = .885); and (3) searching for new possibilities with respect to products and services, processes, or markets (component loading = .885).

Component 2: Exploratory Knowledge Relatedness

Component 2 consists of 3 items with component loadings of at least .60 and no cross-loadings greater than .30 on any other component. The item component loadings ranged from .740 to .839. Interpreting the items identified in the first component, these items reflect a knowledge relatedness of tasks or activities related with exploratory learning. The three items which loading on the relatedness component of exploratory learning include (1) reading (books, newsletters, internet, etc.) about things you do not know much about (*component loading* = .839); (2) broadening your knowledge bases (*component loading* = .799); and (3) requiring you to learn new skills or knowledge (*component loading* = .740).

EFA-Exploitative Learning

The 11 remaining items developed to represent exploratory learning were subjected to principal component analysis with an oblique rotation. The Kaiser-Meyer-Olkin measure of sampling adequacy was .916, which exceeds the recommended value of .60. Bartlett's test of sphericity was statistically significant (χ^2 (55) = 3,019.85, $p < .001$).

Examination of the initial Eigenvalues suggest a 2- component solution based on Kaiser's criterion of Eigenvalues greater than one. The scree plot also confirms that a 2-component solution seems to fit this data. The pattern matrix was examined to considered component structure. A theoretical consideration of the items revealed one item that appeared redundant. The item (a) "searching online for information to build on or update your current knowledge" (*initial component loading* = -.779) appears to be theoretically

contained within the item (b) “reading (books, newsletters, *internet*, etc.) that build on or update your current knowledge” (*initial component loading* = -.878). Therefore, this item was dropped, and the component solution was recalculated. Based on the same criteria, the initial item solution was replicated.

The pattern matrix was again considered to examine component structure. Due to the fewer number of items representing exploitative learning than exploratory learning, the criteria for problematic items were slightly relaxed in order to retain an appropriate number of items. Items were considered to cross-load if the item loads >.40 on more than one component and were considered to fail to significantly contribute to the component solution if the item did not load on any component with a component loading > .50. In the initial solution, several items cross-loaded (items loaded on more than one component > .40) or failed to significantly contribute to the component solution (no component loading < .50). Problematic items were identified and removed in an iterative series of analyses. Following the removal of the single item which cross-loaded, none of the remaining items cross-loaded > .40 and all contributed significantly to the component solution (*component loading* > .50). In total, two items were discarding before arriving at an optimal, 2-component solution accounting for 68.15 percent of the variance. The Kaiser-Meyer-Olkin measure of sampling adequacy for the nine remaining items was .893, which exceeds the recommended value of .60. Bartlett’s test of sphericity was statistically significant (χ^2 (36) = 2,231.15, $p < .001$).

The first component (*Eigenvalue*= 4.923) was comprised of six items and accounted for 54.70 percent of the variance. The second component (*Eigenvalue*= 1.211) was comprised of 3 items and accounted for 13.46 percent of the variance. The correlation

between the two components was .491. Table G-2, below, provides the items, communalities, and pattern matrix for the 2-component solution.

Table G-2 Principal Component Analysis- Pattern Matrix Exploitation

Item	Comm.	Components	
		1	**2**
surveying existing customers satisfaction?	.727	.920	
receiving feedback from your current customers?	.601	.817	
penetrating more deeply into your existing customer base?	.676	.791	
optimizing firm routines, structures, or systems?	.587	.634	
focusing on improving current business practices?	.690	.585	
updating and improving current products or services?	.637	.571	
reading (books, newsletters, internet, etc.) that build on or update your current knowledge?	.712		.876
updating your knowledge on laws and regulations?	.776		.874
deepening your existing knowledge bases?	.729		.783

Component 1: Exploitation Behaviors

In the initial solution, Component 1 consists of six items with component loadings of at least .50 and no cross-loadings greater than .40 on any other component. The item component loadings ranged from .571 to .920. Interpreting the items identified in the first component, these items reflect behaviors related with exploitative learning such as surveying existing customers satisfaction; optimizing firm routines, structures, or systems; and updating and improving current products or services. The three items which loaded highest on the behavioral component included (1) surveying existing customer satisfaction (*component loading* = .920); (2) receiving feedback from your current customers (*component loading* = .817); and (3) penetrating more deeply into your existing customer base (*component loading* = .791).

Component 2: Exploitation Knowledge Relatedness

Component 2 consists of 3 items with component loadings of at least .50 and no cross-loadings greater than .40 on any other component. The item component loadings ranged from .783 to .876. Interpreting the items identified in the second component, these items reflect the knowledge relatedness of tasks or activities connected with exploratory learning. The items which loading on the relatedness component of exploitative learning include (1) reading (books, newsletters, internet, etc.) that build on or update your current knowledge (*component loading* = .876); (2) updating your knowledge on laws and regulations (*component loading* = .874); and (3) deepening your existing knowledge bases (*component loading* = .783).

EFA-Efficiency Learning

The 13 remaining items developed to represent efficiency learning were subjected to principal component analysis with an oblique rotation. The Kaiser-Meyer-Olkin measure of sampling adequacy was .914, which exceeds the recommended value of .60. Bartlett's test of sphericity was statistically significant (χ^2 (78) = 3,414.15, $p < .001$).

Examination of the initial Eigenvalues suggest a three-component solution based on Kaiser's criterion of Eigenvalues greater than one. The scree plot is unclear, but suggests that a 2-, 3-, or 4-component solution might fit this data. Therefore, I examined both a two-, three-, and four- component solutions. The pattern matrix was considered to examine component structure. The two- and four- component solutions appeared uninterpretable, therefore, the three- component solution was chosen. The initial solution is presented in Table G-3. Similar to the behavioral and relatedness components that emerged as subdimensions of exploratory and exploitative learning, in the initial solution for efficiency

learning Component 1 reflects efficiency learning behaviors. Meanwhile, Component 2 reflects the knowledge relatedness of tasks or activities connected with efficiency learning. However, a third component also emerges which seems to reflect behaviors related to the day-to-day operation of the firm. While I had expected efficiency learning behaviors and behaviors related to the day-to-day operation of the firm to load together, this was not the case. Examining the component correlation matrix in Table G-4, the correlation between Components 1 and 2 is positive (.453), the correlations between Components 1 and 3 (-.452) and between Components 2 and 3 (-.505) are both negative. Therefore, the three items which loaded solely on the Component 3 were dropped and the solution was recalculated.

