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Resource Accumulation Dynamics During The New Venture Formation Process

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RESOURCE ACCUMULATION DYNAMICS DURING THE NEW VENTURE FORMATION PROCESS

by

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ABSTRACT

As described by the resource-based view, resource accumulation is a key concern for new ventures. Although we know that getting the right resources is a critical issue to organizations, we know far less about how fledgling firms assemble these resources over time. The purpose of this study is to examine the dynamics of resource accumulation and their effect on performance and growth during new venture formation. In particular, I examine the constructs of financial capital, human capital, and performance, and will test relationships using a sample from the Kauffman Firm Survey (KFS) that provides the necessary data to test my longitudinal proposals. I predict that that the constructs of human capital and financial capital impact performance, and that performance later impacts these constructs. I use latent curve analysis to examine the growth and decline of resource classes, and also cross-lag analysis to see how performance affects the acquisition of subsequent resources. This work has potential implications for strategy and entrepreneurship scholars alike.

The document is organized as follows: Chapter 1 will serve as the introduction of the work and describe my research question and intent. Chapter 2 will serve as a relevant literature review and gives detail to theoretical perspectives guiding the study at hand. Chapter 3 presents the methodology, including information about the sample and the statistical methods utilized. Chapter 4 explains the results of the testing of hypotheses. Finally, Chapter 5 gives conclusions, limitations, and provides direction for future research.

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LIST OF ACRONYMS/ABBREVIATIONS

RBV	Resource Based View
KFS	Kauffman Firm Survey
ASA	Attraction- Selection-Attrition Model (Schneider, 1987)
CATI	Computer Assisted Telephone Interviewing
LGM	Latent Growth Model
SEM	Structural Equation Modeling

CHAPTER 1: INTRODUCTION

"Organizations do not spontaneously emerge but require the gathering and harvesting of resources" (Scott, 1992)

Resource accumulation is a primary challenge for new ventures. Starting any type of business requires the procurement of an assortment of resources (Lavesque & MacCrimmon, 1998). Ask any entrepreneur about the difficulty of starting a business, and chances are they will mention something pertaining to access to critical resources. Although we know that getting the right resources at the right time is a serious issue for organizations, we know far less about how new ventures assemble their resources. This is consequential since resources have implications for strategy, as Bowman & Hurry (1993) state that resources serve as platforms for launching strategies, which in turn often generate further resources (also see Grant, 1991). Firms use resources for a number of strategic moves, as they can be used to create and maintain competitive barriers (Porter, 1980), act as buffers during periods of economic uncertainty (George, 2005), and sustain a culture of innovation (Katila & Shane, 2005).

This is especially true for new ventures, who need resources to organize and grow (Westhead, 1995), and to establish a potential competitive advantage early on. The dilemma that many new firms face is that they start with a small amount of resources and lack the legitimacy to gain further resources necessary to succeed (Zimmerman & Zeits, 2002). Thus, young firms are resource-constrained, less likely to efficiently use the resources that they are able to accumulate (Sharfman et al., 1988), and consequently suffer from the "liability of newness", a greater risk of firm failure than older, more established organizations (Freeman, Carroll, &

Hannan, 1983; Stinchcombe, 1965). Given this, entrepreneurs must be prudent about the deployment of their best resources. It is vital that new firms use their initial resources wisely by effectively combining what's at hand (Baker & Nelson, 2005) and making the most of what they have, while working hard to accumulate additional resources that are needed for the venture to survive and grow over time.

There seems to be broad agreement among strategy and entrepreneurship scholars alike that resources serve as key drivers of competitive advantage within new firms (Barney, 1991). The strategy field has given substantial attention to the influence that resources have on subsequent firm success. The relationship between resources and firm performance is the central focus of the resource-based view (Barney, 2000) and has been discussed in related works describing the knowledge-based view (Grant, 1996) and dynamic capabilities perspective (Teece, Pisano, & Shuen, 1997; Zott, 2002).

Prior research has illustrated how human and financial resources contribute to business success. For example, Boone, De Brabander, & Van Witteloostuijn (1996) revealed that founder/CEO human capital enhanced organizational performance. Pennings, Lee, & Van Wittelostujin (1998) conclude that human capital confers distinctive competitive advantages in their dynamic study. In the work of Sirmon, Gove, & Hitt (2008), they show that comparative advantages in resource stocks affect performance, and that their efficacy depends on contextual factors and the deployment. Current research continues to support the value of firm resources for strategy and its effect on firm performance, such as that of Hitt, Bierman, Uhlenbruck, and Shimizu (2006), which examines the value of resources such as human and relational capital with internationalization and firm performance. They find that the highest performance is achieved when firms had high internationalization paired with high human capital. This expands

the work of Hitt and colleagues (2001) which showed that human capital was important for domestic strategy in that it was positively related to firm performance and useful in implementing domestic strategy. The implications of this research are central for understanding the management of critical firm resources and the development of appropriate strategies. But also of relevance, it shows that the combining of complementary resources is important (e.g., relational and human capital). It begs us to ask more questions relating resource stocks to firm outcomes beyond just simplistic, static relationships.

Although the field has examined the effects of particular resources on performance, much less is known about how organizations accumulate resources, especially during the early stages of firm formation. Research on the resource struggles of new firms has examined the independent effects of different capital classes (e.g., human, financial) but has lacked explanation as to how distinctive types of resources may work together and potentially affect one another over time (Florin, Lubatkin, & Schulze, 2003). This is crucial, given that resources may hold increased value when considered with others, including complementary assets that may be used to develop other resources (Lichtenstein & Brush, 2001; Teece et al., 1997). Such a deficiency may have caused researchers to underspecify models of venture creation and growth, since they are not taking into account the value beyond that of the resource in isolation (Katz & Gartner, 1988; Shane & Venkataraman, 2000).

Since prior research has established that resources are key contributors to firm strategy and performance, a more dynamic perspective that describes resource accumulation is needed since this is an evolving process. In previous discussions of resource accumulation, the relationships between resources and firm performance suggested by the resource based view (RBV) have mainly been supported (Sirmon & Hitt, 2003). For example, studies have found that

different types of resources explained performance in contrasting environments (see Miller and Shamsie, 1996). Furthermore, the work of Brush and Artz (1999) showed that firm-specific resources and capabilities required by the firm's industry affected performance and could be utilized in the protection of a competitive advantage. What is needed to account for the evolutionary nature of resource accumulation, however, is a large-scale data analysis that considers these relationships between resources and firm performance in a dynamic fashion. Thus, a temporal component needs to be considered (Priem & Butler, 2001). By accomplishing this, the data need to be longitudinal and must be modeled so that questions of accumulation may be asked. To conduct more definitive research in this area, large-scale data allows for the ability to track a multitude of firms over a period of time. In doing this, it is possible to model influences of resources on performance, performance on the acquisition of subsequent resources, one type of resource class on another, as well as autoregressive and cross-lagged effects which give greater confidence in assigning causal direction.

So although prior studies of resource accumulation have demonstrated that resource classes such as human and financial capital have performance implications, research examining resource accumulation suggests that designs have been limited in terms of taking into account changes over time. Furthermore, the field knows little in terms of optimal order of attainment of resources. Thus, the purpose of this study is to examine the dynamics of resource accumulation and their effect on performance and growth during new venture formation. In particular, I will examine how human capital and financial capital accumulate during the new venture formation process, and how resource accumulation affects, and is ultimately affected by, firm performance. This research examines the dynamics of resource accumulation specifically during the new venture formation process. It will test these relationships using a sample from the Kauffman

Firm Survey (KFS) from the NORC data enclave that provides the necessary data to test longitudinal proposals linking resource accumulation and firm performance.

This paper will introduce the theoretical background of the resource based view of the firm and describe the importance of resources within the context of new firms. It will draw upon past empirical work in this domain and illustrate how taking a dynamic approach advances the literature. I will then present my hypotheses and go into descriptions of the methodology used to test my proposed model along with a detailed description of the data source used. Lastly, I will describe the potential contributions that this work has within the strategic management and entrepreneurship literature.

CHAPTER 2: LITERATURE REVIEW

The accumulation of resources can be critical for most new ventures, and understandably so. This challenge holds substantial consequence for the venture's future, or lack thereof. So much of venture success hinges upon not only the amount of resources a firm has, but how they are effectively assembled and deployed, paving the way for a potential inimitable competitive advantage (Barney, 1992). Given the scarcity of resource endowments that so many emerging firms face (Zhao & Aram, 1995), understanding the implications for success is critical if a firm is to efficiently and expertly manage their resources at hand while recognizing the enhanced value of complementary resources over time. In the following sections, the significance of resources is expanded upon and vital forms of resource classes are defined. It is later hypothesized how these resources (specifically, founders'/owners' human capital and financial capital) dynamically impact performance and each other.

Theoretical Background

The Resource Based View

The strategy literature has shown extensive interest in understanding the significance of resources, and organizational scholars have suggested their importance for decades (e.g., Ansoff, 1965; Penrose, 1959; Selznick, 1957). The resource based view of the firm attempts to explicate how organizations cultivate and preserve competitive advantage using firm-specific resources and capabilities (Wernerfelt, 1984). This perspective views resources as assets or inputs to production that an organization owns or accesses (Helfat & Peteraf, 2003), whereas capabilities are abilities for using firm resources to ultimately achieve organizational goals (Amit & Schoemaker, 1993; Helfat & Lieberman, 2002). The basic premise of the RBV is that resources and capabilities amplify the efficiency and effectiveness of organizations (Barney, 1991).

Optimal resource accumulation is a key component of the resource based view of the firm. According to the RBV, a firm's sustainable competitive advantage does not result as a consequence of advantaged product-market positions, but rather from valuable and rare resources positioned to maintain these product-market positions (Barney, 1991). Such firm-specific resources cannot simply be purchased; they must be internally amassed over a period of time (Barney, 1986; Dierickx & Cool, 1989; Grant, 1991; Peteraf, 1993, Rumelt, 1984).

Competitive advantages are most valuable when they are sustainable. The length of time for the sustainability of a firm's competitive advantage is contingent upon the degree that these firm-specific resources are difficult to imitate or mimic (Pacheco-de-Almeida et al., 2008). Rivals' attempts to catch up with other firms by spending money to quickly develop a strategic resource are oftentimes ineffective because of time compression diseconomies, resource stickiness, causal ambiguity, or lack of complementary resources (Barney, 1991; Dierickx & Cool, 1989; Mishina, Pollock, & Porac, 2004; Reed & DeFillippi, 1990).

Time compression diseconomies imply that attempts to over-accelerate resource accumulation increases costs for the firm (Mansfield, 1971; Pacheco-de-Almeida & Zemsky, 2007; Scherer, 1967). Getting it faster costs money; in fact, some estimates of time compression diseconomies have suggested that a mere 1 percent reduction in the time used to develop a resource may raise development expenditures up to 2 percent (Graves, 1989). Resource accumulation may also decelerate due to resource stickiness (Mishina, Pollock, & Porac, 2004; Penrose, 1959). When resources are considered sticky, their unique or focused nature renders them inadequate if the task changes; they are seemingly stuck to a certain purpose or use and cannot easily be adapted to another. Therefore, firms are not able to leverage their existing resource bases and speedily transfer their resource slack to alternative uses, as the alteration of an

organization's collection of sticky resources usually takes substantial time (Pacheco-de-Almeida et al., 2008). Such barriers to imitation result in wide phases of resource accumulation, which in turn help to uphold the firm's competitive advantage (Cohen, Nelson, & Walsh, 2000; Lieberman & Montgomery, 1988, 1998). For a firm to amass resources in a one-time shot and be successful is not very feasible. Thus, the time firms take to internally amass firm-specific resources to pursue product-market strategies is fundamental to the domain of strategy and to the sustainability of an organization's competitive advantage.

Literature on the resource based view of the firm has been criticized for being overly focused on the "generic characteristics of rent generating resources" (Priem & Butler, 2001: 33). Possessing or having access to a valuable and rare resource is indispensable for competitive advantage, yet alone it is not sufficient (Sirmon, Gove, & Hitt, 2008). Such resources must be effectively packaged and deployed to exploit opportunities and/or mitigate threats in specific competitive engagements for a firm to achieve a competitive advantage that proves to be valuable for the firm as well as sustainable (Hansen, Perry, & Reece, 2004; Kor & Mahoney, 2005; Lavie, 2006; Mahoney, 1995; Majumdar, 1998). Competitive advantage is not realized simply by having resources, but rather, is the result of having more valuable resources (Sirmon et al., 2008; Peteraf & Barney, 2003). Thus, the resources must be valuable to the firm and its objectives. Mahoney and Pandian (1992) state that a firm generates rents not because it necessarily has access to better or more resources, but because the firm's distinctive competence enables it to more effectively use the resources which are on hand.

The environmental context in which an asset is utilized has influence on whether an asset truly is a resource for the firm (Barney, 1991). Firm resources do not function purely in isolation, rather their value is affected by the environments in which the firms operate (Katila & Shane,

2005; Priem & Butler, 2001). This is the contingent value of resources, and builds upon the environmental contingency approach in organizational theory (Lawrence & Lorsch, 1967; Pfeffer & Salancik, 1978).

Invested resources often provide a platform for the launch of strategies. From this perspective, strategies emerge from resources. Strategies, in turn, often bring about additional resources. Therefore, there may be value in the consideration of these two elements together (Bowman & Hurry, 1993). Resource allocation is a common theme in the domain of strategy, and the focus lies on the firm's efficient use of organizational resources (Bowman & Hurry, 1993). Efficient resource allocation may mean that the organization will invest to craft barriers to competition (Porter, 1980). Resources can operate as stimuli to experimentation, risk taking, and proactively making strategic choices. They are also deployed to foster the development of capabilities that make firms competitive and act as buffers during phases of economic constraint (George, 2005). Resources may provide security to an organization in the face of external threats that cannot be controlled. Firms utilize both tangible and intangible resources in the development and execution of their strategies (Hitt, Bierman, Shimizu, & Kochhar, 2001).

The above-average firm must hold resources that either lower unit costs, ceteris paribus, or that boost perceived use value; some resources may be capable of both (Bowman, 2001). Through swings in demand, resources can be redundant, and through poorly chosen management intercessions, can be ultimately destroyed (Bowman, 2001). Competition may be heightened in industries in which firms' resource accumulation is more gradual (Pacheco-de-Almeida, Henderson, & Cool, 2008).

Ultimately, the heart of the resource-based view is firms' capacity to write the "rules of the game" by building novel resources to service contemporary markets (Hamel & Prahalad,

1994; Sanchez et al., 1996). This is a core competence perspective, as it stretches the traditional view of the fit of a firm's capabilities to its environment, and in turn embraces the idea that firms may evolve to attain new competencies that have the power to shift the competitive environment in their favor (Collis, 1991; 1994; Hamel & Heene, 1994).

RBV in the Context of New Firms

The core of entrepreneurship is the establishment of new ventures (Hitt et al., 1999). The formation of an organization is an ever-changing process in which strategic actions including obtaining resources, developing products, hiring employees, and seeking funds are carried out at different points of time and in varying sequences (Gartner, 1985). At the crux of new venture creation is the thorny intersection of resources, capabilities, and opportunities (Thakur, 1998). Resources are necessary for the creation of the organizational form, though a basic structure is needed to garner these resources in the first place; thus, this is a dangerous stage in new venture creation (Thakur, 1988). During the process of organizational emergence, the entrepreneur accumulates resources and participates in actions which ultimately distinguish the firm as a separate entity from the founder who conceived of the initial idea (Reynolds & Miller, 1992; Carter et al., 1996). The results of Brush et al. (1998) suggest that all four properties of emerging organizations are needed for short-term firm survival. These include intentionality, resources, boundary, and exchange. However, resources early on may have a ripple effect that impacts the duration of the organization's life. During early periods of new venture development, it is the recognition and attainment of valuable resources, instead of resource deployment, that is most critical for the later success of the firm (Stevenson & Gumpert, 1985). Resources such as money, people, and skills, are committed to new ventures in expectation of a future return that outweighs

the cost of making that commitment. These investments can have positive or negative long-term repercussions for the survival and potential success of the new venture (Maritan, 2001).

Simply stated, new ventures need resources to grow (Westhead, 1995). The resources available to new firms are conditional upon founders' abilities to assemble resources and develop the appropriate strategies for them, as well as the broad accessibility of resources from the external environment (Grant, 1991). It is widely acknowledged that the path to business for an entrepreneur involves securing the right resources (Lessem, 1983). However, most founders begin their ventures without much capital available (Aldrich, 1999). Zhao and Aram state that "Almost by definition, small new firms lack the resources of many larger, established firms. The task of an infant firm, and a measure of its success, is to make a transition from being resource weak to being resource strong" (1995: 349).

The new venture is typically in a quandary in that it may have limited resources, but commonly also lacks the legitimacy necessary for accessing such resources, due to little or no record of past performance (Zimmerman & Zeitz, 2002). When there is a lack of external legitimacy, resource accumulation can be tricky, since initiating transactions without external endorsements is complicated for new firms (Singh et al., 1986). Gaining access to publicly held resources is less decisive for some new ventures than for others. For example, new ventures funded by their founders have access to financial resources of the founders and their associates or family/friends. On the other hand, new ventures instituted by established organizations have access to the human, intellectual, financial, and other resources of the established organization (Zimmerman & Zeitz, 2002). Many new firms do, in fact, start out small because of the terms on which resources are readily available to them at inception (Aldrich, 1999).

A number of scholars have suggested that resources are of greater importance in fledgling firms (Stinchcombe, 1965). Some have made the case that substantial resource endowments at a younger age may initiate greater investments in capability development, thereby improving a firm's prospects for survival (Hannan, 1998). However, young firms are inclined to be resource-constrained and endure a "liability of newness", making it less probable that they have the necessary experience to foresee their resource needs early on and for when they start to grow (George, 2005; Stinchcombe, 1965). Thus, young firms are less likely to make efficient use of resource slack than more established firms, as Sharfman et al. (1988) have argued that older firms have had opportunities to experiment with diverse types of resources and choose the ones that best match their demands. Older firms have more predictable needs and can better foresee slack deployment to improve performance. They have an idea of what to expect in terms of resource requirements and can make reasonable estimates and predictions, whereas a new firm may be less apt to know their needs.

The presence or absence of excess resources and their impact on performance carries substantive implications for scholarship in organizational theory (George, 2005). As the understanding of the relationship between resources and performance heightens, a longitudinal approach is needed to understand how they may, in fact, evolve over time. The measurement problem related with most resource accumulation processes is that they are unstructured, intangible, ever-changing, and seldom empirically observable (Hall, 1992; Itami, 1987; Villalonga, 2004). Resource accumulation lags have been under-examined in strategy research (Pacheco-de-Almeida et al., 2008), and few works directly discuss the impact of time lags on sustainable competitive advantage (Pacheco-de-Almeida et al., 2008; Dierickx & Cool, 1989). As mentioned previously, a longitudinal study that allows for the modeling of resource classes

and performance over time can help in the understanding of how the tenets of the resource based view operate dynamically.

Now that I have described how the RBV has been used to elucidate resource accumulation, I am going to look in further detail at research traditions that add further depth and are used to motivate my study. The literature of resource management and slack touches upon resource accumulation processes and is important to give consideration to, in order to understand how resources are brought together and used. In addition, I discuss growth, since resource accumulation has been discussed in the literature as a precursor affecting growth and survival. Finally, contextual factors are mentioned, as some researchers have looked at the influences of various contextual factors as moderating effects.

Resource Management

One approach to understanding the accumulation of resources is represented by work in resource management. Sirmon et al. (2007) describe resource management as the widespread process of structuring a firm's resource portfolio, bundling the resources to build relevant capabilities, and leveraging these capabilities to ultimately realize a competitive advantage. Structuring a resource portfolio entails creating the mix of the most valuable resources, and is the process of acquiring, accumulating, and deleting the resources in a firm's stock of available resources. Bundling refers to the processes used to combine resources in order to create capabilities for the firm. Leveraging involves processes used to configure and deploy capabilities specific to a particular market context. In operation, their synchronization can be achieved through continuous feedback and market monitoring (Sirmon et al., 2008). Competitive outcomes are not decided by an organization's broad portfolio of resources per se, but rather by the more focused set of resources that it eventually bundles and deploys (Sirmon et al., 2008).

This is important because resources are not static; they change, evolve, and become more or less valuable depending on other resources captured or lost by the firm. This gives even greater need for resources to be studied over time, so that the evolutionary nature can be captured.

When considering resource management, it is not just the bundling of resources that is significant, but also the amount. Katila & Shane (2005) examine when not having resources is actually valuable to innovation. This allows us to see that sometimes, not having enough resources can be a good thing. Conversely, having too many resources may not always lead to steady increases in performance. In fact, too many resources and a firm can fall prey to complacency. For a new firm, is it possible to have too much of a good thing?

Slack

Another literature to consider in discussing resources is that of slack, since it is not just the type of resources that holds importance, but the appropriate amount at the right time. Slack is defined by Nohria & Gulati (1996) as the collection of resources in an organization that is in excess of the minimum needed to produce a specified level of output. Slack involves potentially utilizable resources that can be diverted or redeployed for the achievement of organizational goals. Slack resources may fluctuate in type (e.g., human or financial capital) and form (e.g., discretionary or nondiscretionary) over time (George 2005). Studies have used a variety of different forms of financial slack as a predictor of innovation (Nohria & Gulati, 1996), risk taking (Wiseman & Bromiley, 1996), and performance (Bromiley, 1991; Tan & Peng, 2003). Some researchers have noted that explanations for the influence of different forms of slack on performance do not convey a priori arguments but tend to present post hoc rationalizations instead (Deephouse & Wiseman, 2000; Greve, 2003).

Researchers have reasoned that slack loosens internal controls and generates surplus that can be redirected toward projects with ambiguous outcomes, thereby cultivating a climate for innovation (George, 2005). Evidence indicates a positive effect of slack on the innovation and performance of public firms (Bromiley, 1991; Damanpour, 1987; Greve, 2003), and this branches from the behavioral theory of the firm (see Cyert & March, 1963; March 1994). The resource constraints literature also helps to explain slack (Baker & Nelson, 2005; Mosakowski, 2002). Alternatively, according to studies in this literature, firms with fewer resources are likely to leverage them more efficiently (Baker & Nelson, 2005; Starr & Macmillan, 1990) and may be more creative with what little they have. The claim is that resource limitations modify the manner by which resources are acquired and exhausted, forcing managers to enhance firm allocative efficiency (George, 2005).

Slack resources help firms with adaptation to multifaceted competitive landscapes (Levinthal, 1997), thereby impacting firm performance (George, 2005). Adequate or excess resource endowments provide flexibility and sometimes more time for a firm in their decision for a course of action when striving to adapt to its environment (Thompson, 1967). Slack resources may assist in buffering firms from external environmental shocks and can influence the enactment of strategies (George, 2005). Firms with greater slack resource endowments are more likely to have flexibility in their responses to competitor strategies, thereby shaping performance (George, 2005).

Slack is used to steady a firm's operations by absorbing excess resources during periods of growth and by enabling firms to uphold their goals and commitments during times of stress or uncertainty (Cyert and March, 1963; Levinthal & March, 1981). Slack offers that extra cushion of resources and impacts performance if used effectively (George, 2005).

However, there does seem to be the incidence of "too much of a good thing", as performance declines are likely to be seen at higher levels of slack (George, 2005). Slack may insulate a firm from exogenous shocks (Thompson, 1967), which can provoke managerial complacency or unreasonable passiveness. Smith, Grimm, Gannon, and Chen (1991) found a negative relationship between slack and the probability of reacting to competitor actions, as managerial responses were attenuated because of the "buffer" of extra resources. When slack is high, managers may deny that solutions exist and become inflexible in their strategies, which negatively impact performance (Staw, Sandelands, & Dutton, 1981). Large resource reserves might also cause a firm to be less driven to embark upon tasks and projects through experimentation, which may actually decrease performance because new entrepreneurial opportunities are not fully exploited. Another possibility is that managers may become overly optimistic and employ poorly chosen strategic actions (Cooper, Dunkelberg, & Woo, 1988; de Meza & Southey, 1996) that decrease performance (Bateman & Zeithaml, 1989). Biases liable to arise at high levels of slack may include the planning fallacy (Kahneman & Lovallo, 1994) and escalation of commitment (Ross & Shaw, 1993). If managers sense that their levels of slack surpass those of their competitors, they are likely to be more optimistic regarding courses of action and may inadvertently implement strategic actions that decrease performance (George, 2005). In complex environments when slack is present, managers may perceive it as a sort of guarantee of firm survival and execute "satisficing" rather than performance-maximizing strategies (March, 1994; Sharfman et al., 1988).

