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# SOCIAL CAPITAL: MEASUREMENT, DIMENSIONAL INTERACTIONS, AND PERFORMANCE IMPLICATIONS

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SOCIAL CAPITAL: MEASUREMENT, DIMENSIONAL INTERACTIONS,  
AND PERFORMANCE IMPLICATIONS

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A Dissertation  
Presented to  
The Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy  
Management

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by  
James Tobin Turner  
August 2011

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## **ABSTRACT**

Recent OM literature conceptualizes social capital as being comprised of three inter-related dimensions: the relational dimension, the structural dimension, and the cognitive dimension. Existing research suggests that social capital offers firms the potential to leverage their interorganizational relationships to create sustainable advantage and superior performance opportunities for the firm.

However, despite the interest and attention of social capital theory among operations management (OM) and supply chain management (SCM) researchers, there is a surprising shortage of cohesive empirical research on social capital theory. The absence of reliable and valid empirical measures of social capital has limited OM researchers' ability to effectively evaluate the potential of this theoretical lens. Moreover, there is a pressing need for social capital be evaluated not as separate independent dimensions, but holistically with an emphasis on the true inter-relatedness of the three dimensions.

In this dissertation we add clarity to social capital and its implications on intellectual capital and firm performance.

Specifically, we develop and empirically test reliable and valid metrics for social capital; develop and empirically test a model of social capital comprising of three interrelated dimensions; and develop and empirically test the relationships between social capital, intellectual capital and performance outcomes for firms. We find that the three dimensions of social capital are, in fact, inter-related and that there are significant risks inherent in studying social capital as being comprised of independent dimensions. We show that firm size can have significant relationships with the structural dimension of social capital.

This dissertation serves to further establish social capital as a valuable lens for OM researchers.

## **DEDICATION**

I dedicate this dissertation to my family.

The support of my loving wife has made this PhD process possible. I love her fully, completely and forever. She makes me a much better person, and I will be eternally grateful for her love and support. My mom and dad (Clemson Class of '67) have instilled in me a love of family and an appreciation for the importance of keeping my eye on what matters most. I will never be able to repay them for what they have given me—but they know that. I will, though, do all I can to pass the strong foundation they've provided for me throughout my life along to Jed and Merf. The reason I tell those two yahoos every day that I love them is because, well, I do: Forever and ever with all my heart.

## **ACKNOWLEDGEMENTS**

I will forever be appreciative of the support of my committee: Dr. Sri V. Sridharan, Committee Chair, Dr. William Gartner, Dr. Larry LaForge, and Dr. DeWayne Moore. There aren't many things more painful to do than read a dissertation and these fine people stayed with me through a number of revisions large and small. I am truly grateful for the time and energy each spent on my dissertation. Thank you.

I need to pass on a special thanks to Dr. Sri. Lord knows he read and revised the words social capital, structural dimension, relational dimension and cognitive dimension until he most of have been blue in the face and feeling quite nauseous. I cannot count the hours Dr. Sri spent with me and throughout the long process he was always generous in his support and fair in his counsel.

I consider Dr. Sri to be an awesome educator, a tremendous researcher, and a wise and cherished mentor. Of greatest importance to me, however, is that I consider Dr. Sri to be a very good friend. And I believe that will long remain the case.

Dr. Sri: thank you.

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## CHAPTER ONE

### INTRODUCTION

A fundamental challenge for supply chain and operations management scholars is to better understand how organizations can use their interorganizational relationships to create sustainable advantage and superior performance. Social capital has been shown to have much promise in helping researchers answer this challenge, and, not surprisingly, research on applying the social capital lens in the OM field has been increasing dramatically over the last 15 years. Preliminary theoretical studies have suggested that social capital is a valuable resource for firms and that it can improve a firm's long-term performance. However, current OM research lacks both a consistent conceptualization of social capital as well as reliable metrics for measuring it. In this dissertation we seek to help develop social capital as a more empirically valid OM theoretical lens by addressing two research questions: 1) how can and should we effectively and reliably measure social capital?; and 2) how are the dimensions of social capital related to each other?

While the relational, cognitive and structural dimensions of social capital serve as separate constructs—and have typically been researched independently—we agree with Krause et al. (2007) and Nahapiet and Ghoshal (1998) that the interrelationships between the dimensions play an integral part in the development of social capital. Researchers need to better understand these interactions to develop social capital as a meaningful OM lens. For example, Nahapiet and Ghoshal (1998) stated specifically in the conclusions of their 1998 ground-breaking work on social capital that they considered: “the impact of each dimension of social capital independently of the other dimensions. [The authors] recognize, however, that the dimensions ... of social capital are likely to be interrelated in important and complex ways” (p. 250). In their more recent work on social capital, Krause et al. (2007) suggest: “We believe more research is needed [on social capital]. Specifically, future efforts could focus on existing measures of the three dimensions of social capital, and on additional measures of buying firm performance such as innovation.

Social Capital offers an opportunity for increased understanding of the complexities of supply chain relationships. We hope other researchers will further investigate the social dimension of these relationships.” Inkpen and Tsang (2005) perhaps stress this need most succinctly when they state: “We have discussed the three dimensions of social capital independently. In future research scholars should also examine the interaction effects among these dimensions” (p. 162). This dissertation is a response to these calls for action.

Put simply, we seek to increase the value of social capital theory to operations management researchers by clarifying our understanding of what social capital is and how it creates sustainable performance advantage for firms.