Table G-3 Principal Component Analysis- Pattern Matrix Initial Solution Efficiency

Item	**Comm.**	**Components**		
		1	**2**	**3**
fine-tuning existing offerings to keep current customers satisfied?	.594	.819		
stabilizing firm routines, structures, or systems?	.644	.812		
creating reliability in experience?	.728	.770		
focused on the elimination of errors?	.649	.662		
solving problems that come up in your routine work?	.698	.593		-.322
which were clear to you how to conduct?	.747		.891	
you have already acquired a lot of experience?	.737		.829	
you carried out as if they were routine?	.688		.802	
you could properly conduct using your present knowledge?	.476		.595	
managing the day-to-day operation of your firm?	.747			-.871
performing the day-to-day tasks of the firm?	.777			-.860
focusing on the daily tasks of the firm?	.702			-.791
solving problems that arise in the day-to-day operation of your firm?	.641	.348		-.555

Table G-4 Principal Component Analysis Component Correlation Matrix Efficiency

Component	1	2
1	1	
2	.453	1
3	-.452	-.505

The 10 items which remained were again subjected to principal component analysis with an oblique rotation. The Kaiser-Meyer-Olkin measure of sampling adequacy was .891, which exceeds the recommended value of .60. Bartlett's test of sphericity was statistically significant (χ^2 (45) = 2,426.64, $p < .001$).

In the final solution, no items cross-loaded (items loaded on more than one component > .40) or failed to significantly contribute to the component solution (no component loading < .50). Therefore, this was considered an optimal, 2-component solution accounting for 63.81 percent of the variance. The first component (*Eigenvalue*= 5.041) was comprised of six items and accounted for 50.41 percent of the variance. The second component (*Eigenvalue*= 1.340) was comprised of four items and accounted for 13.40 percent of the variance. The correlation between the components was .499. Table G-5, below, provides the items, communalities, and pattern matrix for the final 2-component solution.

Table G-5 Principal Component Analysis- Pattern Matrix Final Solution Efficiency

Item	Comm.	Components	
		1	**2**
stabilizing firm routines, structures, or systems?	.611	.823	
fine-tuning existing offerings to keep current customers satisfied?	.545	.802	

creating reliability in experience?	.722	.791	
focused on the elimination of errors?	.660	.764	
solving problems that come up in your routine work?	.705	.750	
solving problems that arise in the day-to-day operation of your firm?	.552	.600	
which were clear to you how to conduct?	.726		.860
you have already acquired a lot of experience?	.744		.857
you carried out as if they were routine?	.692		.853
you could properly conduct using your present knowledge?	.423		.513

Component 1: Efficiency Behaviors

In the final solution, Component 1 consists of six items with component loadings of at least .50 and no cross-loadings greater than .40 on any other component. The item component loadings ranged from .600 to .823. Interpreting the items identified in the first component, these items reflect behaviors related with efficiency learning such as stabilizing firm routines, structures, or systems; fine-tuning existing offerings to keep current customers satisfied; and solving problems that come up in your routine work. The three items which loaded highest on the behavioral component included (1) stabilize firm routines, structures, or systems (*component loading* = .823); (2) fine-tuning existing offerings to keep current customers satisfied (*component loading* = .802); and (3) creating reliability in experience (*component loading* = .791).

Component 2: Efficiency Knowledge Relatedness

Component 2 consists of four items with component loadings of at least .50 and no cross-loadings greater than .40 on any other component. The item component loadings ranged from .513 to .860. Interpreting the items identified in the second component, these items reflect a knowledge relatedness of tasks or activities related with efficiency learning.

The four items which loading on the relatedness component of exploitative learning include (1) which were clear to you how to conduct (component loading = .860); (2) you have already acquired a lot of experience (component loading = .857); (3) you carried out as if they were routine (component loading = .853); and (4) you could properly conduct using your present knowledge (component loading = .513).

Confirmatory Factor Analysis

The next step in measurement development is an examination of the reliability of the measures. Confirmatory factor analysis was conducted using Maximum Likelihood Estimation in IBM SPSS AMOS (Version 25). First, each of the three dimensions of entrepreneurial learning are assessed separately in order to confirm the dimensionality of each construct. Finally, the constructs are assessed together in series of structural models.

Data Cleaning- Confirmatory Sample

Data was cleaned to ensure that response sets provide reliable information and that responses meet the underlying assumptions required for statistical analysis. I examined descriptive statistics and inter-item correlations and checked for univariate and multivariate outliers. I also examined the assumptions of confirmatory factor analysis by considering sample size and testing for multivariate normality.

First, the data were examined for outliers. Again, I examined the number of owners, the size of the top management team, and the number of employees as proxies for firm size. The number of owners ranged from one to one million (*mean* = 5,787.99; *S.D.* = 75,917.77). The number of members in the top management team ranged from one to 15 (*mean* = 2.11; *S.D.* = 1.77). The number of employees ranged from 0 to 9,500 (*mean* = 79.42; *S.D.* = 835.97). Visual inspection of the data confirmed several outliers. Five

responses which reported 100 or more owners and an additional three responses which reported 11 or more members in the top management team were identified as outliers and discarded.

Univariate outliers were identified by examining the z-scores of each of the items representing entrepreneurial learning. Using the cutoff criteria of $|z| > 3.29$, 5 participants with item responses falling further than 3.29 standard deviations from the mean were identified as univariate outliers.

Multivariate outliers were identified by examining Mahalanobis Distance. Using the criterion of $\alpha = .001$, an additional 9 participants that fell outside of the critical chi-square value were identified as multivariate outliers. In total, 14 participants that were identified as univariate or multivariate outliers were discarded. Following the removal of outliers, the confirmatory sample consisted of 324 respondents.

The final confirmatory sample consisted of 324 respondents. Although the general guideline is that sample sizes in excess of 300 are considered adequate (Worthington & Whittaker, 2006), some scholars recommend that the number of participants-per-item is a more adequate measure of sample size adequacy. The final sample size of 324 respondents to 31 items reflects a respondent-to-item ration of 10.45-to-1 exceeding the recommendation of 10-to-1 respondents per item (Hair et al., 2010).