Literature of resource constraints suggests that firms with access to fewer resources than what their operational demands require are actually likely to be more efficient as they uncover means to leverage and stretch the few resources they have available to them (George, 2005).

Economic arguments of X-efficiency (Leibenstein, 1980) are in agreement with the resource constraints literature. Leibenstein suggested that firms are inefficient in the deployment of resources, so if demands for resources exceed availability, firms are likely to be more efficient in the deployment of resources to enhance their performance while conserving as much of their existing resource base as possible.

Work by Nohria & Gulati (1996) suggests that there is an inverse-U shaped relationship between slack and innovation in organizations. Both too much and too little may be disadvantageous to a firm's innovation. Slack enhances experimentation but also diminishes restraint when it comes to innovative projects, resulting in the curvilinear relationship. A curvilinear relationship may also be present when considering slack and firm performance. George's (2005) study of privately held firms highlights the notion that resource availability in excess of resource demand is unlikely to enhance performance. Although his results support the idea of resource constraints having a positive performance effect, "further exploration using samples of entrepreneurial high-growth firms is necessary before conclusions about the nature and dynamism of this relationship can be drawn". Thus, it is obvious that having the right amount of resources plays a role in organizational outcomes.

Growth

A basic concept in the RBV is that a firm must recurrently develop its resource bases and capabilities to take advantage of ever-evolving conditions (Barney, 1991; Kraatz & Zajac, 1997; Powell, 1992). The world is not static, and neither is a firm's operating environment, thus the resources of a firm must evolve in a parallel fashion. Optimal growth entails the balance between the exploitation of current resource positions and the cultivation of new resource positions for a firm continually over time (Chatterjee & Wernerfelt, 1991; Ghemawat & Costa, 1993; Hansen &

Wernerfelt, 1989; Itami & Numagami, 1992; Rubin, 1973). It is imperative for a firm to build new resource positions if they are to realize sustained growth (Pettus, 2001). When a firm's unused productive resources are joined with shifting managerial knowledge, inimitable opportunities for growth are created (Castanias & Helfat, 1991; Cohen & Levinthal, 1990; Henderson, 1994; Henderson & Cockburn, 1994; Teece, Pisano, & Shuen, 1997). By having resource bases that change and evolve, and pairing these resources with ones that are complementary, the mimicking of the firm's strategic growth process entirely will be impossible. Having the exact set of resources bundled at the exact time is not replicable due to time lags and the specialized nature of certain resource classes (i.e., human capital).

Recently, scholars have begun to focus on how firms first develop firm-specific resources and then revamp these accordingly in response to alterations in their business environment (Henderson, 1994; Iansiti & Clark, 1994; Teece et al., 1997). When a firm has mined the maximum value possible from its existing resource base, then it must develop dynamic capabilities to sustain growth in a changing environment (Pettus, 2001).

The growth potential for growth in any firm is dependent upon the resource base it builds in a path-dependant process (Arthur, 1994). Pettus (2001) empirically demonstrates that firms pursuing a specific resource-based development path undergo growth processes that are greater than firms that do not adhere to such a development pattern. Ansoff (1957) was one of the primary scholars to speak to sequential stages of firm growth, identifying phases for firms to pursue to spawn growth.

Firms experiencing high growth rates have augmented existing competencies with new ones sequentially, often during extended time periods (Hall, 1992, 1993; Mosakowski, 1993). Although many scholars concur that resource advantages stem from a multifaceted, path-

dependent process (Barney & Zajac, 1994; Dierickx & Cool, 1989), there is not a concrete explanation or prediction of this growth path (Pettus, 2001). In fact, investigations of these sequential development progressions of a firm's resource base dynamically are lacking in the literature.

Such resource based sequencing is imperative for attaining sustainable growth (Heene & Sanchez, 1997; Montgomery, 1995). Organizations need to constantly upgrade and improve their resource bases if they are to sustain competitive advantage and growth (Argyris, 1996; Robins & Wiersema, 1995). By utilizing a sequential development of resources and capabilities, a firm's advantage is ultimately made inimitable (Barney, 1991; Lado, Boyd, & Hanlon, 1997). Resources built over time in a path-dependant process renders them inextricably embedded within a firm (Pettus, 2001). This facet of resource development makes it theoretically impossible for a firm's competitors to completely imitate (Dierickx & Cool, 1988; Reed & DeFillippi, 1990).

The emergence of a new business can be characterized as a sequential process in which preliminary exploration is followed by feedback on performance and some degree of fit between a new venture's key success factors and a firm's capabilities. The following outcome can either be one of expansion or of exit, depending upon whether the firm is triumphant in advancing the capabilities necessary to establish and sustain a competitive advantage in their environment (Pettus, 2001). Some new ventures do not pursue growth, but, rather, seek a stage of sustainability (e.g., Birch, 1987; Hoy, McDougall, & Dsouza, 1992). Even so, such ventures will still need access to resources to continue operations (Zimmerman & Zeitz, 2002) and keep stable in the position at which they desire to be.

Zimmerman & Zeitz (2002) propose that the greater the quantity of a new venture's resources, the more growth it can achieve. However, there are some limits to the rate of firm expansion (Penrose, 1959). Due to the Penrose effect (Penrose, 1959; Marris, 1964; Shen, 1970; Slater, 1980), the availability of inherited managers with relevant experience and know-how limits the amount of expansion in a period of time. Little is known about the amount of resources that is most ideal for growth. George (2005) makes an important point in that, "The implications of slack for growth in entrepreneurial firms is an important issue that needs to be addressed methodically".

Firm Resources and Performance

As stated by Grant (2002), a firm's most critical resources are those which are not only durable, but difficult to identify and understand, imperfectly transferable, not easily replicated, and those in which the firm possesses clear ownership and control. The specific types of resources focused on for the purposes of this study are founders'/owners' human capital and financial capital.

Capital

There are many types of capital, as described by the management literature. For the purposes of my study, I focus on the firm's human capital that founders/owners bring to the venture, as well as the finances they bring because these are considered by organizational scholars to be the primary resources for an organization. Considering that the firms in my study are new, and are of a variety of sizes/industries, these forms of capital are ones of importance to most firms regardless of the type of business they are engaging in.

Organizational capital, human capital, and social capital cooperatively form what is considered by some scholars as intellectual capital (Subramaniam & Youndt, 2005).

Organizational capital is the institutionalized knowledge and codified experience inherent within and utilized through databases, patents, manuals, structures, systems, and processes (Youndt et al., 2004). Organizational capital is codified, and its creation, preservation, and enhancement arise from structured, repetitive activities (Nelson & Winter, 1982). Human capital is tangled with social capital (Coleman, 1988; Lester et al., 2008) and for the purposes of the present study, this aspect of intellectual capital is focused upon. In addition, financial capital is analyzed and relationships are predicted between them.

Human Capital

Human resources have long been perceived as being essential to a venture's survival and growth capabilities (Florin et al., 2003). A venture's human resources act as a surrogate display of its competence and credibility when performance measures are lacking, as is often the case in new ventures (Pennings, Lee, & Witteloostuijn, 1998). They can also augment a venture's dynamic capabilities by being able to problem-solve (Snell & Dean, 1992), respond to environmental contingencies (Youndt, Snell, Dean, & Lepak, 1996), or by recognizing tactics for stretching financial resources which may be limited (Chandler & Hanks, 1998).

Human capital has been referred to as "walking assets" (Spar, 1997), as it refers to the aggregate knowledge, skills, abilities, and other competencies of a firm's labor force (Ployhart et al., 2006; Becker, 1964; Coleman, 1988). Every employee at an organization brings some amount (however small) of human capital to the organization. For most organizations, human capital is a primary resource (Sirmon, Gove, & Hitt, 2008), and therefore the creation and management of human capital is typically a critical determinant of sustained competitive advantage (Barney, 1991; Becker, 1964).

Central to human capital cost-benefit analysis is the distinction between general and specific human capital (Becker, 1993). General human capital is valuable in a multitude of locations and situations, but specific human capital has value only within a specific area (Becker, 1962). So an owner of a new venture may possess general human capital (good communication skills) as well as specific human capital (experience in the same industry as the current venture). Human capital may also be firm-specific or industry-specific. Firm-specific human capital may include age and tenure, whereas industry-specific human capital may involve relatedness (i.e., availability of that type of human capital within a relevant labor market) (Buchholtz, Ribbens, & Houle, 2003).

Attributes of an employee such as industry experience and professional degrees are two indicators of industry-specific human capital (Pennings et al., 1998). All else being equal, businesses whose professionals have a high level of human capital are less likely than other firms to dissolve due to the ability to attract new clients. However, the effect of aging needs to be considered, measured by industry or firm tenure. Very high levels of human capital (and age) will generate a greater propensity toward firm dissolution. A person with high human capital has more available options. In the entrepreneurship literature, a person with high human capital may be less likely to start a business because with their human capital attributes, attractive employment options are easily available to them, and thus there is a high opportunity cost for starting the venture and sacrificing those potential employment opportunities.

Also influencing the relative value of human capital is ownership. In professional service firms, the owners' human capital is more relevant to the firm's profit potential than that of the employees. One reason may be due to ownership ties, thus decreasing those inducements to leave a firm. Owners make financial as well as non-financial investments, and often have substantial

"exit barriers" that are greater than those of associates who have less at stake (Pennings et al., 1998). Higher founder or CEO human capital has been linked to enhanced organizational performance (Boone, DuBrabander, & Van Witteloostuijn, 1996). Hitt et al. (2001) showed that human capital was important for strategy, in that it was positively related to firm performance. Recent research on human capital has furthered this idea (Hitt et al., 2001; Hitt, Bierman, Uhlenbruck, & Shimizu, 2006) by showing that this form of capital had a positive relationship with the relationship with the performance of the venture and strategic initiatives such as internationalization.

If a talented employee exits his or her current firm to join a new one, this transfer increases the human capital of the employee's new organization while simultaneously decreasing the human capital of the individual's former employer (Somaya, Williamson, & Lorinkova, 2008). A powerful framework for understanding the creation of human capital is the attraction-selection-attrition (ASA) model (Schneider, 1987). According to the ASA model, through the process of attracting, selecting, and retaining individuals, an organization increasingly moves toward homogeneity, or similarity, in knowledge, skills, abilities, and other relevant competencies. This is the basis of the so-called Homogeneity Hypothesis, which asserts that members of the same organization should be more similar in shared personality than members of different organizations (Ployhart et al., 2006).

The more idiosyncratic a type of capital is, the more substantial its role on firm survival. Similarly, intangible capital inherent to partners is more "sticky" than that linked with lower-level employees (Pennings, Lee, & Van Witteloostuijn, 1998), meaning that it is more likely to stay with the firm and not as easily transferable. Thus, the human capital of owners is of substantial consequence.

Though Hambrick & Mason's (1984) upper echelons theory suggests that executives' backgrounds will impact organizations by some means, the resource and capability perspectives enable us to forsee when such backgrounds can potentially be converted into competitive advantage (Carpenter, Sanders, & Gregersen, 2001). Superior managerial skills seem to satisfy the criteria for delivering a sustainable competitive advantage (Castanias & Helfat, 1991). The view that managerial skills are important is traditional in the strategy domain (Andrews, 1971). Given the complications of managerial work (Mintzberg, 1973), the numerous leadership skills that must arise (Yukl, 1998), and the need to build up industry- and firm-specific knowledge to influence decision making (Thomas, Clark, & Gioia, 1993), superior managerial capabilities also materialize as rare and difficult to imitate (Combs & Skill, 2003). This is why my focus for human capital is that of the founders and owners.

According to Burt, 1997: "While human capital is surely necessary for success, it is useless without the social capital of opportunities in which to apply it", therefore, "Managers with more social capital get higher returns to their human capital". Social capital refers to the sum of actual and potential resources from the web of relationships cultivated by that individual over time (Nahapiet & Ghoshal, 1998). It involves the knowledge embedded within, available through, and utilized by interactions among individuals and their networks of interrelationships (Nahapiet & Ghoshal, 1998). "Social capital" has been found to directly shape venture performance by giving entrepreneurs access to germane information (Birley, 1985), needed financial capital (Batjargal, 2003), emotional support (Bruderl & Priesendorfer, 1998), legitimacy (Stuart, Hoang, & Hybels, 1999), and competitive capabilities (McEvily & Zaheer, 1999).

Although some scholars are able to empirically distinguish between human and social capital (e.g., Florin et al., 2003), others recognize that the two are conceptually and empirically tricky to separate (Coleman, 1988; Nahapiet & Ghoshal, 1998), and do not attempt to isolate the effect of one from the other (Lester et al, 2008). The same approach is taken with the present analysis as human and social capital are difficult to untangle and conceptually human capital is more encompassing for the purposes of the research at hand.

The depth of human/social capital refers to the intensity of expertise, knowledge, skills, and social networks. Every employee carries within them a distinctive array of attributes and resources to a firm (Kosnik, 1990), and the depth of these attributes and resources undoubtedly affects the value of each individual to the firm (Lester et al., 2008). In the context of new firms, the founders with the deepest experience and most influential networks will therefore be the most valuable to their organizations (Lester et al., 2008).

Financial Capital

It is true that entrepreneurs invest time, but many also invest relatively large sums of money to get their venture off and running. Just as devoting substantial time into the venture is considered a worthwhile investment, likewise, the more money put into the business, the better the performance is likely to be (Levesque & MacCrimmon, 1998). Financial capital involves funds used to start and operate the business. It is common sense to most entrepreneurs that it takes money for a new venture to grow and prosper. For example, the accessibility of financial resources impacts innovation because having capital available enables an innovator to follow the full path of developing the new product before selling it to others (Katila & Shane, 2005). Financial constraints are considered by some to be a basic barrier for entrepreneurship (Aghion, Fally, & Scarpetta, 2007). A frequent theme in prior work is the relationship between financial

distress and failed firms, as failure has been attributed to inadequate financial planning (Gaskill, Van Auken, & Manning, 1993; Lussier, 1995). Similarly, in an earlier study, Boardman, Bartley, and Ratliff (1981) found that rapidly growing firms often fail because of the financial stress of this growth. In fact, a survey by Peterson, Kozmetsky, and Ridgway (1983), which asked existing firms why businesses failed, found that lack of financial-related factors were highly cited. The relationship between financial distress and bankruptcy has been long recognized (Altman, 1968; Beaver, 1968). Without access to financial capital, a fledgling firm has a tough road ahead.

According to Montgomery, Johnson, and Faisal (2005), financial capital makes it easier for the entrepreneur to start a business and to keep it going, and may lead to higher revenues. Consistent with the work of Holtz-Eakin, Penrod, and Rosen (1994), they find support for financial capital having a positive and significant impact on the probability that a firm stays in business. Cooper, Gimeno-Gascon, and Woo (1994) found a positive relationship between early capital investments in the life of the firm and the growth and survival of new firms. In fact, a review article (Cooper & Gimeno-Gascon, 1992) reports that six of eight studies looking at this found a relationship between higher initial financial capital and success. Earlier work by (Evans & Jovanovic (1989) pointed to the positive effect of financial resources on revenue, and such a relationship seems likely today. Financial resources do play a role in firm performance.

Practitioner-oriented publications advise entrepreneurs that to get their firm up and running, financial resources to some extent are needed, but that the amount depends upon the type of business that they plan to run (ConsumerReports, 2008). Regardless of the type, there is still usually a financial capital investment to be made which may be sizeable in the eyes of the entrepreneur. Entrepreneurs frequently lack the resources necessary to self-finance their start-up

and initial operational costs (Janney & Folta, 2006). As described by Shane & Venkataraman (2000), although the entrepreneur may be full of ideas they are often low on cash. Every entrepreneur planning for a new venture deals with the predicament of determining just how much money is necessary to start their business. More often than not, they underestimate (Stancill, 1984). Aghion, Fally, and Scarpetta (2007) find that finance matters most for the entry of smaller firms, especially in industries more dependent upon external finance. Their results imply that financial capital enables small firms to compete with larger firms in a more balanced fashion. Higher levels of financial capital gives small firms a chance to take advantage of growth opportunities, especially in rising industries where larger firms would be leaders otherwise.

According to Hamilton and Fox (1998), many firms will never raise all the funding they would like. Given this, there is a degree of financial pressure felt by entrepreneurs. As mentioned by Benedetti (2009), "being your own boss is great until the bills start rolling in", since financial capital investments can seem quite substantial for even small businesses. Because new firms often lack the needed capital to finance innovation, they must elicit resources from external sources to obtain equipment and to make hires (Schoonhoven et al., 1990). But beyond the question of how much money is needed, there are concerns as to whether it is better to have human capital prior to financial capital, and if early performance affects the garnering of later financial capital. Hence, we may question the source of financial capital and the relationship to venture performance.

Financial resources involve the level of financial assets of the firm (Robinson & McDougall, 2001). Initial levels of financial capital may vary according to the initial strategy that is to be pursued. A firm's access to financial capital can affect the venture's performance by providing a cushion against environmental shocks and allowing for the utilization of more

unique and less imitable capital-intensive strategies (Cooper, Gimeno-Gascon, & Woo, 1994). Financial assets may be acquired through the intercession of superior human capital. Though some researchers (e.g., Fried & Hisrich, 1994; MacMillan, Zemann, & Subbanarasimha, 1987; Tyebjee & Bruno, 1984) have found that the relationship between a venture's human resource base and its ability to acquire funding is positive, others have reported that only certain attributes are, such as industry experience (Hall & Hofer, 1993; Zacharakis & Meyer, 2000) and education (Cooper, Gimeno-Gascon, & Woo, 1994).

Financial capital may impact performance through both direct and indirect effects. Direct effects include the ability to undertake more lofty strategies, alter courses of actions, buy time, and meet the financing demands forced by growth. Indirect effects, such as that of financial capital accumulation, may send a message of legitimacy or better planning (Cooper, Gimeno-Gascon, & Woo, 1994). It is challenging for many new businesses to emerge because of the need to build up reputation, but expenditures can provide this visibility and develop the organization's reputation (Levesque & MacCrimmon, 1998). This form of capital may also serve as a proxy for organizational skills.

Just how important financial capital is to a new venture has been questioned by a number of entrepreneurship scholars. Davidsson (2006) makes the claim that while access to financial capital may be tremendously critical for certain types of high-potential ventures, it is not the sole factor that destroys the most start-up attempts. Many people say you need money to start a business, but others believe that it is not necessarily so (Lechter, 2006). An entrepreneur may form the venture, contribute the idea and their services and skills in return for an equity position and find other stakeholders to supply cash or resources for their percentages of ownership (Lechter, 2006). As Aldrich notes (1999), few entrepreneurs have access to substantial capital, as

many begin with nothing but their ideas and intentions. However, many are able to find ways around the obstacles with support from personal networks, etc.

Often, the savings of founders are the dominant source of initial financial capital (Hamilton & Fox, 1998), but the involvement of financial institutions plays a role. For many entrepreneurs, using personal assets is ideal. Money that is held in a bank account, money-market fund, or brokerage account is easily accessible, and the entrepreneur doesn't have to pay any interest or sizeable fees to obtain it (ConsumerReports.org, 2008). Given the pecking order theory (Myers, 1984), financing preferences at the beginning of business formation are constrained toward owners' equity & personal savings, but then establish a preference for external debt over equity.

A prime barrier to the entry and the early growth of firms includes the costs of constructing the new firm and later, the costs stimulated by the R&D expenditures and/or the marketing of an early-stage incumbent firm (Aghion, Fally, & Scarpetta, 2007). Therefore, financial capital is not only an important issue to venture founding, but continues to hold relevance as the firm attempts early growth. Although a decent number of start-ups ultimately fail, those that have more money saved up are more durable and have greater staying power and potential for growth. According to Tam and Buckman (2007), many of these may continue on long enough to become profitable small businesses, even if they never accomplish the stratospheric heights of, say, a Google Inc. Just as a squirrel will hide a stash of acorns for the long winter, new firms are making sure there is a cushion for a "tough season" ahead.

An example is that of P.J.'s Lager House (Benedetti, 2009). Entrepreneur P.J. Ryder started P.J.'s Lager House in Detroit. He funded his venture with inheritances, a home equity loan (to make the down payment on location), and working capital came from credit cards along

with borrowing from his Roth IRAs. He has also been taking money from personal savings accounts, and his wife's income has been helping too. His first two years were unprofitable, but he was able to keep his financial cushion and therefore keep afloat, even during unexpected contingencies. Now, in 2010, it looks like he will finally be making a profit.

Start-ups that are more prudent with their financial resources discover that their cash cushion gives them more freedom to tweak their products and alter their business model, as well as having financial resources available for those unexpected contingencies. Financial capital can potentially buy time, so the entrepreneur can learn or overcome their problems (Cooper, Gimeno-Gascon, & Woo, 1994). Tam and Buckman (2007) describe how nowadays start-ups are most apt to hire only a small number of staffers, hoard their cash, and find inexpensive ways to garner attention such as discount web advertising and reliance on word-of-mouth. They contrast this to trends of new start-ups at the end of the last century, when dot-coms typically staffed up quickly with droves of new recruits and were known for excessive marketing, as exemplified by Pets.com Inc., which burned through $110 million in 1999 & 2000, noticeably including $25 million for advertising in venues like the Super Bowl. While many start-ups are currently raising less funding, they are spending wisely and making the money last longer. It seems that there is a better understanding of the criticality of financial resources, and new firms want to be smart in utilizing them for the most advantageous outcomes for the firm.

Research Question and Hypotheses

When entrepreneurial firms initiate high-growth strategies, they face the challenge of accumulating supporting resources from markets in which they have yet to prove their legitimacy (Brush, Greene, & Hart, 2001). Research on this challenge has focused on the independent effects of human, social, or financial capital but has lacked a theory to explain how these

different types of resources might act in a collective manner (Florin, Lubatkin, & Schulze, 2003). Shane and Venkataraman (2000) as well as Gartner (1988) have noted that this omission may have caused underspecification in models of venture creation and growth. Resources do not operate singly, so why does the literature give little attention to the question of how resources impact one another over time, and also of how performance affects resource acquisition in subsequent periods?

Considering the different types of resources, it is only logical to wonder how the order of attainment may influence the rate of growth or decline in new firms. Resource-based sequencing is key in accomplishing sustainable growth (Heene & Sanchez, 1997; Montgomery, 1995), as firms must continually improve their resources if they hope to maintain competitive advantage and grow (Argyris, 1996; Robins & Wiersema, 1995). This sequential development and accumulation of resources can construct a competitive advantage for a firm that is ultimately inimitable (Barney, 1991; Lado, Boyd, & Hanlon, 1997) because they are intertwined within the firm (Pettus, 2001), thus making the prospect of complete imitation by competitors infeasible (Reed & DeFillippi, 1990). But what type of resource is best to have first?

The goal with my research at hand is to understand how the resource accumulation process unfurls and what resources are important to have before others. Is it better for a firm to have human capital before financial capital? Or is the reverse true? Having insight into this issue can help real-world entrepreneurs give priority to those resources that ultimately beget others. I want to know, how does the resource accumulation process unfold within the context of new firms? This encompasses the use of a dynamic perspective, which can offer indicators of these constructs over multiple time points. Understanding this issue involves using latent constructs of the founders'/owners' human capital, financial capital, and that of performance. These constructs

are not analyzed statically, but rather their growth or decline is assessed relative to other constructs. Thus, it is possible to see how the trajectory of one construct affects the trajectory of another. In doing this, questions can be asked regarding how resources affect performance, how early performance affects resources, and how different resource classes affect one another over time. I hope to contribute to the strategy and entrepreneurship literature by building off of the RBV research tradition and add to the discussion on resources by offering a more dynamic view.