### **1.1 Importance of social capital**

The purpose of this dissertation is to establish social capital as a valid and reliable lens for better understanding interorganizational relationships and to better understand how relationships create performance advantage for firms. While recent OM literature attempts to move empirical social capital research into mainstream OM research (Cousins et al. 2006, Krause et al. 2007, Lawson et al. 2008) there is a need to strengthen our understanding of the interaction between social capital and firm performance. Given the interest and attention of social capital theory among operations management (OM) and supply chain management (SCM) researchers, there is a surprising shortage of cohesive empirical research on social capital theory. Unfortunately, the absence of reliable and valid empirical measures of social capital has limited OM researchers’ ability to effectively evaluate the potential of this theoretical lens (Nahapiet 2008). We seek to address and add clarity to this knowledge opportunity. Specifically, we seek to address three knowledge gaps in this dissertation:

1. Develop and empirically test reliable and valid metrics for social capital;

2. Develop and empirically test a model of social capital comprising of three interrelated dimensions; and
3. Develop and empirically test the relationships between social capital and performance outcomes for firms.

Nahapiet and Ghoshal (1998) proposed that social capital facilitates the combination and exchange of intellectual capital between parties which in turn generates the creation of *new* intellectual capital. However, in the more than ten years of research since their paper, little research has considered social capital as they originally proposed (Nahapiet 2008). Moreover, recent calls have gone out for OM and SCM researchers to more fully explore (Moran 2005, Maurer and Ebers 2006) and to codify (Krause et al. 2007, Kostova and Roth 2003, Inkpen and Tsang 2005) our understanding of social capital theory.

The key underpinnings of social capital, however, are relatively well-established in the sociological field of study. Social ties constitute a valuable resource for organizations to achieve outcomes that they would not have otherwise been able to achieve, at least without significant additional cost (Coleman 1988, Burt 1992, Putnam 1993, 1995). OM literature suggests that social capital can be viewed and studied using cognitive, structural and relational dimensions. However, only with reliable and valid measures of the dimensions of social capital can we begin to clarify our understanding of the benefits of this resource (Menor and Roth 2007). A review of existing social capital research in the OM field research shows a lack of consistency in the operationalization of the social capital lens. Despite the frequently-cited work of Nahapiet and Ghoshal (1998), there has been a remarkable shortage of empirical work in the OM field investigating the dimensions as they originally proposed.

Finally, we seek to explore how some firm performance outcomes are affected more positively by some dimensions of social capital than others. Recent research suggests that social capital should be viewed within a contingency framework where desired outcomes will be relevant to the design and structure of the social capital



dimensions (Krause et al. 2007; Moran 2005). Specifically, we test the impact of social capital on three aspects of performance: 1) cost improvements, 2) firm profitability, and 3) innovation. As Kostova and Roth (2003) have suggested, understanding the performance implications of social capital—both positive and negative—may be the issue of greatest need and importance in social capital research. This dissertation will make a contribution in fulfilling this need.

## **1.2 Social Capital opportunities in OM**

We believe that one of the key challenges with social capital is that it has become an “umbrella” concept that means many different things to many different people. Concepts such as direct ties, strengths of direct ties, network density, structural holes, centrality, external-internal weak ties, breadth of influence, trust, supplier dependence, buyer dependence and relational history have all been used as underpinnings of social capital. However, current researchers (Adler and Kwon 2002, Hirsch & Levin, 1999, Moran 2005) stress the need for better and clearer definitions of social capital and clarified boundaries of social capital theory for OM researchers. In fact, this litany of concepts termed ‘social capital’ limits the usefulness of the term for OM researchers. In Chapter 2 we provide a list of operational definitions for social capital and consider the similarities and differences of the definitions. Ultimately, we support the definition and conceptualization of Nahapiet and Ghoshal (1998) as presented in *Academy of Management Review* in 1998. This article remains well-cited in OM literature (for example, this article has been cited over 820 time according to the Social Science citation index (<http://apps.isiknowledge.com/summary>), and this article is largely credited with bringing social capital theory from its sociological foundations into mainstream OM literature (Krause et al. 2007). We seek to answer the calls for a stronger social capital theoretical base by being the first to empirically test the three dimensions of social capital as a holistic model of social capital with psychometrically sound practices.

Of equal importance is the awareness that social capital is a valuable capital resource for firms only if it positively impacts firm performance. For this reason, a number of authors have argued that studying ‘social capital’ without investigating its impacts on performance is without great value (Krause et al. 2007; Nahapiet 2008; Moran 2005). In this dissertation we strive to ensure that the performance outcomes are studied in direct association with social capital.

## CHAPTER TWO

### LITERATURE REVIEW AND CONCEPTUAL MODEL

#### 2.1 The research framework and theoretical lens

A central challenge for operations management and supply chain researchers is to understand how and why some firms are able to establish sustainable performance advantage over competitors through relationships across the supply chain. Social capital theory has been presented as a valuable lens through which to view how organizations interact effectively and efficiently to develop knowledge, to sustain competitive advantage, and to increase access to valuable resources. Most OM research in the social capital area has dealt almost exclusively into the areas of structural and relational social capital. Large gaps remain in our understanding of the role of social capital—as conceptualized by Nahapiet and Ghoshal (1998)—in OM research and practice. Recent literature (Koka and Prescott 2002; Portes and Landolt 1996) calls for a new conceptualization of social capital to address the confusion between a structural conception of social capital and its true underlying benefits.

##### 2.1.1 An introduction to social capital

There is still much work to be done to better understand the “how” and “why” of successful networking and social capital generation. As Adler and Kwon (2002 p. 33) state: “to foster social capital in organizations, our framework suggests that managers need to do more than merely encourage social interactions among employees.” Perhaps a first needed step is to consider the various conceptualizations of the term “social capital.” Table 2.1, below, builds upon Adler and Kwon’s (2002) summary of social capital definitions to include all OM-based uses of the term through the year 2010. Definitions in the table are ordered from most recent to least current.