I tested multivariate normality in this sample by examining Small's test (Small, 1980), Srivastava's test (Srivastava, 1984), and Mardia's test (Mardia, 1970). Small's test and Srivastava's test were both statistically significant ($p < .001$), indicating multivariate skewness had been violated. Srivastava's test and Mardia's test were also both statistically significant ($p < .001$), indicating multivariate kurtosis had also been violated. Additionally,

the Omnibus test of multivariate normality based on Small's test was also statistically significant, indicating multivariate normality had been violated.

Descriptive Statistics

Descriptive statistics are reported following the removal of outliers. Again, respondents were overwhelmingly male (64.8 percent) and Caucasian (82.4 percent). They were also highly educated (89.8 percent had a 4-year degree or greater) and older (*mean* = 57.73; *S.D.* = 11.07). Consequently, they also had a relatively high number of years of work (*mean* = 35.70; *S.D.* = 11.47) and industry experience (*mean* = 28.64; *S.D.* = 12.24). Demographic and descriptive statistics for this sample are presented in Table G-6, below.

Table G-6 Demographic and Descriptive Statistics- Confirmatory Sample

Gender *n* = 324	Frequency	Percentage
Male	210	64.8
Female	111	34.3
Prefer not to answer	3	.9
Race *n* = 324	Frequency	Percentage
American Indian or Alaskan	3	.9
Asian	16	4.9
Black or African American	24	7.4
Native Hawaiian or Pacific Islander	1	.3
White	267	82.4
Prefer not to answer	13	4.0
Ethnicity *n* = 324	Frequency	Percentage
Hispanic or Latino	20	6.2
Not Hispanic or Latino	294	90.7
Prefer not to answer	10	3.1
Level of Education *n* = 324	Frequency	Percentage
Less than high school	0	0
High school or equivalent	6	1.9
Some college	15	4.6
2-year degree	11	3.4
4-year degree	126	38.9
Master's Degree	95	29.3

Doctorate or professional degree	70	21.6
Prefer not to answer	1	.3

Table G-6 Demographic and Descriptive Statistics (Cont)

	n	***Min***	***Max***	***Mean***	***S.D.***
Age	324	32	93	57.73	11.07
Work Experience	324	5	66	35.70	11.47
Industry Experience	324	0	64	28.64	12.24

Descriptive statistics of the firms operated by respondents in this sample are presented in Table G-7. Firms owned by respondents in the confirmatory sample ranged from 0 to 165 years in age (*mean* = 20.23; *S.D.* = 19.14). Respondents' firms were relatively small, owned by up to 20 owners (*mean* = 1.91; *S.D.* = 2.32) and managed by up to nine members of a top management team (*mean* = 1.95; *S.D.* = 1.31), with 50 or fewer employees (*mean* = 6.05; *S.D.* = 9.42). Approximately 40 percent of respondents considered their firm a family firm (39.8 percent), and the same percentage of respondents reported that a family or family group holds majority ownership of the firm.

Table G-7 Organizational Descriptives- Confirmatory Sample

	n	***Min***	***Max***	***Mean***	***S.D.***
Firm Age	324	0	165	20.23	19.14
# of Owners	324	1	20	1.91	2.32
TMT Size	324	1	10	1.95	1.31
# of Employees	121	0	50	6.05	9.42

Table G-7 Organizational Descriptives (Cont)

Family Firm n = 324		Frequency	Percentage
	Yes	129	39.8
	No	195	60.2
Family Ownership n = 323		Frequency	Percentage
	Yes	129	39.8
	No	194	60.1
Franchise n = 324		Frequency	Percentage
	Yes	4	1.2
	No	320	98.8

CFA Exploratory Learning

As previously stated, each of the three dimensions of entrepreneurial learning are assessed separately in order to confirm the dimensionality of each construct. I conduct confirmatory factor analysis using Maximum Likelihood Estimation in IBM SPSS AMOS (Version 25). To confirm the component structure of exploratory learning, I compare two models. In Model A, all 13 remaining items developed to reflect exploratory learning are loaded onto a single latent construct. In Model B, the two subcomponents which emerged in the exploratory factor analysis were modeled as sub-dimensions of a higher-order exploratory learning construct. A comparison of the models follows.

In Model A, all 13 items were loaded onto a single latent variable. In the unidimensional model, initial indicators of model fit appear to be less than ideal. Chi-square results were statistically significant ($\chi 2 = 379.15$, $df = 65$, $p < .001$); however, chi-square has been noted to be extremely susceptible to sample size and approaches significance in larger samples. Although the SRMR statistic of .055 indicates acceptable model fit, the CFI statistic of .892, GFI statistic of .828, AGFI statistic of .760, TLI statistic of .870, and RMSEA statistic of .122 all indicate poor model fit. Additionally, although all of the standardized regression weights fall above the recommended threshold of .50, the

standardized regression weights of the ten items which would load onto the first sub-component (*range* = .72—.86, *mean*= .785, *S.D.*= .046) are significantly higher than the standardized regression weights which would load onto the second sub-component (*range*= .52—.62, *mean*= .586, *S.D.*= .056).

In Model B, the subcomponents which emerged in the exploratory factor analysis were modeled as sub-dimensions of a higher-order exploratory learning construct. First, the standardized regression weights of all 13 items loaded above the recommend threshold of .50. Further, initial measures of fit indicate improved model fit compared to the unidimensional model. Several fit indices including the SRMR, NFI, TLI, and CFI suggest acceptable model fit. Chi-square results were again statistically significant ($\chi 2 = 289.42$, $df = 64$, $p < .001$). Further, the GFI statistic of .860, AGFI statistic of .801, SRMR of .0415, RMSEA statistic of .104, NFI statistic of .903, TLI statistic of .906, and CFI statistic of .923, also all show improvement compared to the unidimensional model. Therefore, Model B was chosen as the superior model. Table G-8 provides a comparison of Model A and Model B.