Hypotheses

There is an acknowledged need to investigate how the entrepreneurial process truly unfolds (Shane, 2006). However, much of the prior research has looked at relationships of resources and performance at a moment in time. Organizations are not static, but rather, "processual in nature…" (Mackenzie, 2004: 351). Thus, it is vital that research endeavors in this field have the ability to analyze resources in a way that is not a single snapshot, but rather an evolution.

The resources managed by a firm are very complex and interdependent (Barney, 1991). Many resources, taken by themselves or in combination with others, may bear a sustained competitive advantage. Although managers may have various hypotheses about which resources engender advantages for their firms, it is not often possible to rigorously test these hypotheses.

Human capital resources consist of the training, experience, judgment, intelligence, relationships, and insight of individual managers and workers within a firm (Barney, 1991). These are especially critical as strategic resources for entrepreneurs, especially privately held knowledge that acts as a basic source of advantage in competitive environments (Connor & Prahalad, 1996). Some literature suggests that entrepreneurs, as a result of their previous experiences, carry specific sets of knowledge that can be valuable to other new ventures they

embark upon (Fiet, 1996; Hills, Shrader, & Lumpkin, 1999; Ronstadt, 1988; Shane, 2000; 2003; Shook et al., 2003). Thus, we can see the relevance for founders'/owners' human capital in new and emerging firms.

Florin et al. (2003) state that although some researchers have found that the relationship between the quality of a venture's human resource base and its ability to acquire funding is positive, others have reported that only certain characteristics, such as industry experience (Hall & Hofer, 1993; Zacharakis & Meyer, 2000) and education (Cooper, Gimeno-Gascon, & Woo, 1994), are important. Support for the effect of a founding team's prior experience (Gartner, Starr, & Bhat, 1998) is also mixed, even for start –ups founded by "serial entrepreneurs" (Alsos & Kolvereid, 1998).

Higher founder or CEO human capital has been shown to enhance organizational performance (Boone, DuBrabander, & Van Witteloostuijn, 1996). Hitt et al. (2001) demonstrated that human capital was important for strategy, in that it was positively related to firm performance. Other things being equal, firms whose professionals echo high levels of human capital are less likely to dissolve than other firms because of their ability to attract new clients and involve key stakeholders (Pennings et al., 1998). Thus, I propose for founders'/owners' human capital in new firms:

> **H_1**: *As founders'/owners' human capital increases over time, firm performance will increase*

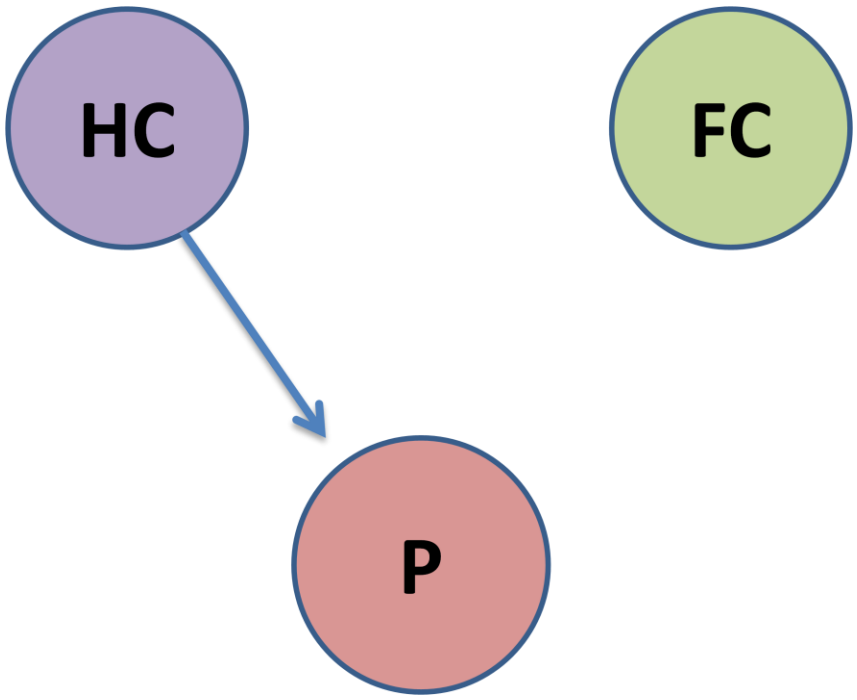

Figure 1: Simple model of Hypothesis 1

As founders/owners' human capital increases over time, firm performance will increase

Similarly, resources that are financial in nature have been shown to carry performance implications. Having access to money is extremely important to new ventures, as financial capital has been tied to new firm survival and growth (Cooper, Gimeno-Gascon, & Woo, 1994). As mentioned previously, access to money can impact growth. It also provides firms with a means to purchase other resources. Furthermore, it serves as a buffer in tough times or periods of uncertainty. Like human capital, financial capital is similarly hypothesized to affect performance in a way such that as financial capital increases as time progresses, performance will increase more dramatically.

H_2: *As financial capital increases over time, firm performance will increase*

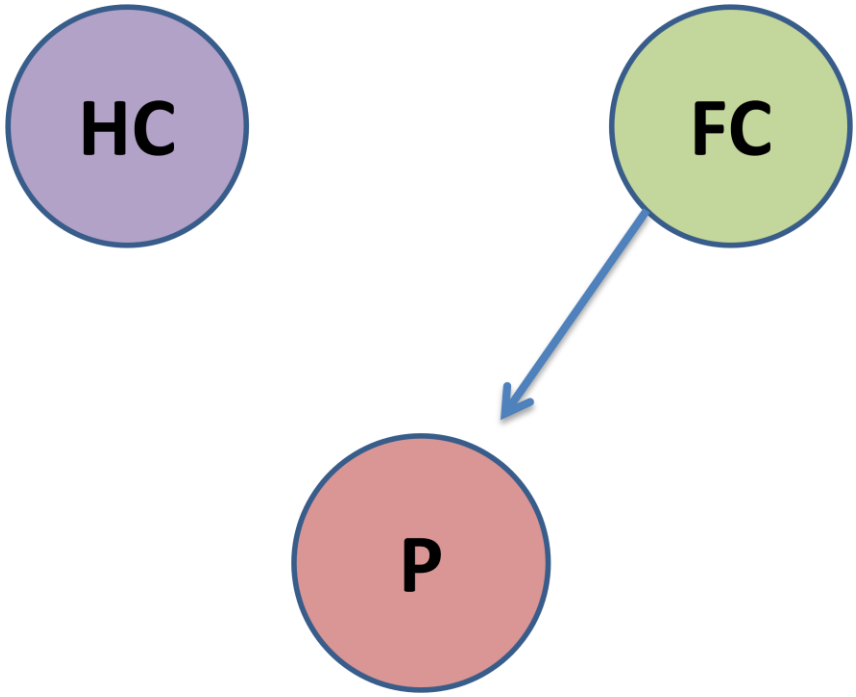

Figure 2: Simple model of Hypothesis 2

As financial capital increases over time, firm performance will increase

It is important to note that given the prior arguments on slack, an inverse-U shaped curve is expected for the relationships between founders'/owners' human capital and performance as well as financial capital and performance. However, given that the current issue of the KFS has only four time points spanning only a few years, I believe that it is too early for this pattern to be observed. Thus, while it is believed that with the current amount of waves, relationships of growth will be noticed, over time this will convert to an inverse-U since too much capital (or excess slack) will not result in higher performance, given earlier arguments made in the literature on slack.

As mentioned previously, the arrangement of resources can be key. Researchers may have underestimated the performance effect of human resources by examining only the direct relationships and not those emanating from the interaction of human resources with social resources (Florin et al., 2003). The resource-based and dynamic-capability perspectives suggest that resources that are intangible, such as those embedded in human capital, are most likely to "generate rents" when they are "bundled" with others in a complementary fashion which will prove most valuable to the firm (Barney, 1992; Teece et al., 1997). Indeed, "there is an interaction between the two kinds of resources of a firm- its personnel and material resources – which affects the productive services available from each" (Penrose, 1959: 76).

Building off of work on legitimacy in new firms, it is hypothesized that founders'/owners' human capital will beget financial capital; mainly, that having a competent founder with established networks can send a symbol of legitimacy which can aid in the acquisition of financial resources. Human capital is beneficial in gaining financial capital as well as other key resources (Bush, Greene, & Hart, 2001). Also, founders/owners with high human capital can utilize their abilities to come up with creative ways to accumulate financial resources. Knowledge-based resources are employed to transform other resources (Hitt, Bierman, Shimizu, & Kochhar, 2001). I believe that given this, founders'/owners' human capital will impact financial capital at later stages.

> **H_3**: *The rate of change in founders'/owners' human capital will explain the rate of change in financial capital in later time periods*

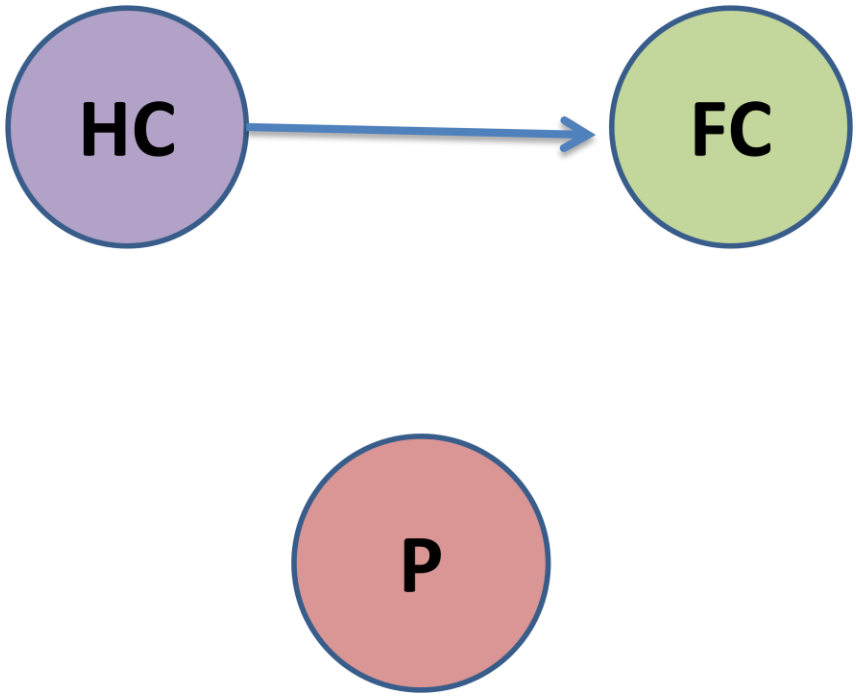

Figure 3: Simple model of Hypothesis 3

The rate of change in founders'/owners' human capital will explain the rate of change in financial capital

One of the advantages of having the number of time points available in the KFS is that reverse effects may be modeled. Thus, while Hypotheses 1 and 2 relate capital to performance, it is believed that strong performance in turn impacts the acquisition of new resources. The question of early performance being associated with resource acquisition has not been looked at. However, it is understood in the real-world that doing well in business gives you resource advantages. Even BusinessDictionary.com (2010) states that profits (a performance measure) are able to furnish resources for investing in future operations. A successful firm is a more attractive one, and will be able to attain resources easier. If a firm is growing, it is likely to have more resource needs to sustain the organization and remain competitive. Alternatively, if a business is

performing poorly, resources will be hard to come by. This is because existing resource bases will eventually deplete, and credibility will diminish. Thus financial capital and human capital will be lowered. I believe that early performance does impact resources, and that this is the case for both types of resource classes.

H_4: *As firm performance increases over time, human capital will increase*

H_5: *As firm performance increases over time, financial capital will increase*

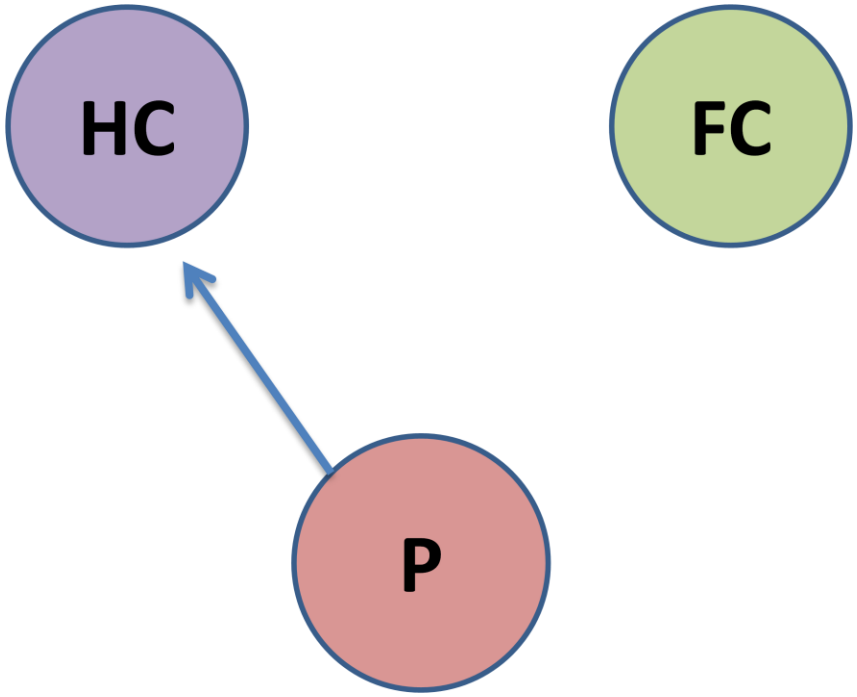

Figure 4: Simple model of Hypothesis 4

As firm performance increases over time, human capital will increase

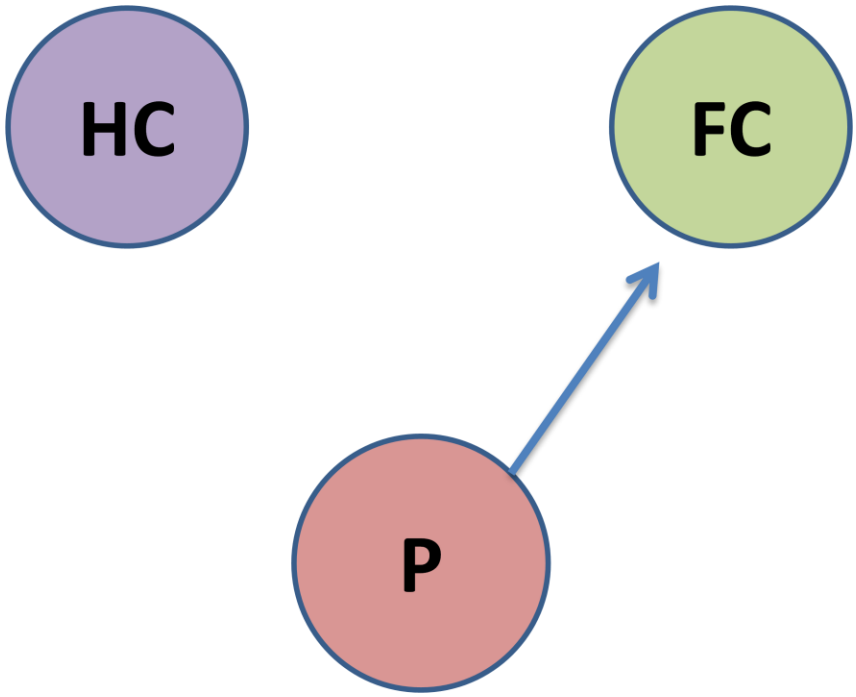

Figure 5: Simple model of Hypothesis 5

As firm performance increases over time, financial capital will increase

Also, it is of interest to examine cross-lagged effects. This application sheds light on the direction of influence between two variables that are associated over time (Robins, Fraley, & Krueger, 2007). In these types of models, two constructs are measured at two or more points in time, the question being whether there is a causal relation between the two, and if so, which construct is causal and which is resultant of the other. In addition to estimating autoregressive effects (the effect of the construct on itself at a later time), the effect of each construct on the other construct at a later time is examined. Such latter effects are the focal components of the model and are the cross-lagged paths. Structural equation modeling is particularly well suited for this type of analysis. The ability to model both constructs on all occasions as latent variables is important because it ensures that no path coefficients are attenuated due to measurement error. It

is hypothesized that there are cross-lagged effects with both founders'/owners' human capital was well as financial capital on performance.

> **H_6:** *There will be cross-lagged effect of founders'/owners' human capital on firm performance, such that the amount of human capital in an earlier time period will positively affect the level of performance in the next*

> **H_7:** *There will be a cross-lagged effect of financial capital on firm performance, such that the amount of financial capital in an earlier time period will positively affect the level of performance in the next*

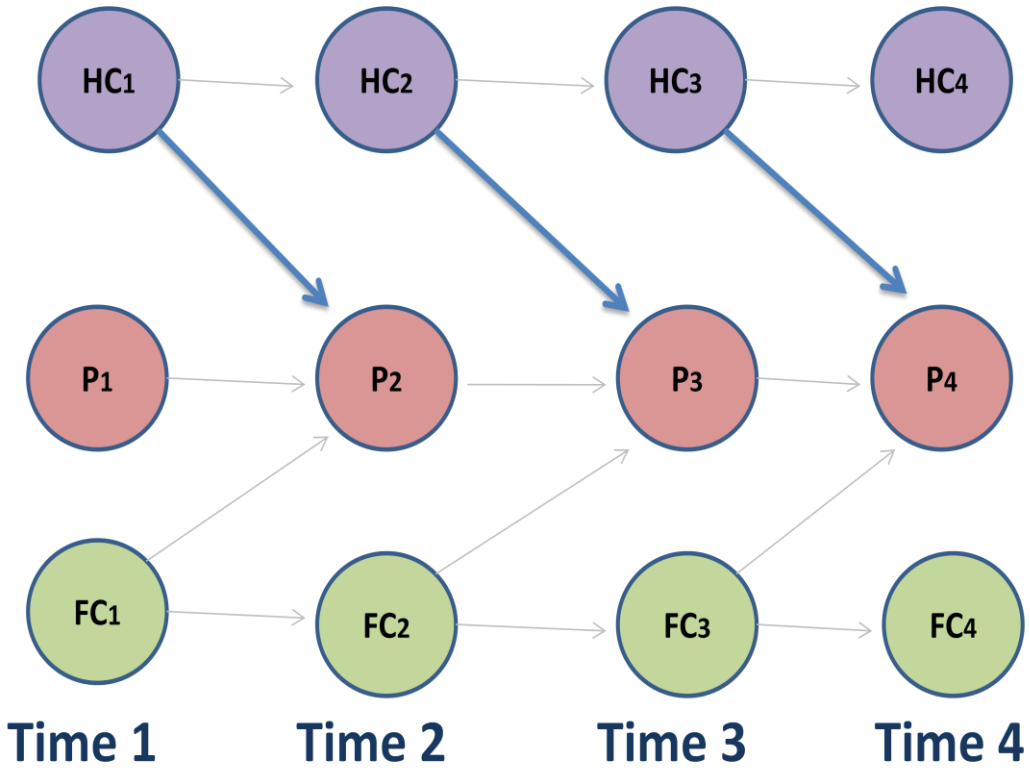

Figure 6: Simple model of Hypothesis 6

There will be cross-lagged effect of founders'/owners' human capital on firm performance, such that the amount of human capital in an earlier time period will positively affect the level of performance in the next

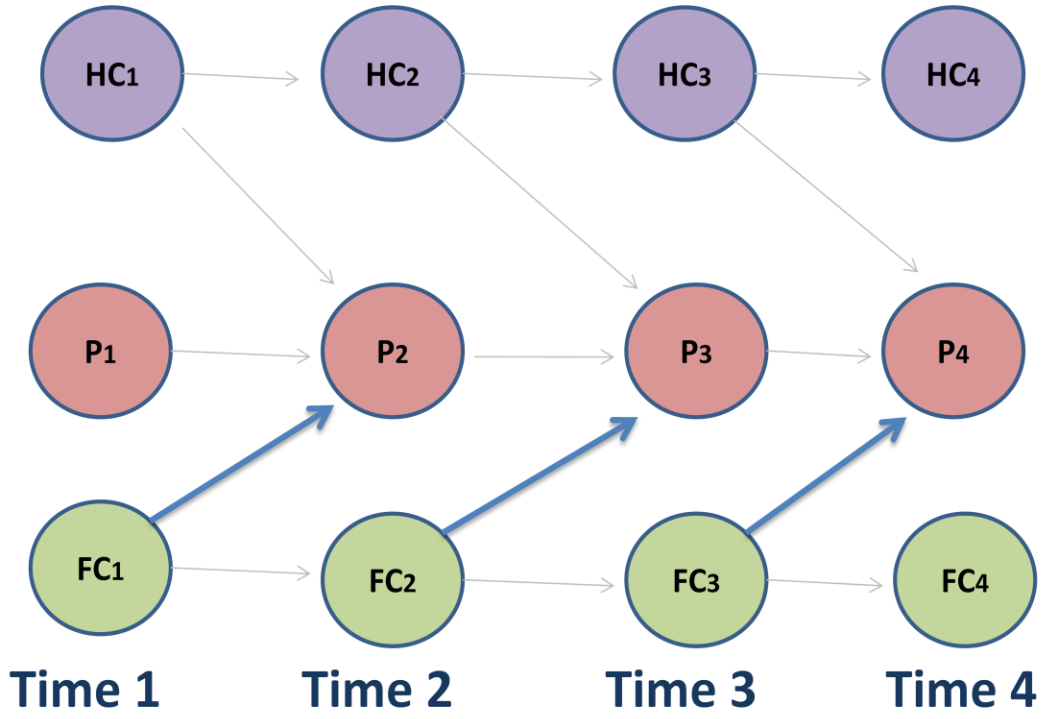

Figure 7: Simple model of Hypothesis 7

There will be a cross-lagged effect of financial capital on firm performance, such that the amount of financial capital in an earlier time period will positively affect the level of performance in the next

Furthermore, I believe that although types of capital impact firm performance at a later (or lagged) period, what is interesting is that performance has the ability to thus in turn impact the acquiring of subsequent resources as time goes on. Given that there are four time points available, it is possible to model not just the cross-lagged effects of resource classes upon performance, but look at how performance affects the subsequent acquisition of resource classes at later time points.