**Table 2.1. Definitions of Social Capital.**

Lawson, Tyler & Cousins	“a valuable asset that stems from access to resources made available through social relationships” (2008:446)
Krause, Handfield & Tyler	“a valuable asset that stems from access to resources made available through social relationships” (2007:531)
Maurer & Ebers	“signifies an asset available individual or collective actors that draw on these actors’ positions in a social network and/or the content of these actors’ social relations” (2006:262)
Inkpen & Tsang	“the aggregate of resources embedded within, available through, and derived from the network of relationships possessed by an individual or organization” (2005:151)
Liao & Welsh	“more than just a structure or network [social capital] includes many aspects of social context such as social interaction, social ties, trusting relationships, and value systems that facilitate the actions if individuals in a particular context” (2005:347)
Moran	“a valuable asset and that its value stems from the access to resources that it engenders through an actors’ social relationships” (2005:1129)
Knoke	"the process by which social actors create and mobilize their network connections within and between organizations to gain access to other social actors' resources" (1999: 18).
Woolcock	"the information, trust, and norms of reciprocity inherent in one's social networks" (1998: 153).
Nahapiet & Ghoshal	"the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network" (1998: 243).
Portes	"the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (1998: 6).
Inglehart	"a culture of trust and tolerance, in which extensive networks of voluntary associations emerge" (1997: 188).
Burt	"the brokerage opportunities in a network" (1997: 355).
Brehm & Rahn	"the web of cooperative relationships between citizens that facilitate resolution of collective action problems" (1997: 999).
Pennar	"the web of social relationships that influences individual behavior and thereby affects economic growth" (1997: 154).
Fukuyama	"Social capital can be defined simply as the existence of a certain set of informal values or norms shared among members of a group that permit cooperation among them" (1997).  "the ability of people to work together for common purposes in groups and organizations" (1995:10).

Thomas	"those voluntary means and processes developed within civil society which promote development for the collective whole" (1996: 11).
Belliveau, O'Reilly, & Wade	"an individual's personal network and elite institutional affiliations" (1996: 1572)
Putnam	"features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (1995: 67).
Portes & Sensenbrenner	"features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (1995: 67).  "those expectations for action within a collectivity that affect the economic goals and goalseeking behavior of its members, even if these expectations are not oriented toward the economic sphere" (1993: 1323).
Burt	"friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital" (1992: 9).
Loury	"naturally occurring social relationships among persons which promote or assist the acquisition of skills and traits valued in the marketplace... an asset which may be as significant as financial bequests in accounting for the maintenance of inequality in our society" (1992: 100).
Bourdieu & Wacquant	"the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (1992: 119).
Schiff	"the set of elements of the social structure that affects relations among people and are inputs or arguments of the production and/or utility function" (1992: 160).
Boxman, De Graaf, & Flap	"the number of people who can be expected to provide support and the resources those people have at their disposal" (1991: 52).
Baker	"a resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors" (1990: 619).
Coleman	"Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics' in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure" (1990: 302).

Bourdieu	<p>"the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (1985: 248).</p> <p>"made up of social obligations ('connections'), which is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility" (1985: 243).</p>
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Variation in the conceptualization of the term ‘social capital’ is apparent in two key ways (Adler and Kwon 2002, Nahapiet 2008):

1. Focus on sources versus the outcomes of social capital;
2. Focus on the *quality and descriptive* of actual relationships versus the *structure* of the relationships. This will be covered in more depth in section 2.3, but to clarify, some previous OM research (such as Burt 2007) has only considered the existence of relationships between parties and not the nature of the relationship (such as length of the relationship or the presence of trust in the relationship).

We suggest in this dissertation that for social capital research to move towards being a well-established and useful theoretical lens for OM researchers, the theory must be clearly delineated from previous “relationship” research with clearer boundaries of the theory. As Adler and Kwon (2002) cautioned:

“It is not obvious, however, that we gain more than we lose by gathering all these various phenomena under an "umbrella concept" (Hirsch & Levin, 1999) of social capital. Such a move risks conflating disparate processes and their distinct antecedents and consequences. More fundamental, it is inevitable that an object of research encompassing as much as this should attract researchers from heterogeneous theoretical perspectives. (p. 18).”

Adler and Kwon (2002) stress that too much network research and relationship research has been lumped under the term “social capital” without there being a consensus of what social capital is and is not. This dissertation attempts to firmly anchor social capital theory as a relevant and useful framework for OM researchers.

Nahapiet (2008) suggests the following three points in an effort to clarify not only the *definition* of social capital but, perhaps just as important, the *theoretical domain* of social capital:

First, social capital is a resource-based perspective. The actual connections, interactions and access to resources that occur between parties represent the resource of interest. Many alternative perspectives are taken in network and trust research conducted outside the “social capital” lens. For example, other network and social capital literature considers concepts such as “structural holes” (Burt 1992) to be the focus of study—where the actual *hole* between social networks is the unit of analysis. The concept of structural holes is covered in more depth in section 2.3. In structural hole analysis, for example, there is typically a correlation between number of contacts or numbers of holes and annual compensation of an individual in a social network. In other studies of networks and interorganizational relationships, there are a number of perspectives used, but implicit is our view of social capital is that it is both a *resource* and *source of access* to resources.