Table G-8 Model Fit Indicators- Exploratory Learning

Indicator	Model A	Model B	Fit
χ2	379.15	289.42	Improved
GFI	.828	.860	Improved
AGFI	.760	.801	Improved
SRMR	.055	.042	Improved
RMSEA	.122	.104	Improved
NFI	.873	.903	Improved
TLI	.870	.906	Improved
CFI	.892	.923	Improved

Although Model B fits the data better than Model A, model fit is still less than ideal. Therefore, to optimize scale length and improve model fit, I examined the standardized regression weights, modification indices, and standardized residual covariance matrices of the superior model (Model B). Figure 15 describes the model analysis procedure used in optimizing scale length and improving model fit.

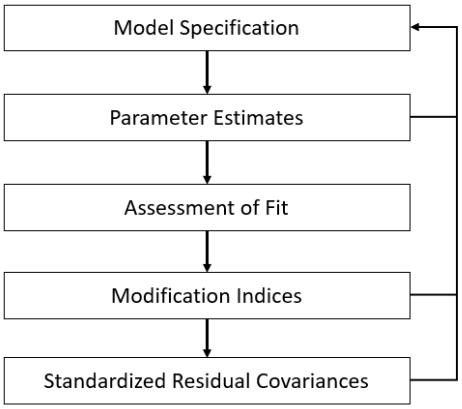

Figure 19 Model Analysis Procedure

Standardized regression weights were examined first.

Using the criterion of modification indices (MI) > 15, modification indices were examined and covariances were added to the model iteratively when they made theoretical sense. As a result, the error terms of two pairs of variables were allowed to correlate. I also examined the standardized residuals covariance matrices to identify any problematic variables. Residuals greater than 3 standard deviations from the mean indicate problematic variables pairings. No standardized residuals were greater than 1.353 standard deviations from the mean; therefore, all items were retained.

Following modification, the majority of fit indices indicated "acceptable" to "good" model fit. All indicators suggested improved model fit. Although the chi-square results remained statistically significant ($\chi 2 = 176.21$, $df = 62$, $p < .001$), comparison of the models indicated chi-square improved. The GFI of .921, AGFI of .884, SRMR of .034, RMSEA of .076, NFI of .941, TLI of .951, CFI of .961, all indicate good model fit. Figure 16 shows the final structural model with standardized estimates for the exploratory learning construct.

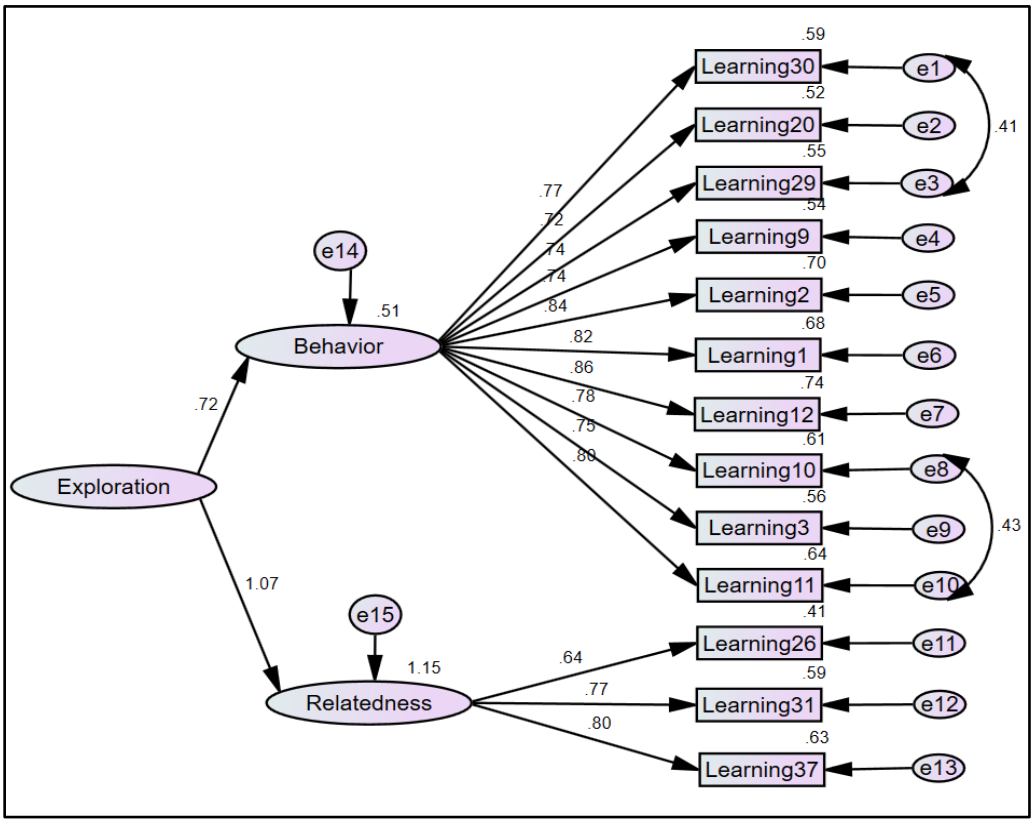

Figure 20 Confirmatory Model Exploratory Learning

CFA Exploitative Learning

To confirm the component structure of exploitative learning, I again compare two models. In Model C, all nine remaining items developed to reflect exploratory learning are

loaded onto a single latent construct. In Model D, the two subcomponents which emerged in the exploratory factor analysis were modeled as sub-dimensions of a higher-order exploratory learning construct. A comparison of the models follows.

In Model C, all nine items were loaded onto a single latent variable. Model fit was assessed using a number of fit indices. In the unidimensional model, initial indicators of model fit again appear to be less than ideal. Chi-square results were statistically significant ($\chi 2 = 210.20$, $df = 27$, $p < .001$). The GFI statistic of .862, AGFI statistic of .770, SRMR statistic of .071, RMSEA statistic of .145, NFI statistic of .857, TLI statistic of .830, and CFI statistic of .873 all indicate poor model fit. Again, the standardized regression weights of the three variables which would load onto the second-sub-component are all below the recommended threshold of .50.

In Model D, the subcomponent which emerged in the exploratory factor analysis were modeled as sub-dimensions of a higher-order exploitative learning construct. First, standardized regression weights of all nine items loaded above the recommended threshold of .50. Additionally, several fit indices including the GFI, SRMR, NFI, TLI, and CFI suggest acceptable to good model fit. Chi-square results were improved but still statistically significant ($\chi 2 = 123.15$, $df = 26$, $p < .001$). Further, the GFI statistic of .923, AGFI statistic of .867, SRMR statistic of .050, RMSEA statistic of .108, NFI statistic of .916, TLI statistic of .906, and CFI statistic of .923 all display improvement compared to the unidimensional model. Therefore, Model D was chosen as the superior model. Table G-9 provides a comparison of Model C and Model D.