> **H_8:** *There will be cross-lagged effect of firm performance on human capital, such that the level of performance in an earlier time period will positively affect the amount of founders'/owners' human capital in the next*

H_9: *There will be a cross-lagged effect of firm performance on financial capital, such that the level of performance in an earlier time period will positively affect the amount of financial capital in the next*

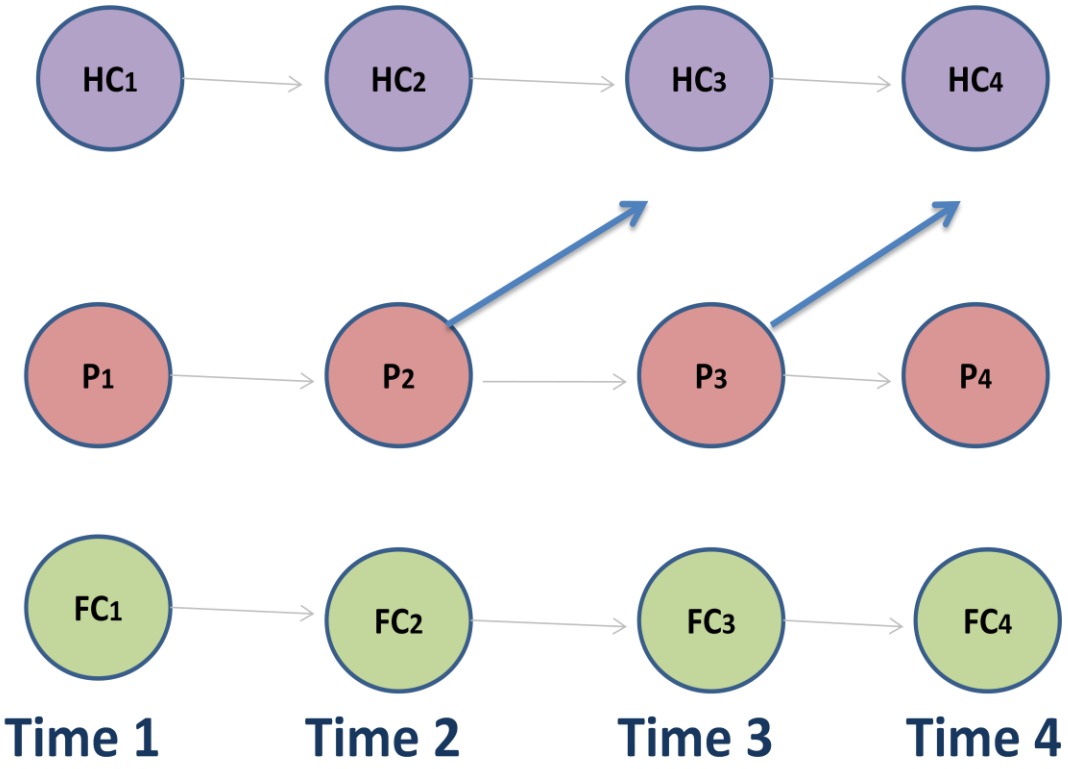

Figure 8**:** Simple model of Hypothesis 8

There will be cross-lagged effect of firm performance on human capital, such that the level of performance in an earlier time period will positively affect the amount of founders'/owners' human capital in the next

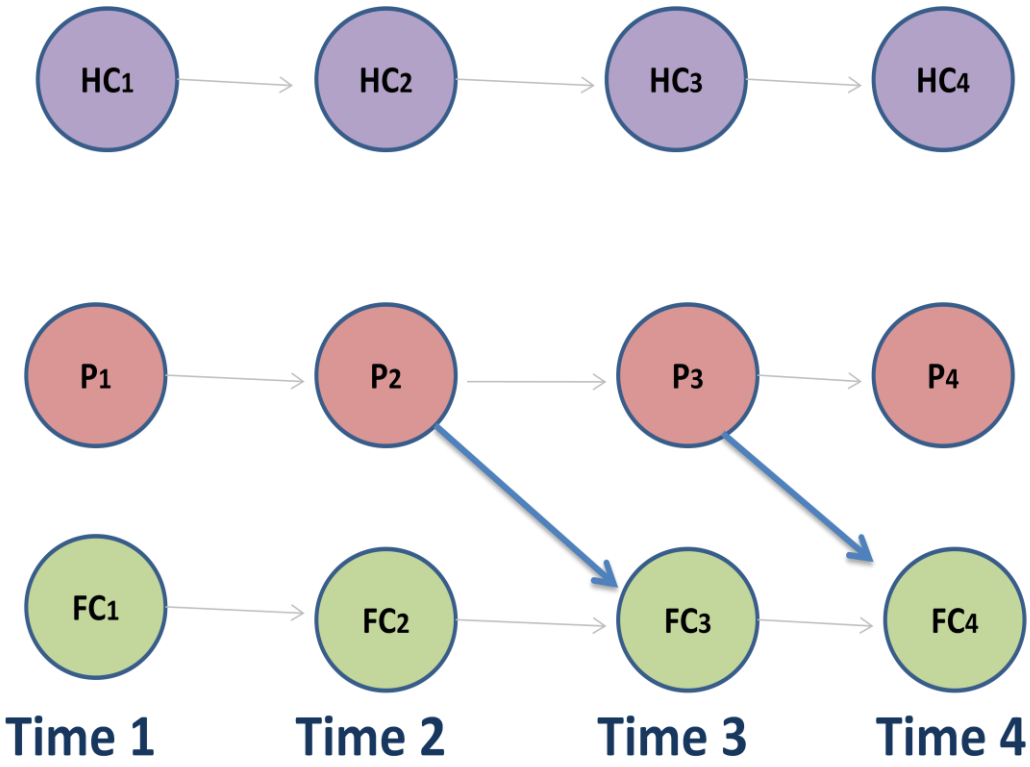

Figure 9: Simple model of Hypothesis 9

There will be a cross-lagged effect of firm performance on financial capital, such that the level of performance in an earlier time period will positively affect the amount of financial capital in the next

A recurrent theme in the RBV literature concerns the many methodological challenges (Barney et al., 2001). These challenges include the difficulty in looking at how resource classes affect one another, the absence of firms of varying sizes in past studies, the fact that most research attempts have been cross-sectional in nature, and the trouble in studying how performance subsequently affects later resource accumulation. By using a reliable and large dataset that accounts for dynamic changes by assessing variables at multiple time-points, I am able to combat the problems that are inherent in cross-sectional design. I am able to look at not just how resource classes affect performance, but given four time-points, I can look at how

performance affects later resources. Furthermore, my sample includes firms of varying sizes. Thus, my research will not suffer from the same methodological challenges that past studies may have been limited by. To test the above hypotheses, latent growth curve modeling will be employed, which allows for this analysis to be conducted in a way most congruent with my research goals.

CHAPTER 3: METHODOLOGY

These hypotheses require the use of longitudinal data that will allow for the comparison of trajectories (of growth or decline) of the latent constructs of human capital, financial capital, and performance, and this has implications for the type of analytic techniques used. To analyze the propositions described, I use a sample from the NORC Data Enclave version of the Kauffman Firm Survey. Please consult their website for further information (http://www.kauffman.org/kfs/default.aspx). The funding agency for this data is the Ewing Marion Kauffman Foundation of Kansas City. The KFS provides entrepreneurship researchers with a rare opportunity to study a panel of new businesses from startup to sustainability over a number of waves. Further details about this dataset and the corresponding sample will be provided below. Much of this information was provided to me in detailed documents describing the KFS. Please see DesRoches, Potter, Santos, and Zhao (2009) for the third follow up methodology report, as well as Robb, Ballou, DesRoches, Potter, Zhao, & Reedy (2009) for an overview of the survey.

Given that the goal of my research is to examine resource classes and performance as they evolve dynamically, it is appropriate to use latent constructs for the measurement of growth/decline trajectories over time. The latent constructs used are performance, founders'/owners' human capital, and financial capital. Each construct is reflected by a number of empirical indicators.

Sample

I will be using the data from the Kauffman Firm Survey (KFS) to test my hypotheses. The KFS is the largest longitudinal study of new businesses. The Ewing Marion Kauffman Foundation sponsored the KFS since data about American businesses in their early years is

extremely limited. The Kauffman foundation has provided comprehensive documents which describe the development of the survey and sample characteristics. The panel of businesses was created using a random sample of roughly 250,000 firms from Dun & Bradstreet's (D&B) database list of new businesses started in 2004. The KFS wanted to create a panel that included new businesses founded by a person or team of people, purchases of existing businesses by a new ownership team, and purchases of franchises. The KFS excluded D&B records for businesses that were wholly owned subsidiaries of existing businesses, businesses inherited from someone else, and not-for-profit organizations.

The KFS is conducted in eight waves, with data from 2004 (start) to 2011 (end). Currently, the data from 2004 – 2007 are available, thus giving four time points with which it is possible to conduct longitudinal analyses. The remaining four years will be released as later waves, thereby allowing my research questions to be analyzed with further depth in subsequent years.

There is a public use version that is more limited in terms of number of variables, and that contains no geographic detail. This public-use microdata file for the KFS contains data from the baseline, first, second, and third follow-up surveys. There is a more detailed data file, which is available through access to the University of Chicago NORC Data Enclave. The confidential version of KFS for the NORC Data Enclave contains more detail in regards in industry codes, geographical variables, firm credit scores, and additional continuous variables.

KFS Objectives

The main objective of the KFS is to attend to the informational gaps related to the study of new firm creation. Because of the foundation's commitment to providing researchers and policy decision makers with the best possible information about entrepreneurship and growth,

Mathematica Policy Research, Inc. (MPR) was commissioned to design and conduct a rigorous survey in order to better understand entrepreneurial patterns by gathering information from newly formed businesses. More than twenty technical advisors, who are leading scholars in the entrepreneurship domain, contributed to the development of the KFS. They were selected because of their interest, expertise, and scholarship in the field of entrepreneurship.

Inclusion

Mathematica Policy Research, Inc. performed substantial questionnaire design activities to ascertain consistent definitions of what represented a new business and the start of business operations, and to investigate the best methods for collecting these data. For the study population, a business starting in 2004 was defined as: a new, independent business that was created by a single person or a team of people; the purchase of an existing business; or the purchase of a franchise within the United States (the 50 states plus the District of Columbia).

Business owners were asked a series of questions about indicators of business activity, and whether these were conducted for the first time in 2004. This was done because of research reporting inconsistency in how business founders perceive when their businesses opened and started operations. These indicators included:

- The payment of state unemployment (UI) taxes
- The payment of Federal Insurance Contributions Act (FICA) taxes
- The presence of a legal status for the business
- Use of an Employer Identification Number (EIN)
- Use of Schedule C to report business income on a personal tax return

For inclusion eligibility, at least one of these actions had to have been performed in 2004 and none performed in a previous year. Businesses were excluded if they had any of these prior to 2004.

Sampling Procedure

A random sample of 32,469 businesses was released for data collection on the baseline survey, conducted between July 2005 and July 2006. A total of 17,258 businesses were tested for eligibility, causing 6,030 businesses to be deemed as eligible (35% eligibility rate). Interviews were completed with principals of 4,928 businesses that commenced operations in 2004, which equates to a 43% weighted response rate using the American Association for Public Opinion Research (AAPOR) response rate calculation 3. A self-administered Web survey and Computer Assisted Telephone Interviewing (CATI) were utilized for the data collection procedure, and KFS respondents were compensated $50 for interview completion. CATI completes accounted for 3,781 (77%) whereas Web completes accounted for 1,147 (23%) of the total interviews. The results across sampling strata reveal that 2,034 interviews were accomplished in the two high-technology strata. The remaining 2,894 interviews were fulfilled by non-high-tech firms.

The sample for the first follow-up survey consisted of the 4,928 businesses that completed the baseline survey. The first follow-up was conducted during the period of June 2006 to January 2007. There were a total of 3,998 interviews completed, while 369 businesses were reported as out of business. This translates to an 88-89% weighted response rate using AAPOR response rate 1. Similar to the baseline survey, respondents were given $50 to complete the interview, which was done either online or via CATI. During the first follow-up, a significantly larger percentage of interviews were accomplished through Web survey (2,366, or 59%) than in the baseline, while CATI completes accounted for 41% (1,632 interviews).

The data collection process for the Second Follow-Up Survey was very similar to the first follow-up. The second follow-up survey was conducted among 4,523 KFS businesses, including businesses that completed baseline and first follow-up surveys, as well as those not able to be interviewed during the first follow-up. Businesses known to be no longer in operation during the first follow-up were excluded, as well as a few that adamantly refused to participate in the first follow-up. The second follow-up was conducted between May and December 2007. During this period, 3,390 interviews were completed and 406 businesses were identified as no longer currently operating. This translates to an 82% unweighted response rate using AAPOR response rate 1, (84% weighted). As with the two previous surveys, respondents were paid $50 to complete the interview, which again was accessible either online or through CATI. During the second follow-up, 63% of the interviews (2,127) were done through the Web survey and CATI completes accounted for 37% of the interviews (1,263). Since the second follow-up survey was the third annual survey for which KFS panel members' participation was requested, KFS respondents typically remembered the process from previous survey waves and little persuasion was needed. However, there were still a few refusals, and of the 4,523 cases in the Second follow-up, 404 initially refused, of which 66 (16%), were persuaded and completed the questionnaire.

The data collection for the third follow-up ran from June 24, 2008 to December 23, 2008. Almost 2/3 of the 2,915 respondents opted for the online survey, while 1/3 answered by CATI. A 78% response weight (unweighted) was achieved for this follow-up wave.

KFS Sampling Frame

The D&B database is a compilation of data from a range of sources, including credit bureaus, state offices that register new businesses, and companies that are likely to be used by all

businesses (e.g., credit card and shipping companies). Gathering information on new businesses is complex, as there is no single registry of new businesses. Furthermore, the time between starting the business and the business actually showing up in one of D&B's sources may be six or more months. Therefore, to secure a fully-representative depiction of businesses starting in 2004, D&B arranged to provide multiple files at varying time points during the following year (2005). They obtained an initial file in June 2005 and a second in November 2005.

The June 2005 file contained 188,292 businesses, each with a starting year of 2004. This number was about 30 percent less than a similar file obtained in June 2004, which contained businesses started in 2003 and was used to draw the Pilot Test 2 sample. The researchers explored the lower number and could find no clear changes in operations by D&B and no evidence from federal sources to explain this drop. The November 2005 D&B file included 62,990 additional businesses with start dates in 2004, resulting in a total pool of 251,282 businesses from the combined June and November files. However, 13,439 businesses from the June 2005 file (7 percent) were not in the November file and were assumed to be no longer operating, which resulted in 237,843 businesses in the combined database.

Stratification

The D&B database was divided into six different sampling strata characterized by industrial technology categories (based on industry designation) and gender of the owner or CEO of the business. The purpose of the strata based on the industrial technology categories was to enable a larger sample allocation among new businesses in the high-technology fields because of entrepreneurial research interest in these industries. The second stratification factor of gender was to ensure proportional representation from firms owned by women, although female-owned businesses were not oversampled.

The final classifications of technology businesses were:

- High Tech: Chemicals and allied products, industrial machinery and equipment, electrical and electronic equipment, instruments and related products
- Medium Tech: Other industries that meet the R&D criteria by the BLS, although a lower percentage of R&D employment than in the high-tech group
- Non Tech: All industries not included in the R&D criteria above

The sampling design necessitated that 3,000 interviews be completed in two categories of technology businesses (high tech and medium tech) and 2,000 interviews be completed in all other industrial classifications.

Pilot Test

Two pilot tests were carried out because little was known about the prevalence of the anticipated eligibility criteria. Overall, 52% of the business owners in the pilot tests would have met the eligibility screening on at least one of the criteria tested at that time. Given these results, a new business eligible for the KFS targeted year was identified as any business responding positively to any of the five tested criteria.

Pretesting

A comprehensive and iterative process was employed in development of the final questionnaire. Using an initial draft questionnaire, cognitive interviews were conducted with eligible new business owners to assess the survey instrument. Next, a comprehensive pretest of 400 new businesses was executed to check the length, review response distributions, and perform methodological experiments.

Data Collection Methods

The Baseline Survey's first contact with businesses involved a letter to business owners which presented the study, requested cooperation, and provided web login information. Enclosed with the letter were instructions on how to access the online survey, a Frequently Asked Questions (FAQs) document, and a toll-free number that could be called for additional information or to answer any further questions. One week later, a postcard reminder was sent to firms. For those that refused, a refusal conversion effort was attempted. A total of 32,469 selected businesses were released for data collection between July 2005 and July 2006. The selected businesses were released in a series of six distributions, with each handled with comparable levels of effort. Data collection finished with a total of 4,928 completed surveys, which translates to a 43% weighted response rate. As these 4,928 businesses comprised the panel for future KFS waves, extra effort was put in to try to keep contact with panel members, including the mailing of a "Welcome Packet" three months following their completion of the baseline survey.

Data Analysis

As stated previously, the growth potential of a firm is contingent upon the resource base it exploits in a path-dependant process (Arthur, 1994). In other words, the performance of a firm relies on the resources it accumulates over time. Although many agree that resources are developed in a complex, path-dependant process (Barney & Zajac, 1994; Dierickx & Cool, 1989), there is not a solid explanation or prediction of this growth path (Pettus, 2001). In fact, analysis of the sequential development process of a firm's resource base is wanting. By using latent growth curve analysis, I am able to combat the methodological problems previously

associated with assessing such a process. Thus, in order to analyze patterns of growth and decline among the latent constructs, I use latent curve analysis.

The measurement dilemma associated with most resource accumulation processes has to do with their ongoing, unstructured, and rarely empirically observable nature (Hall, 1992; Itami 1987; Villalonga, 2004). Since there are few works that directly discuss the influence of time lags on the sustainability of competitive advantage (Pacheco-de-Almeida et al., 2008; Dierickx & Cool, 1989), the KFS data allows for the measurement by utilizing longitudinal analyses which can give insight into temporal issues of resource accumulation. This is the advantage of using the KFS, which is the largest longitudinal study of new businesses ever embarked upon. As this database continues to add waves in the upcoming years, the questions proposed in this study may be examined with even further depth and reliability.

Longitudinal analyses of latent constructs can be performed using Structural Equation Modeling (SEM). The use of SEM to assess relationships in longitudinal panel data is becoming more common (Sivo, 2001). The sophistication of a latent growth model (LGM) allows for modeling of the growth/ decline of variables over time and how they potentially affect the patterns of others. Thus, questions that researchers would be able to analyze include:

- How different types of resources affect performance over time (for the purpose for this study, the focus is on human capital and financial capital)
- How different resources affect each other over time (how the starting point of one affects growth/decline in another, or how the growth/decline in one over time affects the growth/decline of the others over time. Thus, a researcher can evaluate slopes & intercepts)

- Autoregressive effects (how a resource may itself later in time, which in turn affects accumulation of more resources)
- Which sequences of resource accumulation are most effective (e.g., which is more important at onset – human or financial capital?)
- Differences in curves and most optimal patterns (is growth more quadratic in nature as opposed to a linear pattern)

The assertion that resources affect organizational outcomes can be studied with greater depth by looking at the growth or decline of the latent curves over time. Assessing growth curves allows me to address these dynamic relationships in ways not possible previously. As the Kauffman Firm Survey appends more follow-up results, this research stream can progress with it beyond just this study, which only analyzes a component of the overall model.

Advantages of the Model in Latent Curve Modeling

In longitudinal research, the interest is often in studying individual differences in patterns of change in variables over time. The majority of publications have focused on studying analysis of change in one variable at a time (MacCullum, Kim, Malarkey, & Kiecolt-Glaser, 1997). However, in longitudinal analyses, interesting questions may exist involving relationships between patterns of change on different variables, as is the case with the present study.

It is possible to extend general SEM to longitudinal data through the use of latent growth modeling (LGM), and this method is appropriate for our research questions. A methodology that provides a way to model individual differences in growth curves has been termed a latent growth model, or LGM (Duncan & Duncan, 2004). These models are receiving more attention in empirical studies, especially given their ability to account for individual change over time (Sivo,

2001). Since LGM is performed using methodology associated with SEM, it shares many of the same strengths and weaknesses with regard to statistical methodology (Duncan & Duncan, 2004). Meredith and Tisak (1990) extended the work of Tucker (1958) and Rao (1958) to modeling interindividual differences in change through SEM. LGMs assess change via multiple latent indicators, giving the capability of addressing important hypotheses about individual differences in initial status and rates of change as well as allowing predictors of change to be incorporated into the model.

Essentially, latent growth curve models are variations of the standard linear structural model, and they resemble the classic confirmatory factor analysis (Duncan, Duncan, Alpert, Hops, Stoolmiller, & Muthén, 1997). Since they use repeated measures raw-score data, latent factors are interpreted as chronometric common factors representing individual differences over a time period (McArdle, 1988). A fully expanded latent growth curve analysis considers both factor means and variances, and this mixture of the individual and group levels of analysis is distinctive to the procedure and offers it many benefits (Duncan, Duncan, Alpert, Hops, Stoolmiller, & Muthén, 1997).

Therefore, many advantages are presented in the LGM framework. The LGM illustrates a single individual's growth or decline trajectory and also describes individual variation in these trajectories over a period of time. It is possible to examine predictors of those individual differences to answer questions about which variables wield important effects on the rate of development. Another advantage is the capacity to use variables concurrently as independent and dependent variables in the specified model, allowing for multifaceted representations of growth and correlates of change (Duncan & Duncan, 2004). A significant feature of LGM is the capability to test complex structural equation models with the rates of change as latent

(unmeasured) constructs based on observed scores at each time point. Therefore, LGM permits the researcher to study the relationship between one growth curve and another growth curve, while explicitly modeling measurement error (Stull, 2008).

To conduct latent growth analyses, the data are arranged in multivariate format, where there is a single row in the dataset for each member of the sample, with multiple variables containing the time varying information. Given four waves of data, multivariate format necessitates four columns for each variable representing a measurement occasion. For this data, my latent constructs are assessed with variables that are measured at baseline, follow-up 1, follow-up 2, and follow-up 3. This allows for conclusions that will be based upon not just a single occurrence of an indicator, but the trajectory as it increases or decreases over time. Having this ability, I can consider how slopes of one construct may affect the slope of another.

As such, the latent growth factors are regarded as individual differences of growth trajectories over a time period (McArdle, 1988). In the case of straight line growth models, these are the slope and intercept. A fully expanded latent growth analysis takes into account factor means, which correspond to group-level information, as well as variances, which relate to the individual-level differences. Therefore, the modeling task involves the identification of an appropriate growth curve form (e.g., linear, quadratic) which will correctly describe individual development while allowing for the study of individual differences in the parameters that control the pattern of growth over a time period (Duncan & Duncan, 2004). The general two-factor latent growth modeling approach (intercept and slope) holds many advantages in the testing of developmental models. Using this, it is possible to investigate predictors of change independently from correlates of initial status (Duncan, Duncan, Alpert, Hops, Stoolmiller, & Muthén, 1997).

Appropriately, a key assumption of growth curve methodology is that change is systemically connected to the passing of time (Burchinal & Appelbaum, 1991). One critical aspect of growth model testing is assessing the extent to which a particular growth model is able to describe the observed pattern of change with respect to time. The application of LGM within the SEM framework is contingent upon data that are collected when subjects are observed at about the same time, and that the spacing of assessments is similar for all subjects. Since this sample holds measures that were collected at approximately the same time (i.e., a measure of "cash assets" for follow-up 1 for a company is around the same time for another company), the sample meets this requirement. When the change is not systematically related to the passage of time (i.e., if a measure of "startup experience" for follow-up 1 for a company is around the same time as "startup experience" for follow-up 3 was recorded for another company), the models lose their ability to interpret the growth or decline curves, and studying individual trajectories over time will not be as revealing or accurate (Duncan & Duncan, 2004).

For an LGM model with only two temporally separated observations, it is possible to estimate change, but it is impossible to study the nature of the developmental trajectory over time or the rate of change in the individual. Given a two-wave model, the shape of the individual development between two observations may be of theoretical interest as a predictor. The validity of the straight-line model for the trajectory can be evaluated with more than two observations. Furthermore, the precision of parameter estimates will be likely to increase along with the number of observations for each individual (Duncan & Duncan, 2004). With three or more time points, the factor loadings contain information about the shape of growth dynamically. This is why my sample, having a baseline as well as three follow-up instances, is more revealing than if I had only had two measures – an initial and a single follow-up.

As the KFS adds more follow-up waves in subsequent years, studying my model with the added time points can help me to better understand the processes unfolding with enhanced reliability and clarity. Additional waves of data allow for greater precision in estimating individual growth trajectories. Also, curvilinear change can be described more specifically. For example, provided that enough waves are available, latent growth modeling can evaluate polynomial change. I may predict that after, say, the fifth year, a firm's cash assets reach a plateau, and then, after the seventh year, they plummet. Theoretical frameworks which suggest multi-dimensional courses can be modeled and examined in relation to other variables. Furthermore, it is possible to model intervening effects. Thus, an exogenous predictor may act directly on an endogenous construct and also indirectly because of the impact of intervening factors, each of which may be static or time varying. So I might think that a variable such as number of employees may influence the relationship between, say, cash assets and performance, and therefore I am able to model it accurately.

Given these advantages of LGM I am confident in using this methodology for testing my hypothesized relationships. Furthermore, I feel that demonstration of this method can help other researchers to understand what a powerful methodological tool that can be utilized in numerous questions relating to strategy and entrepreneurship research.

Measures

Performance

Previous research suggests that capturing the multidimensionality of new venture performance requires the use of multiple measures (Wiklund & Sheperd, 2005). Subjective measures are useful for assessing broader, nonfinancial dimensions of performance, and typically are more accessible than objective indicators (Stam & Elfring, 2008), however objective

performance measures are less prone to common method bias and are especially helpful in gauging a venture's financial performance. A drawback is that objective measures are often hard to obtain and tough to interpret in the context of new ventures (Chandler & Hanks, 1993). The data in the KFS may allow for the assessment of performance by commonly-used measures.