Secondly, performance outcomes are a central point of emphasis of social capital research—and this includes both positive and negative consequences of social capital. Negative effects of social capital exist, for example, when social networks begin to create inertia between partners due to a “locking in” of past expectations (Maurer and Ebers 2006). It is only by considering performance outcomes that the social capital lens can deliver much needed insight to both researchers and practitioners alike.

Finally, social capital—unlike much of the existing network research—considers the interplay of all its three dimensions. The interaction of the structural connections, relational, and cognitive dimensions is what separates social capital from most network

research. True social capital research must consider each of the structural, relational, and cognitive dimensions and how they interact.

Nahapiet (2008) suggests that by outlining these theoretical boundaries to social capital, social capital becomes a more robust, well-defined, theoretical lens with greater applicability for developing meaningful and applicable insights for OM researchers. We use these three theoretical boundaries throughout this dissertation in our view and study of social capital.

Over the last decade much research has been conducted in an effort to better nail down what social capital is (and isn't) and to avoid ambiguity with the term "social capital." Various uses of the term have left the theory broad in its potential scope and generalizability but, simultaneously, weak as theoretical lens. In this paper we use Nahapiet's and Ghoshal's (1998) well-cited definition of social capital (while alternative definitions are offered in Table 2.1) for two primary reasons. First, these authors' definition is consistent with the conceptualization of social capital suggested by the social capital theoretical domain we have outlined and, secondly, because this definition has been frequently cited by leading OM authors (Nahapiet 2008, Lawson et al. 2008, Krause et al. 2007, Cousins et al. 2006):

"The sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network" Nahapiet's and Ghoshal's (1998 p. 243).

As Wacker (1998) cautions, developing and refining theory begins with clearly defining formal conceptual definitions. This definition of social capital builds on the cumulative OM tradition and lays a foundation for effective research in this dissertation.



## **2.2 Dimensions of social capital**

Social capital consists of the relational, cognitive and structural dimensions. Each dimension of social capital serves as a separate construct and, while the characteristics used to describe the three dimensions of social capital are highly inter-related, each has a set of unique qualities. Over the rest of this chapter we will consider, first, the three dimensions of social capital and their output: intellectual capital. Then, in section 2.3, we will consider the development of social capital research in the field of sociology. From social capital's sociological roots we can gather some insight from previous conceptualizations of the concept of social capital as well as gain an appreciation for the real and genuine challenge of moving social capital research in the sociological field into a single, unified view for the OM and SCM fields.

### **2.2.1 Relational Dimension**

The relational dimension concerns “the kind of personal relationships people have developed with each other through a history of interactions” (Nahapiet and Ghoshal 1998 p. 244). This dimension encompasses the characteristics and qualities of individual relationships. Therefore, issues such as shared history, trust, respect, and friendship are important. The relational dimension is associated with the *qualities*—good or bad—of ongoing relationships. The relational dimension encompasses the character and qualities of the connection between individuals. This is often characterized through trust and cooperation and the identification that a particular individual has within a network of relationships.

An example of how the relational dimension may come into play can be seen when comparing the interactions between separate individuals that may have the same positions in a network of relationships (say a buyer and a supplier). Depending on the history of bonds and trustworthiness between the two individuals, the action and dynamics of the interactions will be very different than between the same two people without the relational ties. The interaction between the individual actors is highly

influenced by the relationship and history of exchanges between the particular individuals. This dissertation views the relational dimension concept as the assets created and leveraged through *distinct* (specific person-to-person) relationships that have their own unique relational history.

### **2.2.2 Structural Dimension**

The structural dimension concerns the “properties of the social system and of the network of relations as a whole” (Nahapiet and Ghoshal 1998 p. 244). This dimension has been explored in depth and strongly influenced by the work of Burt (1992, 1995, 2000, 2002, 2004 and 2007) and deals with who you reach and how you reach them. The structural dimension encompasses network components and facets such as the presence or absence of ties between parties, the configuration of a network (such as the hierarchy within an organization), and concepts such as denseness of relationships, structural holes in networks, the presence or absence of network ties between different people, formal and/or informal (such as appropriable networks) network configuration, and the density and connectivity of a network. According to Burt, actors on opposite sides of structural holes operate in different information circles, and thus, there is value in spanning these separate information circles. Combining information from these separate, non-redundant information flows, then, offers the potential for innovation and the generation of new intellectual capital. We suggest here that these “properties” in and of themselves cannot generate social capital; rather these ties facilitate social capital only when they work in conjunction with the relational and cognitive dimensions. Structural ties alone cannot bridge separate information flows effectively, for, as Burt asserts, closure between two networks requires more than just structural ties, bridging also requires attributes such as facilitating trust, collaborative alignment, and shared interpretations (Burt 1995).

### 2.2.3 Cognitive Dimension

The cognitive dimension refers to “those resources providing shared representations, interpretations, and systems of meaning among parties” (Nahapiet and Ghoshal 1998 p. 244). This dimension, the least studied of the three (Nahapiet 2008, Krause et al. 2007), encompasses the shared meanings and shared interpretations between parties in a relationship. The cognitive dimension captures the concepts of shared norms, systems of meanings and values, and, as such, we can expect the cognitive dimension to directly impact the development of social capital and the development of relationships. Tsai and Ghoshal (1998) suggest that cognitive capital is embodied in the shared visions and collective goals of organizational partners and is encapsulated by shared perceptions, expectations and interpretations. Relationships developed with shared norms and values can be expected to be stronger (Moran 2005, Burt 1992). Weick et al. (1995) asserts that when there is congruence on goals and values and when interpretations are shared by and across organizational partners this cognitive capital becomes on-going, cumulatively supportive, and self-reinforcing. The cognitive dimension reflects the concept that separate networks or communities develop unique terms, acronyms, interpretations of numbers and concepts. For example (Liker 2004), one of the key challenges in a firm’s adopting best practice from Toyota’s Production System into their supply chain is appreciating what is *actually* meant by terms such as zero-inventory, kanban, just-in-time, and kaizen. Using a *term* is quite different from understanding the *concept* the term describes and when the concepts have different meanings to different supply chain partners there are sub-optimal results. Similarly, ERP system set-up failures are often linked to supply chain partners, managers and operators having separate interpretations of the meaning of specific input terms such as lead-times, safety stock levels and resource requirements (Chapman 2005). The cognitive dimension captures the essence of the importance of truly sharing rich information with shared meanings across network actors and not just passing along data or bandying about fancy terms.