Table G-9 Model Fit Indicators Exploitative Learning

Indicator	Model C	Model D	Fit
$\chi 2$	210.20	123.15	Improved

GFI	.862	.923	Improved
AGFI	.770	.867	Improved
SRMR	.071	.050	Improved
RMSEA	.145	.108	Improved
NFI	.857	.916	Improved
TLI	.830	.906	Improved
CFI	.873	.923	Improved

Again, I again examined the modification indices to improve model fit. Using the criterion of modification indices (MI) > 15, covariances were iteratively added to the model one at a time by order of the highest impact. The error terms of two pairs of variables were allowed to correlate. Next, I examined the standardized residuals covariance matrices. Residuals greater than 3 standard deviations from the mean indicate problematic variables. No standardized residuals were greater than 1.639 standard deviations from the mean; therefore, all items were retained.

Following modification, the majority of indicators indicated "acceptable" to "good" model fit. All indicators suggested improved model fit. The chi-square results were, again, statistically significant ($\chi 2 = 47.52$, $df = 24$, $p < .01$), however showed improvement. The GFI (.968), AGFI (.941), SRMR (.035), RMSEA (.055), NFI (.968), TLI (.975), and CFI (.984) all indicate excellent model fit. Figure 17 shows the final structural model with standardized estimates for the exploitative learning construct.

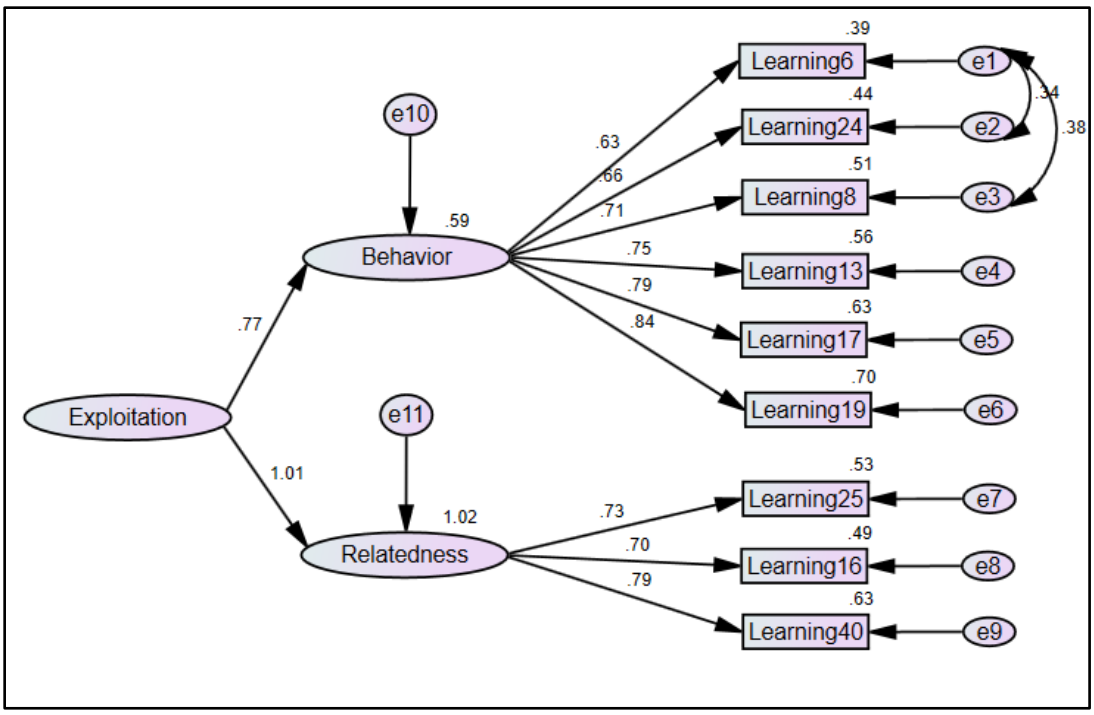

Figure 21 Confirmatory Model Exploitative Learning

CFA Efficiency Learning

To confirm the component structure of efficiency learning, I compare two models. In Model E, all ten remaining items developed to reflect efficiency learning are loaded onto a single latent construct. In Model F, the two subcomponents which emerged in the exploratory factor analysis are modeled as sub-dimensions of a higher-order efficiency learning construct.

In Model E, all ten items were loaded onto a single latent variable. Model fit was assessed using a number of fit indices. In an unmodified model, initial indicators of model fit appear to be poor. Unsurprisingly, the chi-square results were statistically significant ($\chi 2 = 467.13$, $df = 35$, $p < .001$). Although the standardize regression weights all exceed the recommended threshold of .50, the GFI statistic of .733, AGFI statistic of .581, SRMR

statistic of .109, RMSEA statistic of .196, NFI statistic of .672, TLI statistic of .598, and CFI statistic of .687 all indicate poor model fit.

In Model F, the subcomponents which emerged in the exploratory factor analysis were modeled as three sub-dimensions of a higher-order efficiency learning construct. Standardized regression weights of all ten items loaded at or above the recommended threshold of .50. Although the Chi-square results were again statistically significant ($\chi 2$ = 467.13, df = 35, p < .001), they were improved from the unidimensional model. Additionally, all several measures of fit indicate that they are approaching good model fit, all are significantly improved from the unidimensional model. The GFI statistic of .897, AGFI statistic of .833, SRMR statistic of .070, RMSEA statistic of 115, NFI statistic of .874, TLI statistic of .861, and CFI statistic of .895 all display improved model fit compared to the unidimensional model. Therefore, Model F was chosen as superior to Model E. Table G-10, below, compares the model fit statistics from Model E and Model F.