Business Total Profit: The total profit or loss of the new venture is a commonly-used financial indicator of performance. It is one of the best known measures of success for an enterprise (BusinessDictionary.com, 2010), and it the surplus remaining after costs/expenses are deducted from the revenue of the firm.

Calculated Revenue: Revenue is the amount of money that a company earns from its business activities by providing a product or service to its customers for a price. Revenue for a time point involves the amount of money that the firm actually receives during a specific period, less discounts as well as deductions for returned merchandise (Forbes Investopedia, 2010). This is important because it's not just the amount of money made from a sale, but the money that may be lost when attempting the sale given discounts and deductions.

Number of Employees: Growth in the number of employees has been used in a number of studies since the creation of jobs is frequently used to assess the contribution of a small firm to society (Birch, 1987; Venkataraman, Van de Ven, Buckeye, & Hudson, 1990). Change in employees can be an indicator of growth (Pettus, 2001).

Founders'/Owners' Human Capital

Industry experience and professional degrees are two indicators of industry-specific human capital (Pennings et al., 1998). Stam and Elfring (2008) mention industry experience and start up experience as commonly used measures. For this study, I consider the following measures to assess founders'/owners' human capital.

Industry experience: The number of years of industry experience for founders, is measured as the number of a venture's founders/owners that had worked previously in the venture's primary industry or had experience with its primary technology (Cooper et al., 1994; Florin et al., 2003; Shepherd, 1999). Aldrich described prior experience as affecting the knowledge available to founders through job-specific contacts, through general organization-specific knowledge, and through the culture of an occupational sub-community (Aldrich, 1999). Entrepreneurs in businesses closely related to what they did previously have acquired appropriate "prior mental programming" that they can use for the benefit of the new firm (Vesper, 1980). As acknowledged by Davidsson (2006), industry experience has not been studied in detail, possibly because of trouble attributing the nascent venture to a particular industry in its early stages. Lerner & Almor (2002) found task-related industry experience as positively related to business success. Bruderl et al (1992) found a significant effect of industry-specific experience on new venture survival. In fact, owners of ventures were found to be more successful if their new business was similar to those of the past (Srinivasan, Woo, & Cooper, 1994).

Startup experience: The number of start-ups a founding team had founded, is the number of founders/owners that had previously started new businesses (and how many). This is

used given previous research findings showing that founders contribute vital know-how (Florin et al., 2003; Carter, Williams, & Reynolds, 1997; Stuart & Abetti, 1990). Learning by doing may be an important concept in entrepreneurship. For example, Stuart & Abetti (1990) find that in the context of technical ventures, performance is positively related to prior entrepreneurial experience. They note that experience in starting previous ventures endows entrepreneurs with critical knowledge on what's most important, how to perform the necessary duties, key functions, contracts, etc. Having knowledge on how to start a business based upon personal firsthand experience is valuable for a new firm.

Founder Education: The highest level of education by the founders, is measured by the highest degree attained by the founders/owners. This is a commonly used human resource measure. Specialized education is required for many occupations, and general education expands literacy abilities, quantitative training, and social as well as communication skills (Montgomery, Johnson, & Faisal, 2005). According to Acs and Armington (2005), formal education itself does not typically provide the competencies or inspiration to start a business, but higher education prepares individual to seek new ideas and evaluate information rationally; also, people with higher levels of education are more prone to obtain useful knowledge spillovers from others immersed in research. Furthermore, professionals' "prestige" is partly based on the institutions from where they obtained their education; this is a valuable organizational resource due to the elite social networks that may offer contact to valuable resources external to the firm (D'Aveni, 1989). Education has the capacity to enhance entrepreneurs' performance both directly and indirectly (Parker & van Praag, 2006).

Total Number of Owners: The number of people who are owners or founders at the firm, is measured as such over time**.** The tenets of resource-dependence theory suggest that owners can be regarded as channels to advance the resource and skill bases of the venture. Therefore, the more owners that contribute to the firm, the more contacts and networks that may be accessed. The availability of "know-how" (embedded in the entrepreneur or owners) may impact the performance of the firm via more promising strategies or better management methods (Cooper, Gimeno-Gascon, & Woo, 1994). Ownership partners may also enhance legitimacy of the venture to potential lenders and other constituents, as well as adding a level of credibility (Eisenhardt & Schoohoven, 1990; Teach et al., 1986). In fact, Cooper & Gimeno-Gascon, (1992) reported that in four of five prior studies, ventures with teams performed better than those with single founders. With more owners, more knowledge is amassed, and more networks can be utilized by the firm.

Financial Capital

Financial capital has to do with the amount of money a founder can bring to a firm or the value that their financial capital already has given. This is captured using three aggregates:

Available Credit: Captured as the maximum credit line for business (and personal) credit cards minus balance. For most owners, credit cards are a ready source of funding. Once the card is in hand, they can borrow as much as the credit limit allows. However, using this source for seed money may prove to be very expensive for a founder, as interest rates are commonly higher for this form of financial capital than for other types (ConsumerReports.org, 2008).

Equity Financing: Money received in return for some portion of ownership and is a way to fund business expenses. It is captured as the amount of equity financing from spouses/life-partners of owners, parents, in-laws, and children of owners, angel investors, other individuals, government agencies, other agencies, other companies, and venture capitalists. This is invested money that is not repaid to investors in the traditional business sense, as there is an ownership stake.

Value of Cash: The aggregation of cash assets that the owners have at their disposal. It involves cash on hand in checking, savings, money market accounts, certificates of deposit, and other time deposits. This is captured and aggregated for all owners and founders.

Owners' investment in business: Involves the amount of funds invested in the business by the owners/founders. One of the most important resource inputs for a new business is the money supplied by the entrepreneur (Levesque & MacCrimmon, 1998). In a recent ConsumerReports article, the research group reports that approximately 68 percent of start-up financing originates from the business owners themselves. These sources include personal savings, and home equity, 401(k) plans (ConsumerReports.org, 2008).

Controls

Control variables allow me to control for other factors which may have an effect on the relationships I've proposed. Such variables are held constant in order to assess the relationship between two other variables. If not controlled for, they may complicate the relationships between

resources and performance. These will be assessed using the NORC enclave KFS sample, which included a variety of contextual variables. These variables do not change over time.

Geographic Location: Allows for the consideration of differences according to location. My goal is to assess this using the metropolitan statistical area (MSA) information supplied by the KFS. Firms that are in different locations have many external forces which impact their relationship between resources and performance. For example, identical firms may have different relationships between resource classes and performance if one is in, say, New York City, and the other is in Topeka, Kansas. Different geography means not only different weather, topography, and environmental conditions, but also different demographics and trends among other things.

Industry: Gives a better picture as to how industry differences play a role. This is analyzed using the North American Industry Classification System (NAICS) code of the business. The NAICS is the standard used by Federal statistical agencies for classifying business establishments for the purpose of collecting and analyzing statistical data relating to the U.S. business economy (U.S. Census Bureau NAICS, 2010). Companies operating in separate industries have to content with different rivals, competitive pressures, market fluctuations, customers, and technological innovations. This can definitely impact the relationships involving resource classes and performance.

Product vs. Service: To understand differences according to output type. Businesses were coded as to if they provided a product as well as if the provided a service. Some firms may provide both. This served as a control variable because the relationships between

resources and performance may be complicated by the orientation of the firm. A firm solely focused on selling products may have a growth pattern influenced by the fact that it does not offer a service, since the focus may be extremely different in that the quality of the product may outweigh the value of customer service. The opposite may be true in service firms.

CHAPTER 4: RESULTS

This research was intended to analyze the effects resources play on performance, each other, and the effect of performance on subsequent resource allocation. As mentioned previously, longitudinal repeated measures data were analyzed using latent growth curve analysis (McArdle, 1988; Meredith & Tisak, 1990; Muthén, 1991). I chose this method as being most appropriate because it enables me to look at how the slope of a construct evolves over time. Essentially, this method is powerful for the questions of this study because it incorporates both mean and covariance structure into one model analysis, and because it allows for the examination of possible individual differences in the response to treatment. In addition, I use cross-lags to analyze the later hypotheses because this allows for repeated measures assessment. In this chapter, I describe the results of these analyses and model specification which gave the best fit of my model to the data.

Sample Descriptives

The KFS collected data about the selected businesses' operations during their first four years of emergence (calendar years 2004, 2005, 2006, and 2007). The project is currently at its midpoint, since an additional four years are expected. The Baseline sample consisted of 4,928 firms. Each year there is some loss in sample size due to two distinct issues: 1) sample attrition due to refusals and "unlocatables", and 2) firm closures or mergers/acquisitions by other firms. After subtracting the refusals and unlocatable firms, those that have survived over the period or that have been verified as going out of business by 2007 equates to 3,974. When eliminating firms that failed, surviving firms through 2007 equates to 2,913.

The work Robb, Ballou, DesRoches, Potter, Zhao, & Reedy (2009) provides an overview of preliminary analyses and results for the KFS survey. Nearly 90% of firms that started their operations in 2004 survived through 2005, while about 80% percent survived through 2006, and 73.4% through 2007. The other firms closed either permanently or temporarily during this time, while a small number (3.5 percent) were either sold to / merged with another business. Roughly 60% of firms experienced profits in 2007, while about 40% experienced losses. Surviving firms with employees increased average employment from 4.6 employees (2004) to 6.7 employees (2007). By 2007, about 40% of firms had revenues in excess of $100,000, compared with a mere 17% in 2004. Roughly 60% of firms feel that they have a comparative advantage in the products or services that they offer.

Overview of the Analysis

Data analyses were conducted using the SAS System's CALIS (i.e., Covariance Analysis of Linear Structural Equations) procedure (SAS Institute Inc., 1989). Several other programs have the capability to model latent growth models, including EQS, AMOS, and LISREL. Though each of these has strengths in terms of features and / or user-friendliness, CALIS was ultimately chosen based upon the ease and power with which statistical analyses can be conducted.

PROC CALIS is a SAS procedure that can be used for path analysis, confirmatory factor analysis, structural equation modeling with latent variables, and other purposes. The CALIS program included statements to represent the models described in the previous chapter. The output of PROC CALIS provides a significance test for the null hypothesis that the theoretical model fits the data, along with descriptive goodness of fit statistics. It also provides estimates and significance tests for parameters such as path coefficients, variances, and covariances. If

there is not a good fit between model and data, modification indices may be used to determine how the model should be changed. Any revised model can then be estimated to determine if it provides a good fit. The models tested were covariance structure models with multiple indicators for all latent constructs. Means, standard deviations and intercorrelations for the study's manifest variables are presented in Table 1. Looking at the correlations, multicollinearity does not appear to be a problem, except that there is a high correlation between StartupExperience1 and StartupExperience 3 (.871). However, given that these variables are from the same resource (Human Capital) and are just measurements at different times, I do not consider this a problem. One correlation between variables that is interestingly high is that between StartupExperience at Baseline and Calculated Revenue at baseline (-0.654). From this it can be inferred that the more human capital a venture starts with, the less likely their performance is to be high. Maybe firms are using their human capital early on as a legitimation tool to symbolize credibility of the firm, or maybe they are not using their human capital effectively. Perhaps it is the case that at business founding, too much human capital may result in disagreements, which may impact performance (e.g., managerial hubris).

Careful examination of the means and standard deviations for each repeated measure will give an idea as to whether the general trend is monotonically increasing, decreasing, flat, or showing non-monotonic trends. StartupExperience, the measure of human capital, increases from baseline to the first follow-up, then declines in the following two time periods. Cash assets, the measure of financial capital, changes little over time. Calculated Revenue, the indicator for performance, increases from baseline until the second follow-up, and then lowers in the last time period.

Descriptive statistics highlighting skew and kurtosis are highlighted in Table 2. As one will notice, not all of the variables described in the previous chapter were included in these Tables. As will be discussed in further detail in this chapter, some of the variables I anticipated using had to be dropped because of fit issues and non-normality of the data. These issues will be elaborated upon in further detail later in this chapter.

Table 1: Correlations among Variables Used in the Analyses

Variables	*n*	*Mean*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Owners'/Founders HC											
1. StartupExp0	4928	1.412	4.666	1.000							
2. StartupExp1	4928	1.161	4.996	0.359 *	1.000						
3. StartupExp2	4928	0.957	2.946	0.513 *	0.516 *	1.000					
4. StartupExp3	4928	0.862	4.894	0.188 *	0.871 *	0.338 *	1.000				
Owners'/Founders FC											
5. AssetsCash0	4928	2.646	2.645	0.089 *	0.091 *	0.104 *	0.069 *	1.000			
6. AssetsCash1	4928	2.774	2.740	0.051	0.129 *	0.138 *	0.092 *	0.405 *	1.000		
7. AssetsCash2	4928	2.500	2.792	0.044	0.066 *	0.204 *	0.073 *	0.318 *	0.572 *	1.000	
8. AssetsCash3	4928	2.170	2.752	0.021	0.094 *	0.156 *	0.156 *	0.276 *	0.468 *	0.611 *	1.000
Performance											
9. Revenue0	4928	-0.605	4.818	-0.654	-0.029	-0.042	-0.016	0.156 *	0.078 *	0.077 *	0.062 *
10. Revenue1	4928	0.868	4.796	-0.047	0.053	-0.025	-0.040	0.099 *	0.233 *	0.186 *	0.162 *
11. Revenue2	4928	1.216	4.475	0.021	-0.031	-0.039	-0.014	0.112 *	0.200 *	0.324 *	0.261 *
12. Revenue3	4928	0.931	4.269	-0.057	-0.064 *	-0.049	-0.051	0.096 *	0.166 *	0.223 *	0.350 *

note. *n= 4928*

*p<.05

Table 1: Correlations among Variables Used in the Analyses (cont.)

Variables	*9*		*10*		*11*		*12*
Owners'/Founders HC							
1. StartupExp0							
2. StartupExp1							
3. StartupExp2							
4. StartupExp3							
Owners'/Founders FC							
5. AssetsCash0							
6. AssetsCash1							
7. AssetsCash2							
8. AssetsCash3							
Performance							
9. Revenue0	1.000						
10. Revenue1	0.391	*	1.000				
11. Revenue2	0.270	*	0.460	*	1.000		
12. Revenue3	0.198	*	0.335	*	0.452	*	1.000

Table 2: Descriptive Statistics of Variables Used in the Analysis

Variables	*n*	*Mean*	*SD*	*Skew*	*Kurtosis*
Owners'/Founders HC					
1. StartupExp0	4928	1.4115	4.6660	18.8437	482.0994
2. StartupExp1	4928	1.1605	4.9955	38.3170	2030.4836
3. StartupExp2	4928	0.9567	2.9456	13.1840	278.1373
4. StartupExp3	4928	0.8616	4.8939	47.9776	2880.9868
Owners'/Founders FC					
5. AssetsCash0	4928	2.6458	2.6450	0.4325	-1.1842
6. AssetsCash1	4928	2.7735	2.7397	0.4238	-1.2597
7. AssetsCash2	4928	2.5004	2.7918	0.5908	-1.1667
8. AssetsCash3	4928	2.1698	2.7515	0.8173	-0.8692
Performance					
9. Revenue0	4928	-0.6047	4.8175	0.2396	-1.1998
10. Revenue1	4928	0.8676	4.7959	-0.1797	-1.0803
11. Revenue2	4928	1.2157	4.4751	-0.1818	-0.7945
12. Revenue3	4928	0.9306	4.2694	-0.0283	-0.6268

note. *n= 4928*

Overall Model Testing

Tests of Model Fit

Structural models depend on statistical measures to aid in determination of whether the covariance matrix implied by the theoretical model is consistent with the sample covariance matrix. There are many measures available that help to determine fit and all are somewhat different. These goodness of fit statistics include the chi-square, Comparative Fit Index (CFI; Bentler, 1990), Goodness of Fit Index (GFI), the normed fit index (NFI) (Bentler & Bonett, 1980), the non-normed fit index (NNFI) (Bentler & Bonett, 1980), Standardized Root Mean Squared Residual (SRMR; Bentler, 1995), and the Root Mean Squared Error of Approximation (RMSEA; Steiger & Lind, 1980). With the variety of indixes available, model evaluation becomes complicated (Sivo, Fan, Witta, & Willse, 2006). Assessment of model fit within SEM is a thorny issue without an easy solution (Fan & Sivo, 2005), which is why I do not rely on a single test of model fit but consider several fit indixes.

The chi-square statistic offers a test of the null hypothesis that the reproduced covariance matrix has the specified model structure, (i.e., that the model actually fits the data). The chi-square overall goodness of fit statistic is considered a global measure of model fit since it assesses the magnitude of the discrepancy between the model implied covariance matrix and the sample covariance matrix. Unfortunately, chi-square is very sensitive to sample size and departures from the multivariate normality assumption as well as the complexity of the model (e.g., Chou, Bentler, & Satorra, 1991; Curran, West, & Finch, 1996; Hu, Bentler, & Kano, 1992). Though the chi-square test is useful, it is known that it should be interpreted cautiously for the above reasons, and that it must be supplemented with other goodness of fit indices (Hatcher, 1994). Because this test is frequently not valid in applied settings, it is suggested that it is

regarded as a general goodness of fit index rather than a strict statistical test (Joreskog & Sorbom, 1989). In fact, other stand-alone fit indices may reveal a good fit even when the chi-square suggests rejection of the model.

The normed-fit index has been regarded as an alternative to the chi-square test (Bentler & Bonett, 1980). This index may be considered as the percentage of observed-measure covariation explained by a given measurement or structural model (Anderson & Gerbing, 1988). The NFI may range in value from 0 to 1, where 0 represents the goodness of fit associated with a "null" model (specifying that all variables are uncorrelated), and 1 signifies the goodness of fit associated with a "saturated" model (a model with 0 degrees of freedom that wholly reproduces the original covariance matrix). The NNFI and CFI are variations on the NFI that are considered to have less bias due to sample size (Bentler, 1989). The NNFI has demonstrated the ability to reflect model fit at all sample sizes (Anderson & Gerbing, 1988), and the CFI provides an accurate assessment of model fit regardless of size while being more precise than the NNFI (Bentler, 1989). Values over .90 on the NFI, NNFI, and CFI indicate an acceptable fit between the model and the data.

The Measurement Model

The measurement model illustrates the nature of the relationship between the number of latent variables, or factors, and the manifest indicator variables that measure those latent variables. The model investigated in this study consisted of three second-order latent variables corresponding to the three constructs of the model: founders'/owners' human capital, financial capital, and performance. Each of the three latent variables was to have at least three indicators, which serve as the first-order latent constructs. According to the model, the latent constructs of founder/owner education, industry experience, startup experience, and number of owners are

indicators of the latent construct of human capital. Each of these individual human capital constructs are measured over a period of four years, with one measurement (manifest variable) for each year. Additionally, the latent constructs of loans, available credit, cash, equity, and owner investment are indicators of the latent construct of financial capital. These are also measured over a period of four years, a manifest variable representing the measurement at each year. Finally, the latent constructs of number of employees, total sales, total profits, and calculated revenue are indicators of the latent construct of performance. These are also each given a manifest variable to represent to measurement at each year (thus four for each latent construct).

The Initial Measurement Model

I have identified the latent constructs investigated in this study, as well as the indicators that measure these constructs. A simplistic model of the predicted relationships is presented in Figure 10. Accordingly, the human capital construct is measured by the latent measures of HC1, HC2, HC3, and HC4, and these are each measured over time by four manifest variables (representing the founders'/owners' startup experience baseline through follow-up 3), that the financial capital construct is measured by the latent indicators of FC1, FC2, FC3, and FC4, and these are measured by manifest variables (founders'/owners' cash assets baseline through follow-up 3), and that the performance construct is measured by latent measures of P1, P2, P3, and P4, and that each of these is assessed by four manifest variables v9 through v12 (revenue baseline through follow-up 3).

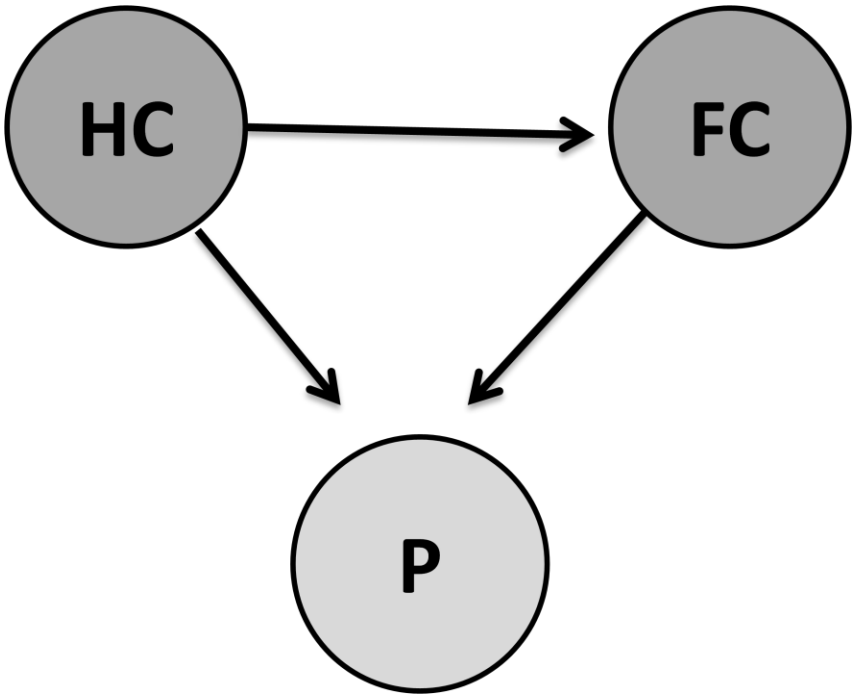

Figure 10: Simple relationship between the constructs of Human Capital, Financial Capital, and Performance.

The measurement model assessed in the first stages of this analysis was not identical to the model in Figure 10, because the model in that figure posits certain unidirectional causal relationships between the latent constructs. The measurement model, on the other hand, does not posit any unidirectional paths between latent variables. In contrast, in a measurement model, a covariance is estimated to connect each latent variable to the other latent variables. In a figure, this would be indicated by a curved, two-headed arrow connecting each latent variable to every other latent variable. Essentially, a measurement model is equivalent to a confirmatory factor analysis model in which each latent construct is allowed to covary with every other latent construct.

This measurement model was estimated using the maximum likelihood method. A number of results indicated that there was a problem with the model's fit. Upon careful examination of the data, it was determined that some of the measures were compromised by missing data and problematic responses. There also were violations of the assumptions of normally distributed data. Therefore, I decided to select the most robust indicators of each second order construct and simplify the analysis to one that examines relationships among first order constructs. Luckily, there were a few constructs that were usable. Based upon theory, and considering assumptions of normally distributed data, I picked what I determined were workable proxies for each of my main variables (human capital, financial capital, and performance).

For human capital, I decided to use founders'/owners' startup experience. This is a good indicator because of prior research that suggests that the tacit knowledge that is brought into the firm by a prior entrepreneur can be very valuable. Knowledge of how to effectively manage a business enterprise is generally tacit and is normally acquired by a substantial investment of time in observing, studying, and involvement in making business decisions. As such, a new venture can increase its chances of success by having this know-how made available through the contribution of those that represent this tacit knowledge (Cooper, Gimeno-Gascon, & Woo, 1994).

For financial capital, I chose the founders'/owners' cash assets. This makes sense given the pecking order theory (Myers, 1984), as mentioned earlier, which maintains that financing preferences at the start of business formation are constrained toward owners' equity & personal savings, but then have a preference for external debt over equity.

For performance, I went with a calculated measure of revenue. This helps us to understand where the firms are positioned given the amount of money they are making from

their products and/or services. Each of these constructs was still measured over four years, thus providing four manifest variables for each latent construct, representing each measure from baseline through the third follow-up.