#### 2.2.4 Intellectual capital

Nahapiet and Ghoshal (1998 p. 245) define intellectual capital as the “knowledge and knowing capability of a social collectivity [such as an organization].”

Fundamentally, new organizational intellectual capital is derived by a firm’s ability to combine and exchange information throughout its social network. There are other ways to develop intellectual capital than through social capital networks (such as research and development departments, for example). However, inherent in this intellectual capital construct is the idea that through the combination of knowledge among disparate parties and the exchange back and forth between parties new knowledge can be created and leveraged (Moran and Ghoshal 1996).

The term intellectual capital is consistent with the view of knowledge as developed in OM literature (Kogut and Zander. 1992, Levinthal and March 1993, Liebeskind 1996, Spender and Grant 1996, Conner and Prahalad 1996, Nonaka 1994, and Teece et al. 1997) where internal firm knowledge is a source (often viewed as *the* source) of competitive advantage to a firm. We note here that there is no *unified* OM theory of knowledge, knowledge creation or knowledge management from which we can draw, but central topics include issues of explicit and tacit knowledge (Kogut and Zander 1992, Levinthal and March 1993, Nonaka 1994), the iterative approach to knowledge creation (Nonaka 1994, Teece et al. 1997), the issue of absorptive capacity and causal ambiguity (Szulanski 1996) and knowledge appropriation as the boundary condition of a firm (Liebeskind 1996). A full review of knowledge, knowledge management and knowledge creation is well beyond the scope of this dissertation. However, of relevance here is the notion that inherent in all these conceptualizations of knowledge is awareness that knowledge can be created through meaningful combination and exchange through social interactions and that knowledge and intellectual capital can be a source of sustainable competitive advantage. We seek to capture this essence through the concept of intellectual capital.

In the next section we consider the sociological foundations of social capital research. From social capital’s sociological roots we can gather some insight from

previous conceptualizations of the concept of social capital as well as gain an appreciation for the real and genuine challenge of developing the social capital to investigate important issues in the OM and SCM fields.

### **2.3 Sociological Foundations**

The foundations of social capital theory can be traced back to sociology. A review of social capital research in the field of sociology shows that the lens has been used to look at individuals, nations, firms, and organizations (for profit and non-profit). Social capital has been used in the sociological field to investigate a wide range of outcomes. For example, sociologists have researched the impact of social capital on gross domestic product and labor markets (Aldridge et al. 2002), crime levels (Halpern 2001), governmental effectiveness (Kawachi et al. 1999; Putnam et al. 1993), educational attainment (Aldridge et al. 2002; Israel et al. 2001) and the quality of public health (Coulthard et al. 2001; Subramanian et al. 2003).

One of the early uses of the social capital concept is seen in the research by Jacobs (1965) who used the concept to investigate the importance of relationships and networks to the survival and functioning of neighborhoods. Jacobs (1965) studied how inclusion in a neighborhood social network had strong impacts on the outcomes of individuals from that community. Subsequently, social capital has been used in the sociological field to cover such research topics as school, region and national productivity and performance. Since these early beginnings, social capital has been used to investigate numerous other social phenomena. Boix and Posner (1998) have suggested, for example, that social capital creation can be used strategically to help combat social problems and ills such as urban poverty, high-crime areas, economic underdevelopment and government inefficiency.

Coleman (1988) represented an important shift in social capital research as he helped shift attention from social capital applied at the individual level towards social

capital research being applied towards outcomes for groups, organizations, and institutions. Putnam's (1995) work investigating the relationship between social capital and participation in voluntary organizations also influenced early OM social capital researchers. Putnam's and Coleman's work served as evidence that the social capital lens offered insights for OM researchers willing to apply the lens to the management arena.

Sociologists have shown social capital to be a valuable lens. A key challenge for OM researchers has been in moving the lens from sociology for useful study in the OM field.