Table G-10 Model Fit Indicators- Efficiency Learning

Indicator	Model E	Model F	Fit
$\chi 2$	467.13	123.15	Improved
GFI	.733	.897	Improved
AGFI	.581	.833	Improved
SRMR	.109	.070	Improved
RMSEA	.196	.115	Improved
NFI	.672	.874	Improved
TLI	.598	.861	Improved
CFI	.687	.895	Improved

I again examined the modification indices of the superior model to improve model fit. Using the criterion of modification indices (MI) > 15, the error terms of three pairs of items were allowed to correlate. Following modification, I examined the standardized residuals covariance matrices. The standardized residual covariance matrix indicated that one item shared several potentially problematic covariances with several other items. Therefore, this item, "activities you could properly conduct using your present knowledge", was excluded from the model and the model was re-evaluated.

Following modification and the removal of one item, the majority of indicators indicated "acceptable" to "good" model fit. the CFI, GFI, AGFI, and RMSEA indicated improved model fit. All indicators suggested improved model fit. The chi-square results were statistically significant ($\chi 2 = 54.52$, $df = 23$, $p < .01$), however showed improvement. The GFI (.964), AGFI (.929), SRMR (.041), RMSEA (.065), NFI (.957), TLI (.960), and CFI (.975) all indicate excellent model fit. Figure 18 details the final structural model with standardized estimates for the efficiency learning construct.

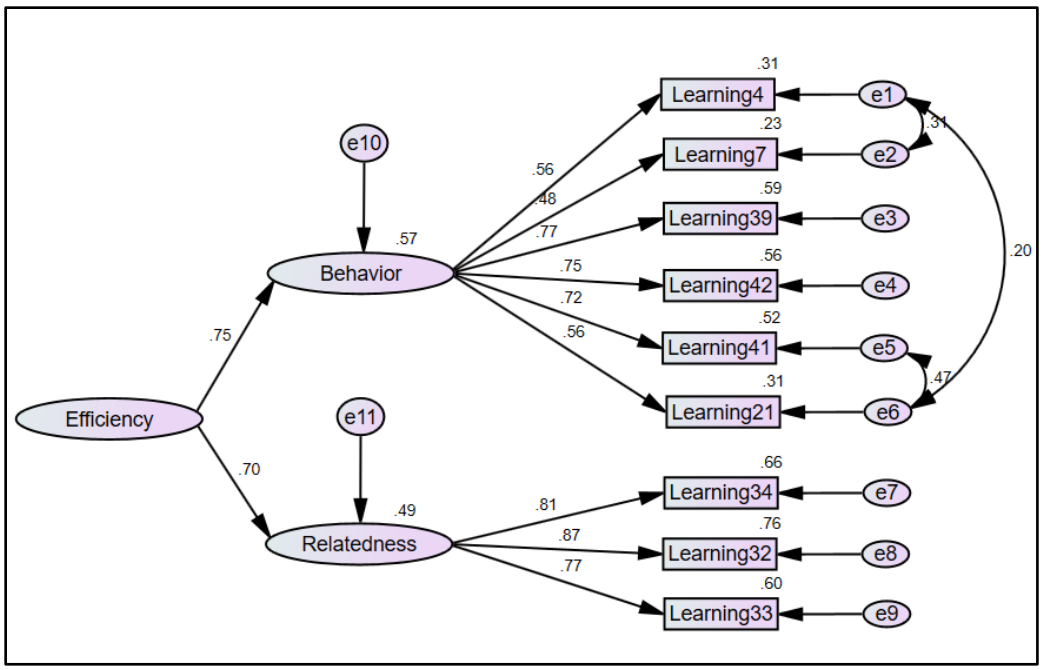

Figure 22 Confirmatory Model Efficiency Learning

Structural Model

The final step in my confirmatory factor analysis is the examination of a series of full structural models to find the best model which fits the data. The series of models that I test include: (1) a unidimensional model with all of the items forced onto one construct, (2) a 3-factor model with each of the dimensions of entrepreneurial learning modeled as unidimensional constructs, and (3) a higher-order model representing the three learning constructs composed of subdimensions representing the behavioral and knowledge relatedness components of each type of learning.

In Model 1, all 31 remaining items were loaded onto a single latent variable. Model fit was assessed using a number of fit indices. In an unmodified unidimensional model, initial indicators of model fit appear to be extremely poor. Model fit was assessed using a number of fit indices. Initial indicators of model fit are extremely poor. The chi-square results were statistically significant ($\chi 2$ = 2,681.27, *df* = 434, $p < .001$). Additionally, the

GFI statistic of .546, AGFI statistic of .481, SRMR statistic of .103, RMSEA statistic of .127, NFI statistic of .650, TLI statistic of .665, and CFI statistic of .687 all indicate poor model fit.

In Model 2, each of the three types of learning were modeled as unidimensional constructs. The 13 remaining items representing exploratory learning were loaded onto one construct. The nine remaining items representing exploitative learning were loaded onto a second construct. And, the nine remaining items representing efficiency learning were loaded onto a third construct. Model fit was assessed using a number of fit indices. In an unmodified model, initial indicators of model fit appear to still be poor. The chi-square results were statistically significant ($\chi 2 = 2{,}307.88$, $df = 431$, $p < .001$). The GFI statistic of .546, AGFI statistic of .481, SRMR statistic of .103, RMSEA statistic of .127, NFI statistic of .650, TLI statistic of .665, and CFI statistic of .687 all indicate poor model fit.

In Model 3, each of the three types of learning were modeled as multidimensional constructs. Exploratory learning was modeled as a 2nd-order construct composing of a behavioral dimension (10 items) and a knowledge relatedness dimension (3 items). Exploitative learning was modeled as a 2nd-order construct also composing of a behavioral dimension 6 items) and a knowledge relatedness dimension (3 items). Finally, efficiency learning was also modeled as a 2nd-order construct composing of a behavioral dimension 6 items) and a knowledge relatedness dimension (3 items). In a sub-dimensional model, initial indicators of model fit appear to still be adequate and are improved from Models 1 and 2. The chi-square results were statistically significant ($\chi 2 = 1541.47$, $df = 420$, $p < .001$). The GFI statistic of .748, AGFI statistic of .703, SRMR statistic of .097, RMSEA statistic of .091, NFI statistic of .796, TLI statistic of .825, and CFI statistic of .842 all

indicate adequate, and improving, model fit. Therefore, Model 3 was chosen as the best model to fit this data. Table G-11 provides a comparison of the models. Figure 19 details the final sub-dimensional structural model with standardized estimates.