The First Revised Model

For my first revised model, I changed the model from a second-order one to a first-order model. In looking at the variables chosen (founders'/owners' startup experience for human capital, founders'/owners' cash assets for financial capital, and calculated revenue for performance), I did so from a theoretical perspective and also giving consideration to the measures which I considered to be most reliable. Figure 11 shows the proposed relationships, with cash assets representing financial capital, founders'/owners' startup experience representing human capital, and calculated revenue representing performance.

However, when considering the financial capital variable and how it changed over time, it was determined that a linear curve model is not appropriate because the data do not achieve a linear growth. This is evidenced by looking at the means for the four financial capital manifest variables (cash assets at baseline, time 1, time 2, and time 3), which are relatively stable. This was not the case for the other latent constructs, human capital and performance. Therefore, I need to consider how the model may be altered as a result of this.

I cannot consider the slope of financial capital for my hypotheses because there is not enough change in the variable. This is revised in my following model. In all, I specify a number of models (all with an incremental change from the prior one) before I arrive at my final accepted model against which all subsequent models will be tested. Appendix B details these iterations. It is important to note that these changes in model fit do not affect my hypotheses or

the directions of causality of the latent constructs. Table 3 details the change in fit indices for these models. I will now focus on the final model.

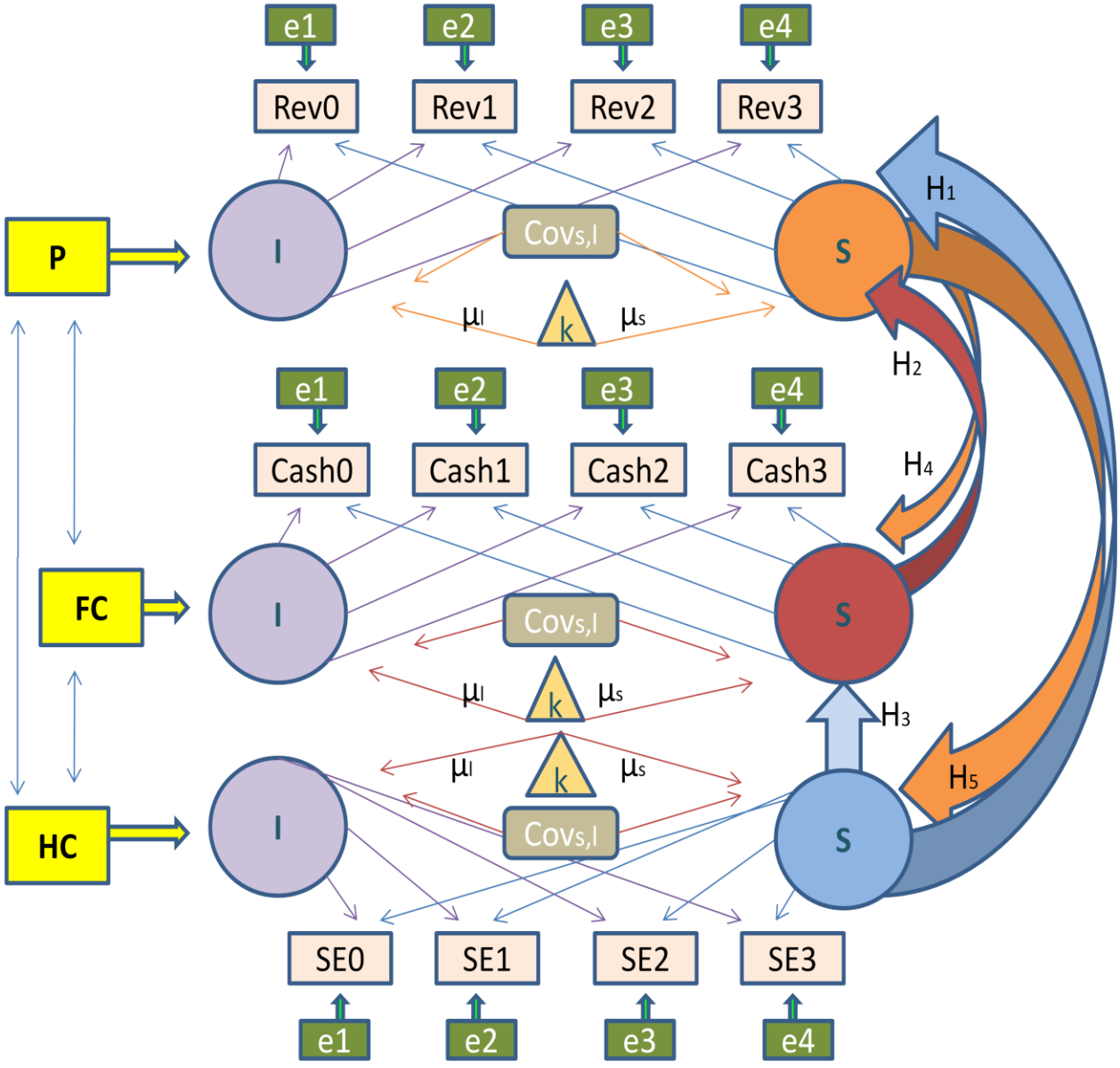

Figure 11: Revised Measurement Model with Specified Relationships

Table 3: Fit indices of variables (4 time points) for latent curve model.

	Fit Indices								
Models	***χ2***	***χ2 df***	***RMSEA***	***GFI***	***CFI***	***PGFI***	***NFI***	***NNFI***	***Neg. Eig.***
Revised Model 2	3134.28	44	0.119	0.925	0.913	0.522	0.912	0.847	2
Revised Model 3	3587.00	50	0.119	0.909	0.901	0.582	0.900	0.845	2
Revised Model 4	3712.00	56	0.115	0.905	0.897	0.650	0.896	0.857	0
Revised Model 5	2803.00	55	0.100	0.926	0.923	0.652	0.921	0.891	0
Revised Model 6	1251.00	45	0.074	0.963	0.966	0.555	0.965	0.942	0
Revised Model 7	1254.00	48	0.071	0.963	0.966	0.593	0.965	0.945	0

note*: n= 4928*

The Final Model

Goodness of fit indices for this respecified measurement model are presented in Table 3. This table shows that the revised measurement model displayed values greater than .9 on the NFI and the comparative fit index (CFI), and the non-normed-fit index (NNFI) indicative of an acceptable fit (Bentler & Bonett, 1980; Bentler, 1989). Although some indices are not quite as high as the previous model, all parameter estimates are significant. Given this, I feel that I have the best model that not only makes theoretical sense, but also fits the data. Therefore, this model was tentatively accepted as the study's "final" measurement model, as a number of tests were conducted to assess its reliability and validity.

The significance tests of the manifest variables' path to the latent constructs of human capital, financial capital, and performance are presented in Table 4. Factor loadings for the indicator variables are presented in Table 4, with standardized coefficients displayed in Table 5. The SAS System's CALIS procedure provides approximate standard errors for these coefficients which allow large-sample t tests of the null hypothesis that the coefficients are equal to zero in the population. It is suggested that the path coefficient t value should exceed 1.96 at the $p < .05$ level, exceed 2.58 at the $p < .01$ level, and exceed 3.30 at the $p < .001$ level (Hatcher, 1994). The t scores obtained for the coefficients in Table 4 range from 2.4 through 51. Because they were all greater in magnitude than 1.96, this indicates that all factor loadings were significant at the $p < .05$ level. This finding provides evidence supporting the convergent validity of the indicators (Anderson & Gerbing, 1988). Table 5 shows these equations with the standardized path coefficients as well as the residual terms (i.e., error term, disturbance term). Path coefficients may be regarded as standardized linear weights that represent the size of the effect that an underlying factor has in causing variability in the variable. These residuals represent the

variable's variability that came from factors other than the independent manifest variables. They may represent causal effects on the dependent variable due to omitted independent variables, random shocks, or specification errors in the equation (James, Mulaik, & Brett, 1982).

Combined, these findings generally support the reliability and validity of the constructs and their indicators. The revised measurement model was therefore established as the study's final measurement model against which other later models would be compared.

Table 4: Path Analysis Equations; Manifest Variables with Estimates

Dependent Variable / Independent Variable	*Path Coefficient*	*Standard Error*	*t-value*
AssetsCash2			
AssetsCash1	0.6136	0.0120	51.0600
AssetsCash0	0.1886	0.0123	15.3400
AssetsCash3			
AssetsCash2	0.5133	0.0132	38.8500
AssetsCash1	0.1850	0.0138	13.4300
AssetsCash0	0.0884	0.0117	7.5700
StartupExp0			
Int Exp	1.0000		
StartupExp1			
Int Exp	1.0000		
Slp Exp	1.0000		
StartupExp2			
Int Exp	1.0000		
Slp Exp	2.0000		
StartupExp3			
Int Exp	1.0000		
Slp Exp	3.0000		
Revenue0			
Int Rev	1.0000		
AssetsCash0	0.2413	0.0247	9.7800
Revenue1			
Int Rev	1.0000		
Slp Rev	1.0000		
AssetsCash1	0.4561	0.0216	21.1660
AssetsCash0	0.0723	0.0241	3.0040
Revenue2			
Int Rev	1.0000		
Slp Rev	2.0000		
AssetsCash2	0.4817	0.0226	21.3428
AssetsCash1	0.0778	0.0238	3.0859
AssetsCash0	0.0483	0.0211	2.4000
Revenue3			
Int Rev	1.0000		
Slp Rev	3.0000		
AssetsCash3	0.4988	0.0179	27.8430

Table 5: Path Analysis Manifest Variable Equations with Standardized Estimates

Dependent Variable / Independent Variable	*Path Coefficient*	*Error*
AssetsCash2		0.6182
AssetsCash1	0.6382	
AssetsCash0	0.1918	
AssetsCash3		0.6131
AssetsCash2	0.5490	
AssetsCash1	0.2058	
AssetsCash0	0.0961	
StartupExp0		0.6881
Int Exp	0.7256	
StartupExp1		0.7925
Int Exp	0.7256	
Slp Exp	0.1277	
StartupExp2		0.5691
Int Exp	1.1935	
Slp Exp	0.4201	
StartupExp3		0.9121
Int Exp	0.7425	
Slp Exp	0.3920	
Revenue0		0.7338
Int Rev	0.6983	
AssetsCash0	0.1869	
Revenue1		0.7583
Int Rev	0.7169	
Slp Rev	0.2387	
AssetsCash1	0.3711	
AssetsCash0	0.0575	
Revenue2		0.7130
Int Rev	0.7437	
Slp Rev	0.4953	
AssetsCash2	0.3909	
AssetsCash1	0.0620	
AssetsCash0	0.0418	
Revenue3		0.6403
Int Rev	0.7817	
Slp Rev	0.7809	
AssetsCash3	0.3977	

The basic LGM consists of two latent factors with the repeated measures over time serving as the indicators (Duncan, Duncan, & Hops, 1998). The first common factor corresponds to the intercept, the point at which the growth curve intercepts the vertical axis at the initial time point. The intercept factor corresponds to information in the sample relating to the mean and variance of the collection of individual intercepts that characterize each individual's growth curve. The second factor characterizes the slope or shape of an individual's trajectory over time. The means of the intercept and slope factors depict growth parameters. The variance of the latent factors reflects the variation of each individual subject around the group mean. The intercept and slope are allowed to covary.

The factor loadings on the slope give a clue as to the form or shape of growth. A linear growth curve had been specified for the repeated measures I used, given the theoretical foundations for the study.

The squared multiple latent variable equations are presented in Table 6. As we can see, t-values range from 9.80 to 23.27 in magnitude. Although some t-values are negative, since they exceed the relative value of 1.96, they are still considered significant. Table 7 provides further detail by revealing the squared multiple correlations and information about variances. The R-squared displayed in Table 7 variables represent the percent of variance that can be explained by the manifest variables. Therefore, the results suggested that the latent constructs of Startup Experience Slope and Intercept, and Revenue Slope and Intercept, have between approximately 7-13% of their variance explained. Interestingly, the highest percentage is for the intercept of Startup Experience, while the lowest is for the slope of Startup Experience.

Table 6: Latent Variable Equations

Dependent Variable	*Path Coefficient*	*Standard Error*	*t-value*	*Standardized Esimate*
Intercept StartupExp	1.3181	0.0567	23.2713	0.3598
Slope StartupExp	-0.1678	0.0159	-10.5350	0.2602
Intercept Revenue	1.1165	0.0912	-12.2448	0.3039
Slope Revenue	0.3477	0.0354	9.8089	0.3000

Table 7: Squared Correlations

Variable	*Error Variance*	*Total Variance*	*R-square*
1. Cash2	5.369	14.047	0.617
2. Cash3	4.616	12.279	0.624
3. StartEXP0	12.074	25.498	0.526
4. StartEXP1	16.014	25.496	0.372
5. StartEXP2	3.052	9.424	0.676
6. StartEXP3	20.259	24.351	0.168
7. Rev0	13.034	24.203	0.462
8. Rev1	13.205	22.965	0.425
9. Rev2	10.846	21.334	0.492
10. Rev3	7.919	19.314	0.590
11. IntExp	11.687	13.425	0.130
12. SlpExp	0.388	0.416	0.068
13. IntRev	10.554	11.801	0.106
14. SlpRev	1.188	1.309	0.092

Table 8: Covariances of Latent Constructs

Parameter	*Covariance*
SLP StartupExp x SLP Revenue	-0.0975
SLP StartupExp x INT Revenue	0.3131
INT StartupExp x SLP StartupExp	-1.9578
INT Revenue x SLP Revenue	-2.1285
INT StartupExp x INT Revenue	-1.5045

Table 8 shows the parameters of latent constructs and their associated covariances. As can be seen, the highest covariance is that shared between the intercept of revenue and the slope of revenue, at -2.1285. The smallest covariance is between the slope of startup experience and the slope of revenue (-.0975).

Below, Table 9 depicts the correlations of latent constructs. The highest correlation is between intercept of startup experience and the slope of startup experience (-.9198). The smallest correlation is between the intercept of startup experience and the slope of revenue (.0039).

Table 9: Correlations of Latent Constructs

Parameter	*Correlation*
SLP StartupExp x SLP Revenue	-0.1437
SLP StartupExp x INT Revenue	0.1548
INT StartupExp x SLP StartupExp	-0.9198
INT Revenue x SLP Revenue	-0.6012
INT StartupExp x INT Revenue	-0.1355
INT StartupExp x SLP Revenue	0.0039

Autoregressive and Cross-lagged Effects

A first-order autoregressive model (Joreskog, 1970) or simplex pattern (Guttman, 1954) within the covariances among the different targets of identification may be used to test the hypothesis of a linear dependence structured in a sequence.

The autoregressive covariance structure signifies a correlation as a function of the time between two repeated measurements. A first-order autoregressive structure is typically used for time-series data (Liang & Zegler, 1982; Duncan et al., 1995).

I test autoregressive within the context of a separate model which accounts for this type of process and can indentify cross-lags that may be apparent. In accordance with my hypotheses, the model for these effects is shown in Figure 12.

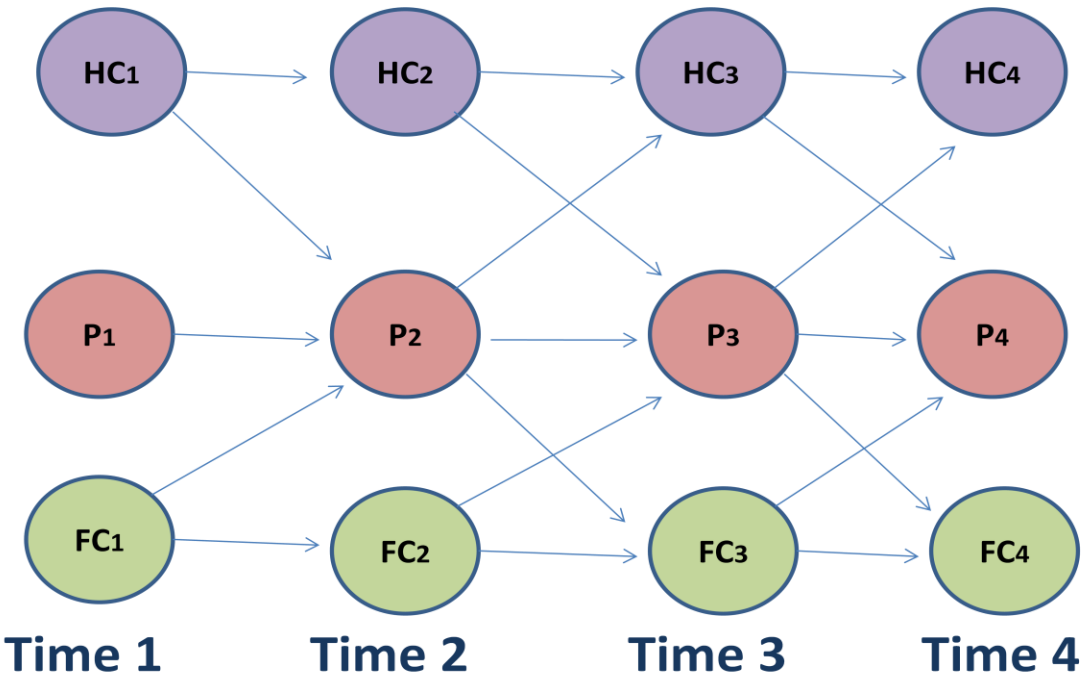

Figure 12: Model of Autoregressive and Cross-Lagged effects.

I first do a test of the overall model in Figure 12. This model specifies that there are autoregressive processes as well as cross-lags occurring. The overall model has a satisfactory fit, as evidenced by the fit indices presented in Table 10. Again, although the chi-square is large, this is compensated by a good fit of the other indices, which are not as sensitive to sample size. Thus, this model serves as the final model without further iterations. I can then go on to examine the parameters.

The parameters all have significant t-values (>1.96), which leads to the acceptance all of the pathways as statistically significant. However, some of these are negative, including startup experience at follow-up 3 as related to startup experience at follow-up 2 and baseline; revenue at follow-up 2, which is negative as related to startup experience at follow-up 1; and revenue at follow-up 3, which is negatively related to startup experience at follow-up 2.

Table 10: Fit Indices for Autoregressive and Cross-lagged Model

	Fit Indices								
Models	***χ2***	***χ2 df***	***RMSEA***	***GFI***	***CFI***	***PGFI***	***NFI***	***NNFI***	***Neg. Eig.***
Autoreg. & CL Model	1654.22	35	0.097	0.951	0.924	0.504	0.923	0.845	0

note*: n= 4928*

Although not directly hypothesized, I feel it is important to look at the individual autoregressive processes that may be occurring. My first test is for human capital. As shown in Figure 12, this process is positive between HC1 and HC2, as well at HC2 and HC3, where it is somewhat stronger. However, between HC3 and HC4, the autoregressive effect is negative.

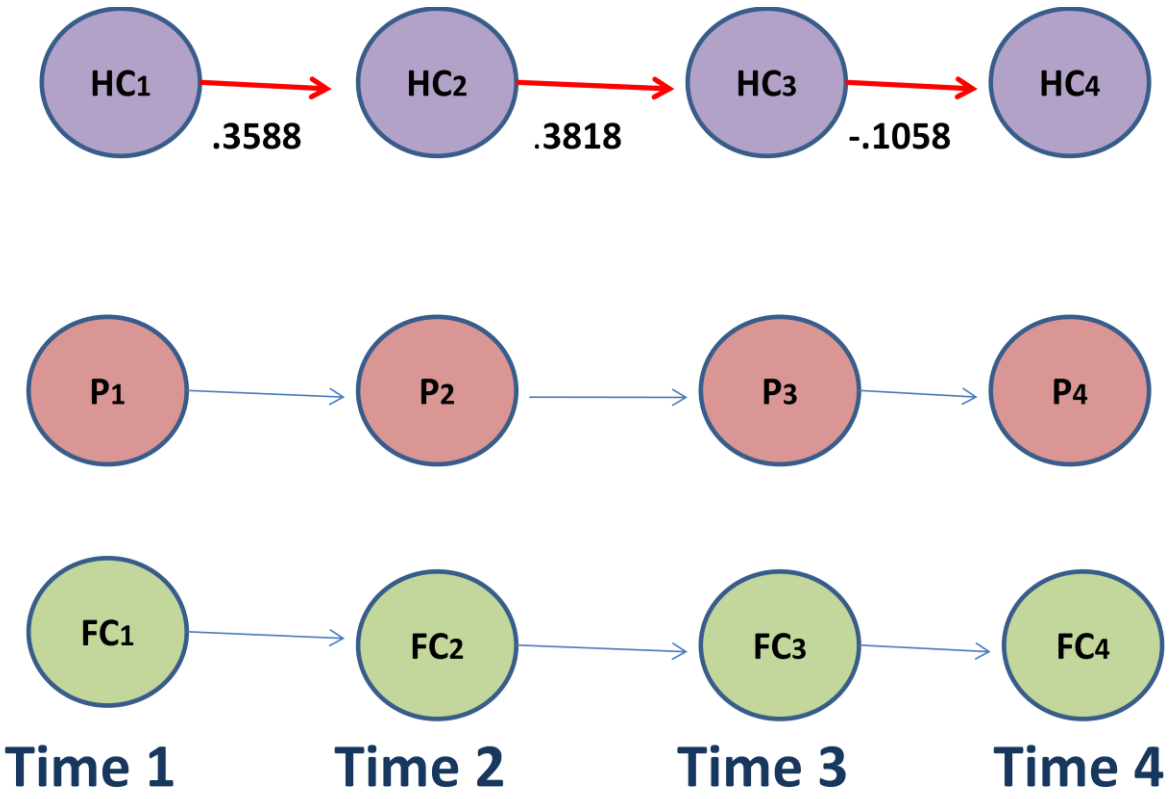

Figure 13: Autoregressive Process of Human Capital

In terms of financial capital, I find that the autoregressive effect gets larger and then smaller, as shown in Figure 14. The same is shown for Performance, as is seen in Figure 15.