#### **2.4 Social Capital Research in the OM Field**

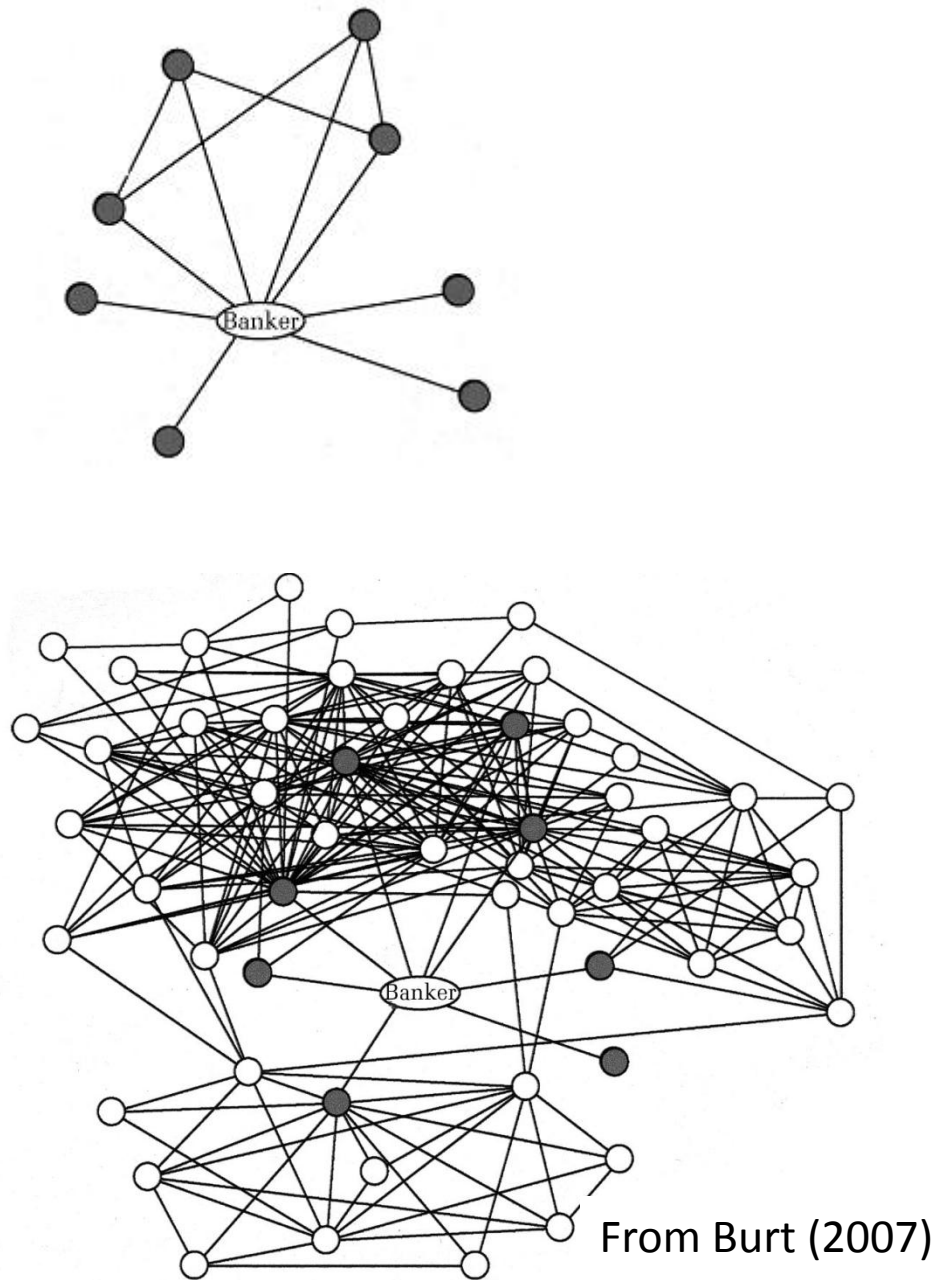
Social capital research in OM has stemmed in large part from the work of Kogut and Zander (1992) who have proposed that a firm be viewed as a "social community specializing in the speed and efficiency in the creation and transfer of knowledge" p. 503. The specific term and concept of social capital was brought into mainstream OM research by the theoretical work of Nahapiet and Ghoshal (1998) who suggested that social capital, as defined by three dimensions, can lead to intellectual capital creation and to performance improvements. Nahapiet and Ghoshal (1998) used sociological research, such as Jacobs (1965), and the foundations laid by Kogut, Zander and Burt in formalizing and developing social capital as consisting of three dimensions: 1) structural dimensions; 2) cognitive dimensions; and 3) relational dimensions.

More recently, OM researchers have attempted to build on this theoretical foundation to build a more cohesive conceptualization of social capital. Adler and Kwon (2002) and Inkpen and Tsang (2005), for example, have sought to integrate various research streams into a single cohesive OM-suitable social capital theory. Both papers result in the conclusions that, at present, it is difficult to present a cohesive unified theory that links all previous research themes. Because the social capital model proposed by Nahapiet and Ghoshal (1998) is consistent with existing relationship theory, network research, the knowledge-based view of the firm and the resource-based view of the firm,

while still offering distinct and unique advantages, we believe the social capital lens is well-suited for OM research and application.

Burt (1992, 1995, 2000, 2002, 2004 and 2007), a sociologist whose work has spanned into mainstream OM research, has done much work on the structural aspects of social capital looking at the overall pattern and configuration of relationships, ties, and networks between individuals. Burt has largely pioneered the concept of structural holes – the gap between separate and distinct social networks – finding that people who are able to span across structural holes often obtain higher positions in organizations and receive greater remuneration than their counterparts. In Diagrams 1 and 2, which are representative of much of Burt’s work, Burt illustrates a network where a specific “banker” fills a unique position in bridging a network of contacts. In Diagram 1 Burt illustrates a network of direct contacts for an individual banker where dark dots are direct contacts. In this diagram the banker stands to benefit by being able to broker information between the top four interconnected contacts and the unconnected colleagues at the bottom of Diagram 1. In Diagram 2, however, we see how other indirect contacts (indirect contacts are indicated by white dots) negate much of the brokerage potential of the banker as indirect contacts between his social network leaves few “true” structural holes. Accordingly, the banker in this example was below average among peers in salary due in large part to his weak network position.