Table G-11 Model Fit Indicators Structural Model

Indicator	Model 1	Model 2	Model 3
$\chi 2$	2,681.27	2,307.88	1,541.47
GFI	.546	.621	.748
AGFI	.481	.564	.703
SRMR	.103	.104	.097
RMSEA	.127	.116	.091
NFI	.650	.698	.796
TLI	.665	.718	.825
CFI	.687	.739	.842

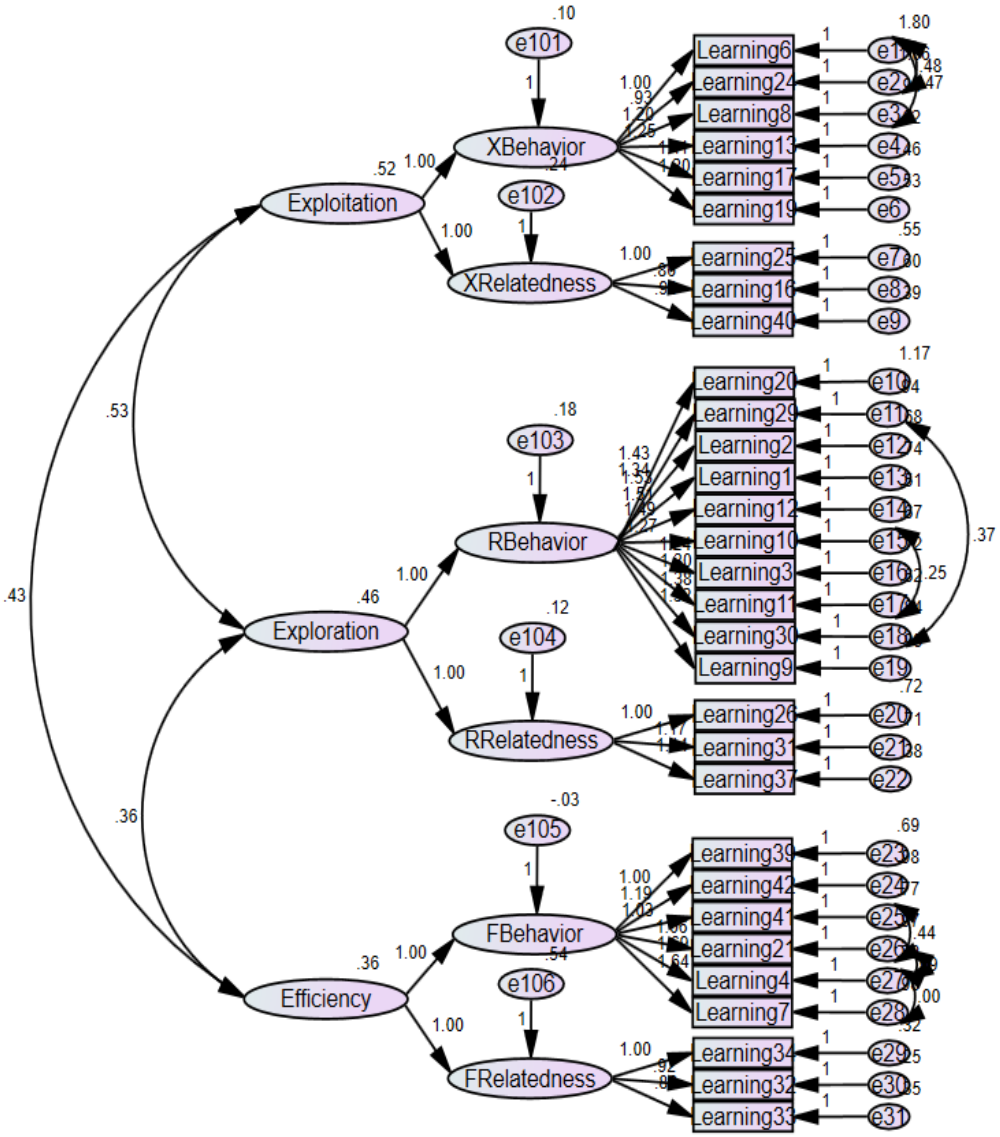

Figure 23 Confirmatory Sub-dimensional Model of Entrepreneurial Learning

Reliability and Validity

The final step in the measurement development procedure is an assessment of the reliability and validity of the hypothesized measures.

Reliability is assessed by examining composite reliability (CR). Composite reliabilities of .861 for exploratory learning, .867 for exploitative learning, and .843 for efficiency learning are above the recommended cutoffs of 0.7 (Hair et al., 2010), substantiating the reliability of the measures.

Convergent validity is assessed by examining the average variance extracted (AVE) for each of the three learning factors. The AVE of .757 for exploratory learning, .766 for exploitative learning, and .740 for efficiency learning are above the recommended cutoffs of 0.50, suggesting convergent validity (Fornell & Larcker, 1981; Hair et al., 2010).

Discriminant validity is assessed by examining the average variance extracted (AVE), and minimum shared squared variance (MSV). For discriminant validity to exist MSV must be less than AVE (Hair et al., 2010). As shown in Table G-12, the three learning factors validated in confirmatory factor analysis exhibit poor discriminant validity. Because these factors do not discriminate from each other, this factor structure was discarded as a viable alternative to examine these constructs.

Table G-12 Assessing Reliability and Validity

	CR	**AVE**	**MSV**
Exploratory	0.861	0.757	1.177
Exploitative	0.867	0.766	1.177
Efficiency	0.843	0.740	1.006

CURRICULUM VITAE

Shaun P. Digan

Entrepreneurship Department, College of Business, University of Louisville
(502) 302-9935 shaundigan.com shaun.digan@louisville.edu

Education

Ph.D., Entrepreneurship **2013-2019***
University of Louisville- Louisville, KY

Masters of Business Administration **2012-2013**
University of Cincinnati - Cincinnati, OH

- Beta Gamma Sigma

Bachelors of Business: Management **2008-2011**
Liberty University - Lynchburg, VA

- Summa Cum Laude

Research Interests

- Entrepreneurial learning
- Entrepreneurial cognition and decision making
- Entrepreneurial affect
- Opportunity emergence

Dissertation

My dissertation research examines entrepreneurial learning behaviors in an attempt to answer the broad research question "*under what conditions do individuals acquire entrepreneurial knowledge?"* Specifically, I examine the influence of prior outcomes in directing individual learning behaviors, as well as organizational factors and individual cognitive characteristics which shape learning processes.