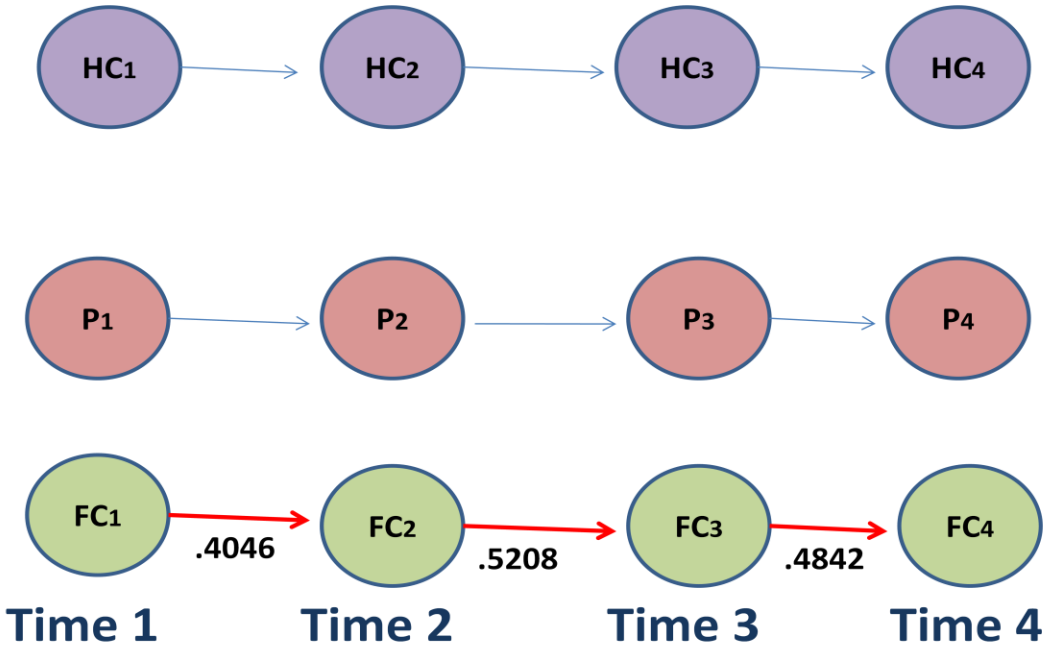

Figure 14: Autoregressive Processes of Financial Capital

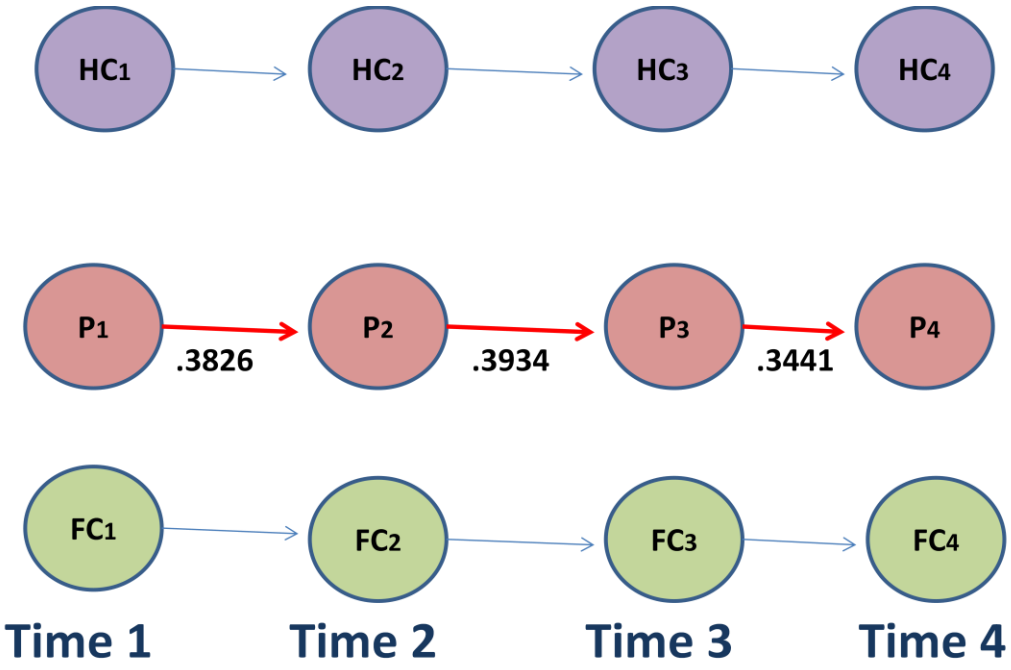

Figure 15: Autoregressive Processes of Performance

For the cross-lagged effects, I first look at human capital affecting performance in later time periods. This is recorded at three time points (i.e., repeated measures). Figure 16 shows this relationship. Over all three cross-lags, this relationship is negative. Thus, as human capital goes up, performance is expected to diminish.

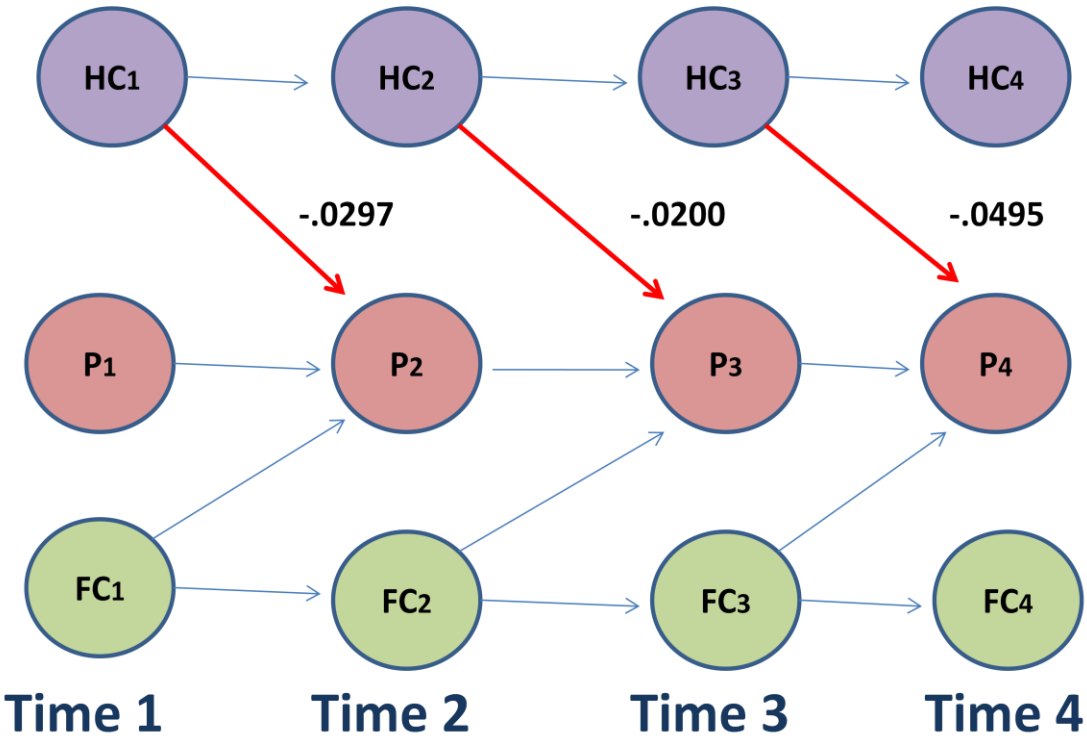

Figure 16: Cross-lagged effects of Human Capital on Performance

I subsequently look at the cross-lagged effect of financial capital on performance at later time points. As predicted, this is positive cross-lagged effect. Thus, as cash assets increase, performance is likely to increase as a result in later time points.

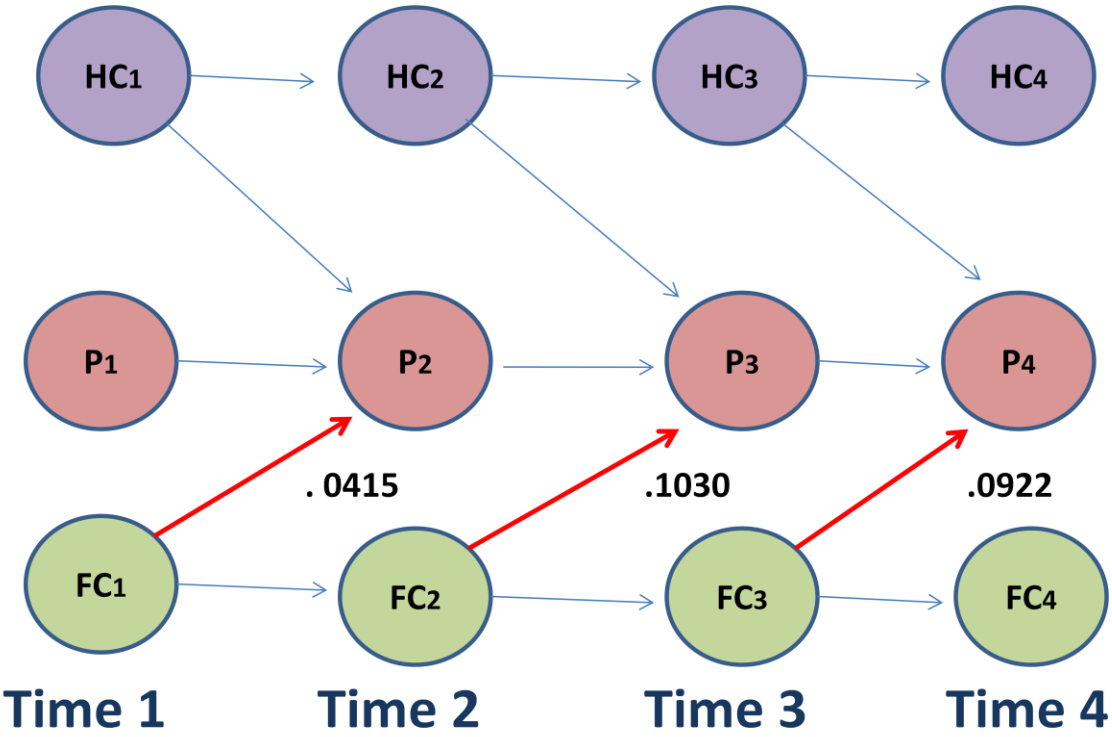

Figure 17: Cross-lagged effects of Financial Capital on Performance

Perhaps the most interesting cross-lags are those having to do with performance influencing resources at a later point. First, I look at how performance influences human capital. Figure 18 shows that this is repeated twice. As a positive relationship, I can conclude that a firm's early performance has effects upon whether its human capital will increase, even if at a small rate.

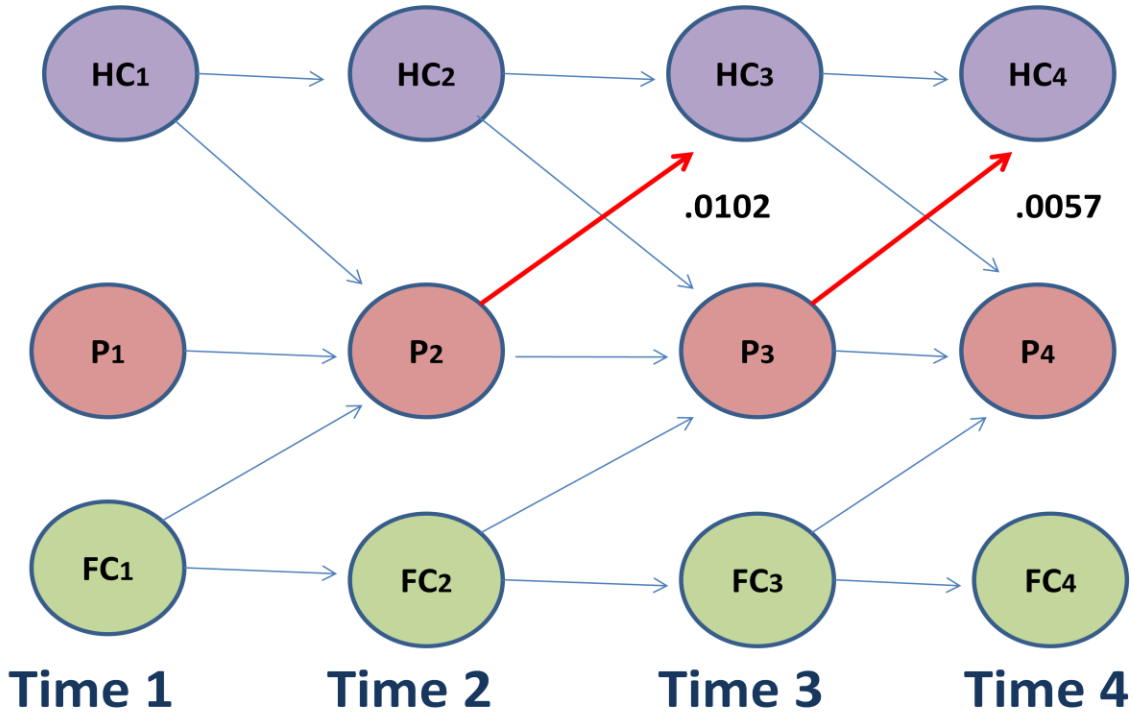

Figure 18: Cross-lagged effects of Performance on Human Capital

I also consider the cross-lagged effect of performance on financial capital, again at two time periods. Once again, this is a positive relationship. I find that as early levels of performance increase, financial capital is also likely to increase. Figure 19 shows that as time goes on, this figure increases.

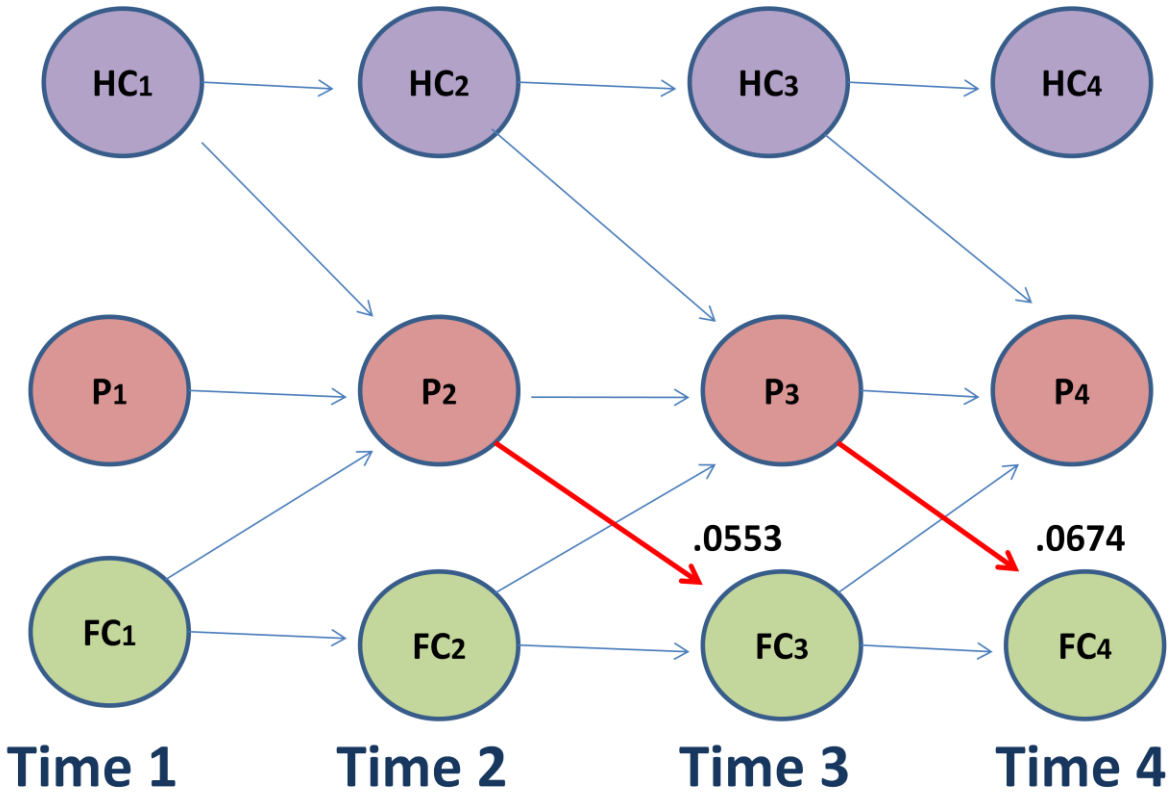

Figure 19: Cross-lagged effects of Performance on Financial Capital

Hypotheses Testing within the LGC Framework

I have been able to test most of my hypotheses within the LGC framework, and my results are considered as reliable as well as replicable. While I was not able to test hypotheses relating to the latent slope of financial capital, I was able to use the intercepts to inform the results in other ways. Again, because of the non-normality of the data, financial capital was not the linear construct that I had proposed.

Thus, I was able to use performance and human capital as constructs for the growth hypotheses, as both the intercepts and slopes for each could be tested. I found that human capital, specifically founders'/owners' startup experience did influence the slope of performance. I also found that performance does have an impact upon human capital. In terms of the cross-lagged

hypotheses, I discovered that, in fact, there are autoregressive processes in motion. Given this, there are cross-lagged effects apparent from human capital to performance, and financial capital to performance. Furthermore (and perhaps even more interesting), is the cross-lagged relationships between performance early on and subsequent levels of human capital and financial capital. So how a new firm performs early on really does make a difference in their resource allocations in the future.

Additional Analyses

After examination of my initial research questions, I conducted additional analyses to get a richer sense of the processes occurring in our model. These analyses were conducted to inform me how far reaching effects of constructs stretched (i.e., beyond affecting the next time period, how did they affect the one afterwards, and the one after that).

Additional analyses were conducted on the autoregressive model. Essentially, the hypotheses centered around first-order autoregressive processes (i.e., from one time point to the next). However, I decided it might be worthwhile to see if second-order autoregressive processes were in play, as well as even third-order. A second-order involves one time removed (e.g., follow-up 1 affecting follow-up 3), whereas a third-order involves two instances removed (e.g., baseline affecting follow-up 3). I consider this for all three variable classes: human capital, financial capital, and performance. Figure 20 shows the results for second and third-order autoregressive processes for human capital. This is significant, thus early measures of human capital do affect later measures. Likewise, financial capital is significant. This process is shown in Figure 21. Lastly, I find that performance also holds second and third-order autoregressive effects. This process is modeled in Figure 22. What I can conclude by this is that there are, in fact, several autoregressive processes evolving past first-order relations. Thus, a firm's resources

at early stages do affect resources at the next stage, as well as later stages. The same is true for performance. New firms must not underestimate the effects of early resources and performance on later effects, given this association.

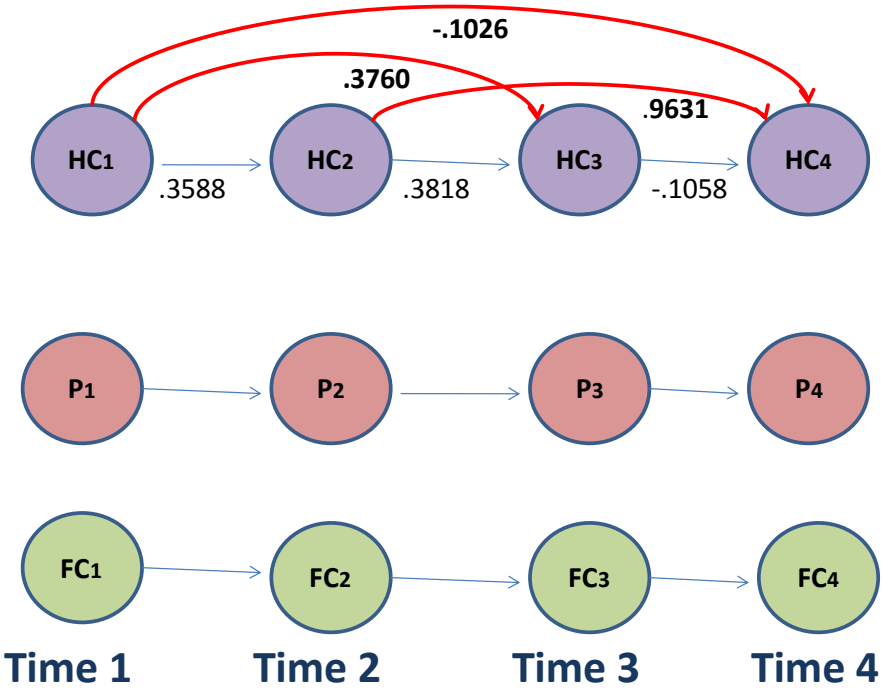

Figure 20: Second and Third-Order Autoregressive Effects in Human Capital

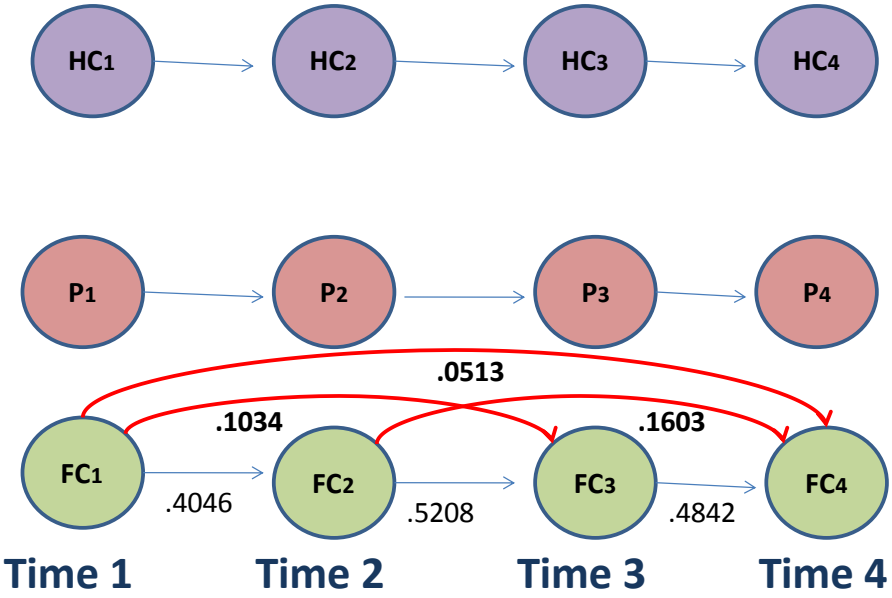

Figure 21: Second and Third-Order Autoregressive Effects in Financial Capital

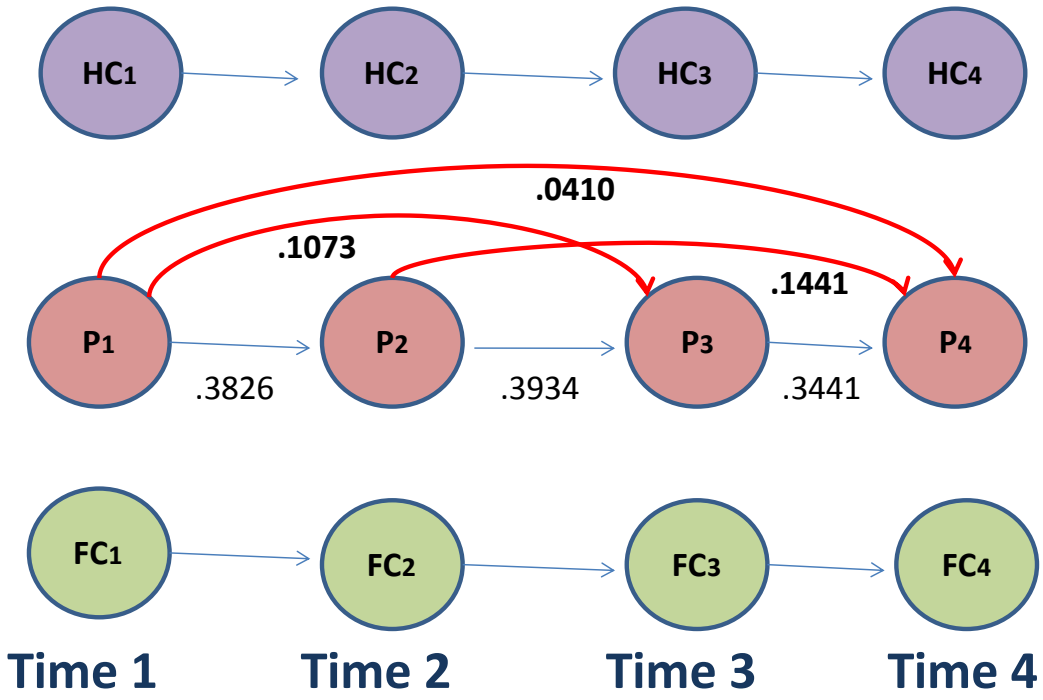

Figure 22: Second and Third-Order Autoregressive Effects in Performance

I also looked at the control variables specified in the previous chapter. I attempted to hold these variables constant in order to clarify the relationships between resources and performance. These controls included the industries of the firms, the geographical locations of the firms, and the output of the firms (i.e., product / service orientation). I also later decided to consider the number of employees and the number of owners. For some of these, I could not run the analysis because of the way the variables were coded. Although I attempted to correct for this, the dataset provided is fixed and does not allow the calculation of new coding schemes. As for other variables, unfortunately, model fit was severely diminished with the addition of these, and so they were dropped from the model. Given these problems, I could not accurately test and find significant results with these control variables, and I was not able to include them in the final

model. I could not deal with these control variables and test them in the way I had anticipated, and therefore this is something that needs to be accounted for in future studies. Furthermore, because of this, the results of my analyses must be interpreted with caution. By not being able to hold the above variables constant, they may complicate the relationships between resources and performance. For example, it may be that the relationship between human capital and performance is somehow influenced by the geographical location of the firm. This is why for future studies in this domain, being able to control variables such as these would be highly beneficial to understanding the true nature of the relationships between resource classes and performance.

CHAPTER 5: CONCLUSIONS

My study has potential implications for strategy and entrepreneurship scholars alike, and may help entrepreneurs in understanding which resource classes are most necessary early on. In this section, I discuss the results of my predictions and explore the meaning of these findings. The main goal of this study was to see how resource attainment may or may not influence growth or decline in new firms. Contributions of this study include the addressing of a gap in the literature, an increased understanding of the different classes of resources, and lastly, the use of a statistical tool which can suit related dynamic questions.