**Figure 1. Examples of Burt's (2007) structural network analysis of direct ties.**



By *uniquely* connecting separate networks, a person can create value for him or herself by being able to bridge otherwise unconnected sets of knowledge and resources. Burt (1992, 1995, 2000, 2002, 2004 and 2007) has developed an entire portfolio of work



based on identifying and quantifying the value of establishing relationships that span otherwise separate networks. However, as Burt (1995) asserts, structural ties alone cannot bridge separate information flows effectively. Rather, closure between two networks also requires relational and cognitive elements such as facilitating trust, collaborative alignment, and shared interpretations (Burt 1995).

Several OM papers have contributed to the strong theoretical development of social capital. Inkpen and Tsang (2005) sought in their paper to theoretically develop how the dimensions of social capital might come in to play with different network types—specifically intracorporate networks, strategic alliances, and industrial districts. Inkpen and Tsang (2005), in attempting to use social capital as a lens for studying interorganizational relationships, stress that “the introduction of social capital variables into the analysis of networks and knowledge transfer adds a level of complexity that has not yet been examined empirically” (p.160) but stress that effective empirical analysis will “lead to a more comprehensive view of the strategic behavior of firms” (p. 161).

Moran’s (2005) work on social capital focused on researching structural social capital and relational embeddedness social capital. Moran’s “structural” element focuses primarily on the network structure and deals with the ‘whom one knows’ issue. Relational embeddedness, on the other hand, addresses the notion of ‘how well one knows them’ (Moran 2005). Along this line Moran suggests that research issues concerning the quality of relationships may be more important than research considering the number of relationships. Moran’s work serves to reinforce the multi-faceted nature of social capital while emphasizing the need for further research to better understand the dimensions and facets of this complex lens.

Several researchers have suggested that social capital be viewed either as bridging (dealing with relationships external a group) or bonding (dealing with relationships internal a group). However, as Adler and Kwon (2002) suggest, “external ties at a given level of analysis become internal ties at the higher levels of analysis, and, conversely, internal ties become external at the lower levels, thus rendering this stream of research, in our opinion to not be the most pressing.”

Despite social capital's promise and interest, however, there are some concerns that the popularity of social capital research has grown faster than the theoretical and empirical base upon which it is founded (Adler and Kwon 2002; Inkpen and Tsang 2005). Moran (2005) cautions: "significant gaps remain in our understanding of what constitutes productive or value-adding social relations." There is increasing support that social capital can and does positively impact firm performance (Kaufmann and Carter 2006; Krause et al. 2007), but there are significant knowledge gaps in our understanding of social capital research at the fundamental level of understanding how social capital facilitates knowledge transfer and superior organizational performance.

Early on in social capital research Nahapiet and Ghoshal (1998), realized that social capital could have strongly negative impacts (such as limiting a firm's receptiveness to new sources of information) on a firm. For example, research has shown that creating new network ties and generating social capital can in fact have adverse effects on firm performance (Moran 2005; Adler and Kwon 2002; Simonin 1999).

Maurer and Ebers (2006) likewise suggest that firms need to be cautioned of the potential downside of "locking-in" stagnant relationships that block a firm from internalizing new knowledge from other social sources. Danielewski (2000), for example, states that "private nomenclature seems to rapidly develop in tight set-upon circles (p. 51)." This "private nomenclature" can be a positive in that it can allow for clear and effective communication among members of the group; however, there is also the risk that the private language also acts as a barrier to new and important knowledge from outside the group. While most social capital research focuses on the positive attributes of intellectual capital, an appreciation of the potential negative outcomes is important. For this reason, recent social capital research has begun to investigate specifically the fit between types of social capital (cognitive, structural, or relational) and type of outcome desires (such as innovation or structured operations) (Moran 2005). Contextual factors are also becoming a point of research interest as scholars attempt to understand how, when and where social capital development is effective. Adler and

Kwon (2002) suggest that there are numerous ways in which social capital, applied in certain contexts, can provide benefits for people and/or firms. Specifically, they suggest that social capital can help individuals find career success, new jobs, and increase compensation.

One recent social capital study (published in *Administrative Science Quarterly*) in particular merits our attention. Maurer and Ebers (2006) use Eisenhardt's case study methodology with open interviews to conduct a 4-year-long longitudinal case study of biotechnology firms. They seek to capture the structural dimension through specific networks between start-up scientists and their fellow scientists. They study the relational dimension by looking at scientific norms and the presence of mutual trust between the start-up scientists and their fellow scientists. The cognitive dimension is assessed by looking for a homogenous set of scientific goals and orientations between the start-up scientists and their peers. In this study, the authors attempt to capture the essence of the social capital dimensions in a manner consistent with Nahapiet and Ghoshal (1998). Interestingly Maurer and Ebers (2006) find that the firms that performed best were those that were able to develop strong social capital early in the firm's development and then continued to develop new and valuable relationships through the growth phases of the company's life cycle. The firms that "locked-in" their early social capital and failed to develop new relationships as their business grew suffered as the growing company encountered new challenges. The social capital resources required for *growing* a company were quite distinct from those required for *starting* a company. While beyond the scope of this dissertation, this paper highlights the need for OM researchers to continue to research how social capital can and should evolve over a firm's life cycle. Maurer and Ebers' (2006) study provides a foundation for the model of social capital proposed in this dissertation.