Committee Chair:	Robert P. Garrett, Jr.	*Proposal Successfully Defended:* April 2017
Members:	James O. Fiet	*Expected Completion Date:* Spring 2019
	Ghiyoung Im	
	Per Davidsson	

Publications

Digan, Shaun P., Kaur, G., Mantok, S, & Patel, P.C., (Forthcoming) Women's Perceived Empowerment in Entrepreneurial Efforts: The Role of Bricolage and Psychological Capital, *Journal of Small Business Management*.

Brumana, M., Minola, T., Garrett, R.P., & Digan, Shaun P., (2017) How Do Family Firms Launch New Businesses? A Developmental Perspective on Internal Corporate Venturing in Family Business, Journal of Small Business Management.

Digan, Shaun P., Kerrick, S., Cumberland, D. & Garrett, R.P., (2017) The Roles of Knowledge and Organizational Form on Opportunity Evaluation, *Journal of Small Business Strategy* 27(2), 65-89.

Conference Papers

Digan, Shaun P. (University of Louisville, Graduate Student Regional Research Conference, 2018). The Influence of Prior Performance on the Type of Entrepreneurial Learning.

Kerrick, S., Digan, Shaun P., & Cumberland, D. (Small Business Institute Annual Conference, 2018) What is the Influence of Entrepreneurship Training on Entrepreneurial Self-Efficacy?

Digan, Shaun P. & Fiet, J.O. (Academy of Management Meetings, 2016) Mapping the Identification and Possible Advancement of an Entrepreneurial Idea.

Digan, Shaun P. & Jessri, M. (University of Louisville, Graduate Student Regional Research Conference, 2016) Conjoint Analysis and Complex Decisions: A Methodological Review of Conjoint Analysis in Entrepreneurship Research.

Digan, Shaun P., Kerrick, S., & Cumberland, D. (Academy of Management Meetings, 2015) The Role of Knowledge on Opportunity Evaluation: An Example from Franchising.

Teaching Experience

Entrepreneurship 350/Management 340: Entrepreneurial Creativity and Innovation
University of Louisville (Summer 2015, Fall 2015)

- Summer 2015— average instructor effectiveness: N/A/5
- Fall 2015— average instructor effectiveness: 4.50/5

Entrepreneurship 401: Entrepreneurial Small Business
University of Louisville (Spring 2017)

- Spring 2017— average instructor effectiveness: 4.10/5
- Spring 2018— average instructor effectiveness: 4.84/5

Select Statements from Student Evaluations:

"Best teaching I've had at UofL so far"
"Best class I've taken at UofL so far"
"Has genuine care and consideration"
"Passionate about entrepreneurship. It's great to have a professor that cares and knows about the subject."
"Is open-minded and offers insightful knowledge"
"A very creative and persuasive environment"
"Excellent communication with students"
"I like that I am consistently being challenged to think creatively"
"Knowledge that applies to life, regardless of career path"
"I really liked the interactive nature of this course"
"Excellent course and instructor"

Awards and Honors

- USASBE- Doctoral Consortium for Teaching and Learning in Entrepreneurship- Selected Participant (2018)
- University of Louisville School of Interdisciplinary and Graduate Studies- Community Engagement Academy- Selected Participant (2017-2018)
- Babson College Entrepreneur Research Conference- Doctoral Student Consortium- Selected Participant (2017)
- Forcht Center for Entrepreneurship, University of Louisville, PhD Award of Excellence for Teaching (2016)
- Academy of Management- ENT Doctoral Student Consortium- Selected Participant (2015)
- University Fellowship - School of Interdisciplinary and Graduate Studies- University of Louisville (2013-2015)
- Beta Gamma Sigma- University of Cincinnati Chapter (2013)

Scholarly Development

Theoretical Based Training

Foundations of Entrepreneurship Research	*James O. Fiet*
Contemporary Entrepreneurship	*Scott Shane*
Economic Theory of the Firm	*Yong Chao*
Finance Theories	*David Dubofsky*
Venture Capital Theories	*James O. Fiet*
Economic Perspectives of Entrepreneurship	*Simon Parker*
Theories of Opportunity	*James O. Fiet*
Organizational Behavior and HR Issues	*Ryan Quinn*
Psychological and Cognition Perspectives	*Dean Shepherd*
Quantitative Entrepreneurship	*Per Davidsson*
Franchising and Entrepreneurship Research	*James O. Fiet*
Sociological Foundations of Entrepreneurship Research	*Howard Aldrich*
Strategic Perspectives of Entrepreneurship Research	*Robert Garrett, Jr.*

Methodological Based Training

Research Design/Methods	*Manju Ahuja*
Experimental Research Design	*Manju Ahuja*
Topics in Entrepreneurship Research	*Pankaj Patel*
New Product Strategy/Marketing	*Robert Carter*
Applied Multiple Regression	*Jason Osborne*
Advanced Statistics	*Cara Cashon*
Multivariate Statistic Techniques	*Namok Choi*
Advanced Statistical Computer Applications (SEM)	*George Higgins*
Hierarchical Linear Modeling	*Jill Adelson*

Grant Writing Academy *Delphi Center for Teaching and Learning*	*Michelle Rodems*

Pedagogical Training

Graduate Teaching Academy (2014-2015) *Delphi Center for Teaching and Learning*	*Michelle Rodems* *Beth Boehm* *Marie Brown*

Service

- Organized the Entrepreneurship Doctoral Research Group among University of Louisville PhD students and candidates.
- Mendeley Advisor- Hosting student and faculty workshops
- Ad hoc reviewer- Entrepreneurship Theory and Practice
- Ad hoc reviewer- Academy of Management Meetings, 2016- Entrepreneurship Div.
- Ad hoc reviewer- Small Business Institute Annual Meetings, 2018
- COB Student Grievance Committee- Graduate Student Representative 2013-14, 16-17
- Ph.D. Representative- Student Dean Selection Committee