Hypotheses' Results

H_1: *As founders'/owners' human capital increases over time, firm performance will increase*

Not supported; As HC increases, performance decreases (negative relationship)

H_2: *As financial capital increases over time, firm performance will increase*

Unable to test (not enough variance in means)

H_3: *The rate of change in founders'/owners' human capital will explain the rate of change in financial capital in later time periods*

Unable to test (not enough variance in means)

H_4: *As firm performance increases over time, human capital will increase*

Not supported; As Performance increases, HC decreases (negative relationship)

H_5: *As firm performance increases over time, financial capital will increase*

Unable to test (not enough variance in means)

H_6: *There will be cross-lagged effect of founders'/owners' human capital on firm performance, such that the amount of human capital in an earlier time period will positively affect the level of performance in the next*

Not supported; HC negatively affects performance in the next time period

H_7: *There will be a cross-lagged effect of financial capital on firm performance, such that the amount of financial capital in an earlier time period will positively affect the level of performance in the next*

Supported

H_8: *There will be cross-lagged effect of firm performance on human capital, such that the level of performance in an earlier time period will positively affect the amount of founders'/owners' human capital in the next*

Supported

H_9: *There will be a cross-lagged effect of firm performance on financial capital, such that the level of performance in an earlier time period will positively affect the amount of financial capital in the next*

Supported

Discussion of Findings

In terms of the relationship between startup experience and revenue, there are some surprising findings. First of all, the slope of startup experience is associated with a negative slope of revenue. Thus, as a firm's human capital in this domain increases, their performance falls. It may be that these founders/owners, all with their own entrepreneurial experiences, may encounter substantial levels of managerial hubris, which can impede communication. As a firm builds startup experience (either by adding new owners who have experience or by existing owners' becoming involved in new ventures) the performance drops. If a firm builds this experience by adding new owners, it may be the case that new people on board need time to "adjust" before they can bring favorable performance outcomes to the firm. On the other hand, if a firm builds startup experience by having their existing owners become involved with more new ventures, it may be that these owners are distracted by their other endeavors, and without focus on the original firm, performance decreases. So this may be an issue of owners becoming

distracted by the "newest and brightest" venture. It may be that these owners need to focus and not diversify their interests in so many new firms, but rather focus on one. If the firm is building startup experience purely by adding new people, then perhaps better orientations and/or trainings can help to equip these people to become accustomed to the climate, goals, and industry environment of the firm so that they may be beneficial early on.

However, when looking at the intercept of startup experience and the slope of revenue, the opposite is true, as there is a positive relationship. If a firm starts high on human capital, maybe it is a signal of legitimacy which helps their performance to increase in subsequent periods, leading to an increasing slope. So consider this, an emerging firm has many founders'/owners' with startup experience on board. It may be that this shows others within the industry that the new firm is credible. It may also signal to holders of other resources (e.g., financial capital) that these people have been through the startup process before, and therefore the venture may be viewed as less of a risk than one without this experience. With these advantages, it may be relatively easy for a firm to see increases in performance over time. If the emerging firm starts high on human capital not because they have several founders/owners with startup experience, but perhaps only one to a few founders/owners who have substantial startup experience, then it may be that the firm has a "star player" or two who has opened many businesses. By having this star player, there may be a greater propensity of recognizing opportunities or understanding how to mitigate threats because the star player has "been there before". This experience is valuable and the entrepreneurship literature points to the advantages of being a serial entrepreneur. Thus, with high human capital at the start, either from a lot of players with some startup experience or one to a few key players with substantial experience, performance is likely to increase. Given this, it is important for emerging firms to start with the

right people early on, since high human capital at emergence is associated with positive increases in performance, but growing human capital over time is not.

In looking at the relationships of the intercept of startup experience and the slope of startup experience, I find that there is a negative association. So this means a higher a firm's initial startup experience, the faster it will fall! If a firm begins operations with high industry experience, they lose that experience over time. It could be that these persons have better opportunities elsewhere, as literature suggests that those with high human capital often have a higher propensity for leaving firms. Or it may be that these star players get bored easily, and want to move on to their next venture opportunity. Perhaps there are those serial entrepreneurs who serve as founders that like to see a business take off, but have no interest in staying with the firm over time. This may result from boredom or loss of novelty. Or it may be that these founders / owners are more likely to see a sinking ship in the long-term. So even if a firm is performing well, these high startup experience founders and owners may forsee obstacles that may be even years down the road and leave the firm. With high startup experience, it is likely that these founders and owners would recognize this before those with low startup experience, given what they may have encountered with prior startups. So firms who have high startup experience at firm birth are likely to see more of that experience leave than a firm that starts out with low startup experience.

Considering revenue, I find that there is a positive relationship between the intercept of revenue and the slope of revenue. Therefore, it can be concluded that starting off with strong performance makes it likely that a firm's performance will continue to steadily grow, at least over the next three years. So there is an advantage to a firm having strong performance from the start, as this is associated with higher performance growth. Entrepreneurs need to understand that

the beginning stages of a firm's life are key, as this impact performance at subsequent time points for the firm.

In terms of the autoregressive and cross-lag analysis, some thoughtful conclusions can be made. In terms of first-order autoregressive processes for human capital, I find that this is positive until time 3 to time 4. It may be at this time point that a firm's human capital is not as dependent upon their human capital level in previous occasions. For the first-order autoregressive effects of financial capital, I find that this is positive over time. The same is true for performance, except that it decreases slightly over time. Thus, the performance of a firm in early stages is contingent upon their performance in the prior stage, however this effect gets smaller as time progresses. This may be that as a firm emerges, what they do in the stage beforehand is especially critical, but as the firm grows, they are no longer dependent upon what has been done prior.

For the cross-lag analysis, I find that there is a negative effect of human capital on performance in the next year. Thus, a higher human capital is associated with a lower performance in the next time period. As more people get on board, there may be more conflict or managerial hubris, which impacts performance the following year. In terms of financial capital, this is a positive cross-lag throughout, showing that having good finances at a given time positively contributes to performance in the next year. This makes sense given prior arguments of financial capital and the associated performance implications. Having money early on is associated with strong performance in the next time period. Money allows for more risk-taking, innovation, provides for a cushion, and leads to experimentation.

Now I look at the cross-lags of performance to the two resource classes. There is a positive relationship between performance and human capital. Thus, when a firm is performing

well, their human capital is inclined to increase in the next time period. It may be because they are able to attract more experienced founders/owners when they are successful. Likewise, this is the case with financial capital. Firms that are performing well will have an increase in their financial resources in the following time period. What this means is that capital classes do affect performance in the next time period, and performance likewise affects acquisition of subsequent resources. This is an interesting cycle, and one that can have implications on firm success.

In looking at second and third-order autoregressive effects in human capital, I find that second order effects are positive. Therefore, the amount of human capital at a given time period has positive implications for the next two time periods. In terms of third-order autoregressive effects, this is a negative association. Therefore, human capital at onset does not have a positive influence on human capital in year 4. High levels of startup experience early on impacts the level later, as firms starting high on startup experience are likely to lose it in time 4. It may be that there is some sort of other event or exogenous factor that is causing people to leave at this point. This may be a function of entrepreneurs or founders bailing out after the firm ages and the novelty fades.

Next, in terms of second and third-order autoregressive effects for financial capital, I find that both of these are positive. Therefore, I can conclude that financial capital early on does impact not just financial capital in the next time period, but also the levels of financial capital in years to come. However, it should be noted that these effects get weaker over time. So first-order autoregressive effects are the strongest, second-order are somewhat weaker, and third-order effects are weakest, although still significant. Thus, financial capital at firm creation is key since it holds consequence at least four years later – and maybe longer! Money symbolizes legitimacy and may be used to acquire other resources. Money impacts money over time… but how far out?

With subsequent waves I can examine how far along in the firms' lifecycle that this effect takes place.

Finally, for second and third-order autoregressive effects for performance, similar to financial capital these are all positive, with first-order effects being strongest, second-order weaker, and third-order weakest, but still significant. Performance early on is critical, as it affects future performance not just in the next time period, but for years to come. Although the carry-over effect weakens for each additional time lag, the effect is still there and definitely worth noting. This supports claims in the entrepreneurship literature of performance early-on being so critical for new ventures. Entrepreneurs must recognize that doing well from the beginning holds consequence for the firm in times to come. Thus, firms will want to do their best from the time they start if they want to be associated with high performance in later times. This is a very interesting carry over effect. Maybe if a firm is known for being successful, or performing well, early on, people attribute the success to the firm, are more drawn to it, and help to ensure its future success.

Contributions

This study is about how the resource accumulation process unfolds in new firms. My models have some important findings that can inform both strategy and entrepreneurship researchers alike. By understanding not just the theoretical questions involved, but also the power of the methods used, I can guide future research in this domain.

First of all, I have findings that help us understand the idea of one growth curve affecting another, as in the case of Human Capital affecting Performance. This is a very telling model, in that as this type of resource grows (or diminishes), the growth of performance is in turn affected.

Furthermore, I was able to look at slope at it relates to a curve. So taking into account a stationary measure as it impacts a curve is valuable. It helps us to consider how some processes that are stationary and others that are longitudinal can be modeled together.

By considering cross-lags, I can see via a repeated measures design how one variable can impact another over time. Human Capital and Financial Capital influence Performance. This is perhaps not so surprising, but more surprising is the direction and the influence of negative relationships. Also, I have posited that Performance early on has the capacity to affect resource classes at later time points. Indeed, this is the case. This gives credence to the idea that early performance is important for a firm. Ironically, the first steps do have the ability to influence the entire pathway for a new firm as they grow or fall.

A Dynamic Approach

By using a longitudinal data set and taking a dynamic approach, this research can overcome the flaw of a "static" point-of-view. Resource accumulation is an important process in newly formed ventures, and the understanding of this issue necessitates the analysis of growth or decline over time. A study in this domain needs to have a data set that allows for multiple time-points, and the researcher must be equipped with the appropriate research tools to analyze it effectively.

Inherent in my data, each firm has four time-points at which the variables are measured. This is important as it allows me to make conclusions about the trajectories of the latent constructs with a reasonable degree of confidence. As the KFS adds waves, more time points will be added and subsequent analyses may uncover interesting trends that are not apparent early on. For example, with four time points, the relationship between two time points may appear

linear. However, when I are able to look at eight time points, it may become apparent that at a point the growth tapers off and stability ensues. Thus, with a dynamic approach, trends that would otherwise be dormant may be discovered.

Furthermore, with a dynamic approach, fascinating cross-lagged effects may be looked at. This is substantial since this allows for greater confidence in causal relationships. The literature has seen little work using this tool, and by using it, this study can help other researchers to see the value in approaching resource accumulation questions from a dynamic point of view.

Resource Classes

Understanding resource accumulation and optimal designs/sequences helps real-world entrepreneurs and has significant consequence for allocation of time and money early on, and in what areas. There is credibility in the idea that one of the toughest balances for entrepreneurs is that of resources early on: too little and you're floundering, too much and you're inefficient (Barringer, 2008; George, 2005).

Insight into why firms are successful or fail is essential to the stability and strength of our economy (Gaskill, Van Auken, & Manning, 1993). About 10-15% of all firms are either created or closed down every year in industrialized and emerging economies (Aghion et al., 2007).

One of the most interesting topics in this study is that of resources as a driver in the ability to beget other resources. In my work, I hypothesize that human capital influences the acquisition of financial capital. This expands upon what we know about resources in that they don't operate in isolation, and that researchers should consider the effects that resource classes have on one another.

This research stream is one of concern for entrepreneurs. It builds upon past research and allows us to further our inquiry on determinants of new venture success. With the present study taking a slice of it, it is possible to embark on complementary studies using the Kauffman Firm Survey in years to come as the database is enlarged.

Growth Curve Analysis

A contribution to the entrepreneurship literature specifically is the use of growth curve analysis. As entrepreneurship research has evolved, its early reliance on descriptive statistics and correlation analysis has matured to methods using a variety of regression techniques (Dean, Shook & Payne, 2007). Such methodological advances in the field have improved our ability to distinguish the significance of different factors connected to new venture emergence and success (Dean, Shook & Payne, 2007). They have offered us a glimpse into the underlying dynamics that contribute to new venture success or failure.

Although popular methodologies in entrepreneurship can help us understand the entrepreneurial process, advances can be made. One critical shortcoming of current methods used in entrepreneurship research is their ability to effectively analyze change over time in terms of growth and decline. Recent entrepreneurship critiques have highlighted the need to examine dynamic processes and outcomes using longitudinal data in order to understand causal processes affecting entrepreneurship (Ireland, Reutzel, & Webb, 2005; Shook, Ketchen, Cycyota, & Crockett, 2003). Other analytical techniques have been limited in their abilities to perform this.

Growth curve analysis is a method that is not common in entrepreneurship research. This is an advanced procedure used in structural equation modeling that offers a powerful means of assessing growth and decline over time while correcting for biasing effects of measurement error (McArdle, 1988; Meredith & Tisak, 1990; Muthén & Muthén, 1991; Sivo, 2001). It has the

potential to be a useful tool in entrepreneurship research as questions regarding growth and decline are analyzed. Latent growth curve analysis provides greater flexibility for testing varied research proposals about growth and decline than other analytic techniques (Sivo, Fan & Witta, 2005; Curran, 2000). This is a robust method applied primarily in psychology and education that can be used to enhance entrepreneurship research. It may remedy limitations inherent in cross-sectional and single informant designs, especially with respect to accounting for measurement error that biases inferences drawn from data. Such a method can be used to analyze antecedents and consequences of growth that span multiple levels of analysis, and it is possible to examine how those effects change over time.

By using growth curve analysis in the current study, my research questions were able to be analyzed in a way that accounts for their evolution over time, and how the evolution of one construct may in turn affect the other. Given the methodological advantages of this impactful tool, there is a higher degree of confidence in the conclusions made.

Potential Avenues: Post Hoc Power Estimation

Given all that I have discovered, a next potential step is in post hoc power estimation and effect sizes. Power is the probability of rejecting the null hypothesis (H0) given that the null hypothesis is truly false. Estimates can be computed using the procedures presented by Satorra and Saris (1985) within the context of LGM. To do this, a model of interest is estimated and a fixed parameter whose power is desired is chosen. Next, I would re-estimate the initial model with the estimated parameter fixed at its estimated value (with the same sample size) and choose an "alternate" fixed value for this parameter. This final step supplies a value for the test statistic. If the null hypothesis is true for that parameter, then the likelihood ratio chi-square for the model would be zero with degrees of freedom which equal the degrees of freedom of the model. If the

null hypothesis is actually false for that parameter, then the likelihood ratio chi-square will be a positive number reflecting the specification error caused by fixing the parameter to the value chosen in the initial model. This number serves as the noncentrality parameter of the noncentral chi-square distribution, which is the distribution of the test statistic when the null hypothesis is actually false. This number is then evaluated against tables' values of the noncentral chi-square distribution to gauge the power.

Limitations

Like all research projects, this study has its share of limitations. However, measures were taken to ensure that the negative effects of the study's limitations would be mitigated.

First of all, this study centers upon performance during the first four years of venture existence. It may be the case that several types of businesses (e.g., high-tech) require a lengthier period to reveal their potential. Although four time-points is enough to conduct the analyses used, it may be the case that over more time-points we would observe changes in direction of the slopes of the latent constructs.

Secondly, while initial resources may influence ventures and predispose them to a particular path or provide them with certain capabilities, they do not ultimately decide the future for the firm (Cooper, Gimeno-Gascon, & Woo, 1994). So although the hypotheses lead us to believe that resources are important for firm performance, I cannot conclude that resources are the ultimate reasons that firms succeed or fail. For example, although a firm may have substantial resource bases at startup, it may be that another has even better ones, or that an existent competitor has already secured a sustainable competitive advantage. I do not take into account competition, market variability, and exogenous shocks. This research leads me to

believe that resources do play a significant role in firm success, but ultimately are not the sole determinants.

Also, although this study did not demonstrate the significant interaction of control variables such as location, industry, or product versus service, inevitably there are some moderating conditions that exist. Later studies may find more reliable indicators of these measures, or may take into account other moderating variables that may help to explain the phenomenon observed.

Furthermore, other financial variables may have served as better indicators of financial capital as opposed to cash assets. In fact, I considered several other variables. First of all, I considered loans, which was calculated as the aggregate amount of business loans from a bank, another business, employees, family, govt. agency, non-bank institution, other individuals, other sources. I also considered a calculation of available credit, which is the maximum credit line for business (and personal) credit cards minus the balance. There was also total equity financing, which was calculated as the amount of equity financing from spouses of owners, parents of owners, other individuals, other agencies, other companies, and venture capitalists. Furthermore, I looked at the owners' total investment in the business. Although these seem as though they would be good indicators of financial capital, cash assets was ultimately used. Many of the other variables were not as reliable as I would have liked. One reason has to do with missing values. Another has to do with responses that seemed inconsistent. I used my best judgment and determined cash assets as an indicator that theoretically made sense in terms of financial capital, but also was deemed methodologically sound.

Unfortunately, when using financial capital, there was not the variability that I had expected when considering baseline, follow-up 1, follow-up 2, and follow-up 3. This is because

the measurements for these four indicators (i.e., the measurement over 4 time periods) were very similar in means. Thus, there was not a curve present – neither positive nor negative. Due to this, I could not analyze the growth curve in relation to human capital or performance. Therefore, as the KFS appends more waves, it may be that some financial indicators are more reliable, and it would be possible to test these in place of cash assets as the indicator of financial capital. Then it will be possible to evaluate whether the direction of financial capital over time is one of growth, decline, or ultimately stability, as consistent with the trend of cash assets. Perhaps the direction for financial assets really is flat for some time and then spikes. This is why analyses of this variable over the remaining time points of the KFS are so critical.

In considering why cash assets are stable over time, it may be that owners are finding other ways to invest in the business. Or, it may be that even though they are spending money on the business, they are maintaining a relatively stable cushion of cash assets to keep for emergencies and/or unexpected market contingencies (i.e., "I'll make sure to keep x amount of dollars in case of attack my a rival, natural disaster, etc."). Again, this is why looking at this over more time points can be informative to my conclusions. With the results that I have for the first four time points, the stable trend suggests that first should be as well capitalized as they can financially from the start, since there is not much variability and what a firm has at the beginning will be similar to what they have even at the fourth time point.

The sample for this study encompassed close to 5,000 firms, and included those that had survived as well as those that failed. This is different from many studies in entrepreneurship in which there is a tendency to only look at those firms which are successful. Though we overcome this survivor bias, ultimately this brings other limitations. Therefore, the trends observed and conclusions made may apply to a greater degree to those firms that survived as opposed to those

that failed, or vice versa. In separating surviving firms from those that fail, I may find that the resource classes may be more or less important. This may inform me as to resource accumulation trends that are most widely observed by surviving firms. It may also help to point out if failing firms are overemphasizing (or de-emphasizing) certain resource classes early on. Such a discovery can guide entrepreneurs on which resources it is best to invest in for survival. A further direction for this research is to perform a multi-sample analysis, where the growth curves of surviving versus failing firms can be compared. By understanding how these two categories of firms differ in terms of their resource acquisition processes, it is possible to have a greater sense of what resources (both amount and type) best contribute to the short-term survival of the firm. When the KFS is complete, and variables for all eight time points are recorded, a perspective that is more indicative of long-term survival can be assessed. In doing this, real-world entrepreneurship applications can be especially impactful; it will be possible to inform entrepreneurs as to what resources can help them to survive, as well as let them know what may be common trends among failed firms.

APPENDIX A: KAUFFMAN FIRM SURVEY INFORMATION

Certain data included herein are derived from the Kauffman Firm Survey release 4.0. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Ewing Marion Kauffman Foundation.

For more information about the Kauffman Foundation, please consult http://www.kauffman.org. Information about the Kauffman Firm Survey may be found at http://www.kauffman.org/kfs/About-the-KFS.aspx .

APPENDIX B: MODEL FIT

The following documents iterations to find the best fitting model.

The Revised Model 1

For my first revised model, I changed the model from a second-order one to a first-order model. In looking at the variables chosen (founders'/owners' startup experience for human capital, founders'/owners' cash assets for financial capital, and calculated revenue for performance), I did so from a theoretical perspective and also giving consideration to the measures which I considered to be most reliable. Figure 11 shows the proposed relationships, with cash assets representing financial capital, founders'/owners' startup experience representing human capital, and calculated revenue representing performance.

The Revised Model 2

For the second revised model, I modeled the variables as being a function of the intercept and slope as well as autoregressive processes, given our predictions. I also eliminated the slope of the financial capital construct, cash assets. This is because, as mentioned previously, the model does not fit the data in this respect; there is not a linear growth (or decline) trend. Goodness of fit indices for this respecified measurement model, as well as others, are presented in Table 3. Although the chi-square statistic is large, this table shows that the revised measurement model displayed values greater than .9 on the NFI and the comparative fit index (CFI), and .85 the non-normed-fit index (NNFI) indicative of a satisfactory fit (Bentler & Bonett, 1980; Bentler, 1989). However, this model presents a problem of two negative eigenvalues, which may represent a problem with the model, so I search for a better fit and do not accept this model as the study's final measurement model.

The Revised Model 3

Given our findings, I model the autoregressive effects of cash variables on other cash variables, and startup experience on other startup experience variables. I eliminate the autoregressive path of revenue in the model. The goodness of fit indices worsen, and I fail to eliminate the negative eigenvalues. Thus, this model does not fit better than the previous one.

The Revised Model 4

Given these findings, I model the autoregressive effects of cash variables on other cash variables, but eliminate the specified autoregressive processes of human capital and revenue. The goodness of fit indices do not change much, and some point to a poorer fit, such as the CFI and NFI, however I have been able to eliminate the negative eigenvalues. Thus, this model offers some improvement.

The Revised Model 5

To increase the fit indices, I consult the Wald test. This helps to identify paths and covariances that should be possibly deleted from the model (Hatcher, 1994). Based upon this, I eliminate the pathway between cash assets at baseline and cash assets at time 2. This makes theoretical sense, so I am able to remove this pathway. Given this, I have reason to believe that the cash assets that a founder or owner has at the baseline or founding of a business does not significantly impact the amount of cash assets that they have the next year (first follow-up instance). The goodness of fit indices point to a better fit with the removal of this pathway. The chi-square, although still considered large, is lowered in comparison to the previous model (2803 versus 3712), and the CFI and NFI now exceed fits of .90. However, I still try to see if there is a better fit that can be achieved.

The Revised Model 6

Given the correlations present, I find that there is a relationship between cash assets and revenue that begs to be modeled. Thus, for the revenue variables, I insert the variables of cash. Thus, for revenue at baseline, I have a path including cash assets at baseline. Similarly, revenue at follow-up 1 contains cash assets at follow-up 1 and baseline. Revenue at follow-up 2 contains cash assets for follow up 1 and baseline. Lastly, revenue at follow-up 3 contains cash assets for follow-up 2, 1, and baseline. Goodness of fit indices are improved with this addition. The GFI and CFI increase to .963 and .966 respectively, and the NFI goes from .921 to .965. However, the chi-square statistic is large. But as mentioned previously, I can expect a large chi-square with a large sample, since this statistic varies with sample size. Before deciding whether to accept this as the final model, I must first consider the parameter estimates. In doing this, a further problem is exposed when I find that there are insignificant estimates for Revenue at the final time point. The critical-t values are not over 1.96, and thus they are insignificant.

The Revised Model 7: The Final Model

Because of the insignificant estimates in the prior model, I change the estimates for revenues in time 4. Thus, instead of the revenue in follow-up 3 being predicted by cash at times 0, 1, 2, and 3, I predict that it is only affected by cash assets at time 3. This makes theoretical sense, as performance may be dependent on cumulative cash amounts up to a certain point for a fledgling firm, and then performance is better predicted by only the cash that the firm has at hand then.

Given the fit statistics (see Tables 3 and 4), I feel that I have the best model that not only makes theoretical sense, but also fits the data. Therefore, this model was tentatively accepted as

the study's "final" measurement model, as a number of tests were conducted to assess its reliability and validity.

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