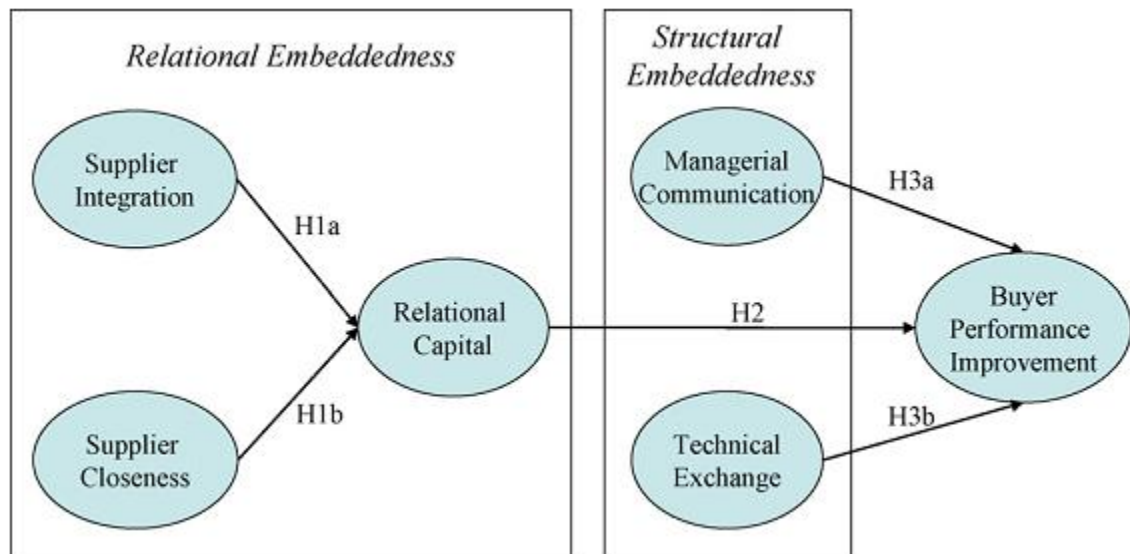
One work that has operationalized and empirically studied social capital using the framework of three dimensions with a large sample size is Krause et al. (2007). Operationally, Krause et al. (2007) have conceptualized the three dimensions of social capital as 1) cognitive capital: goals and values; 2) structural capital: information sharing,

supplier evaluation, and supplier development; and 3) relational capital: length of relationship, buyer dependency, and supplier dependency. Krause et al. (2007) find that social capital elements are indeed positively related to performance measures. However, they find that “the relationships of structural and relational capital vary depending on the type of performance improvement considered.” Specifically, these authors found that cognitive and relational capital were important to explain improvements in cost with buying firms in a relationship. On the other hand, buying firms gained performance in terms of quality, delivery, and flexibility with the presence of cognitive and structural capital. Krause et al.’s (2007) greatest contribution may be in that they are the first authors to introduce social capital (with all three dimensions considered) to OM researchers in an empirical manner consistent with the Nahapiet and Ghoshal’s (1998) conceptualization. However, a close look at the methodology employed in Krause et al.’s work suggests that the importance of their findings may be tempered by concerns over the validity and reliability of their methodology. For example, while the authors give a strong theoretical justification for the relationship between social capital and firm performance, the actual measures they use leave room for concern upon close review. The authors measure the relational dimension by the proxy variables “buyer dependence” and “supplier dependence” using measures, for example, such as “there are many competitive suppliers for this component” and “finding new buyers for these components would not have a negative price on the price this supplier can charge.” In addition Krause et al. (2007) attempt to measure the structural dimension via a construct labeled “supplier development” with items such as the presence of a “dedicated supplier development team.” We believe measurements such as this may be indicative of portions of the “structural dimension” construct, but that the item does not hit at the *core* of the construct. In Krause et al. (2007) structural capital is measured by: “It is expected that the parties will share proprietary information and keep each other informed.” We would suggest that items such as this one seem more like relational dimensions rather than structural in nature.

Krause et al. (2007) state that while their study “provides some initial understanding of industrial buyer-supplier relationships and how their social capital dimensions relate to buying firm performance” they believe “more research is needed” (p. 541). These authors do not consider the interactions of the three dimensions and we would, again, suggest that the primary implication of Krause et al.’s (2007) work is in bringing empirical social capital research into mainstream OM field in a well-defined empirical manner that is theoretically consistent with previous research. However, a thorough review of this paper leaves us with concerns over the development of the measurement items and how were they pretested. In fact, the authors themselves conclude that further research is needed in improving the measures of social capital and its dimensions.

Similar methodological issues are seen also in the work of Lawson et al. (2008) who sought in their paper to identify antecedents and consequences of social capital on buyer performance, but considered only the relational and structural dimensions of social capital. Lawson et al. (2008) use, for example, this item for the structural dimension: “Our engineers and sales staff have a close relationship with our suppliers’ staff” [underline added for emphasis]. This item, however, appears to measure the *relational* dimension as opposed to the *structural* dimension. There is a need for clarification on how the items were developed and pretested in Lawson et. al.’s (2008) work. In fact, due to suspect measures we believe some of the relationships identified by the authors are merely due to tautological relationships between the constructs. For example, we show the theoretical model proposed by Lawson et al. (2008) in Figure 2. Note the relationship, for example, between “Supplier Closeness” and “Relational Capital.” Based on the authors’ measures, this would be a tautological relationship.

**Figure 2. Lawson et. al.'s (2008) social capital diagram.**



These authors considered the relational dimension as supplier closeness and supplier integration and viewed the structural dimension as consisting of managerial communication and technical exchange. However a closer look at the work raises several additional concerns. For example, these authors suggest that supplier closeness leads to relational capital. However the measurement items used for the constructs in their conceptualization of the relational dimension give us cause for concern. After measuring supplier closeness, the *dependent* variable in their model is relational capital which they measure, for example, with the item:

RC 1: The relationship with key suppliers is characterized by close, personal interaction at multiple levels

Obviously there is a major tautological issue when the measure for the DV – the outcome of interest – is *exactly* the same as the definition of the antecedent (IV). It is inconsistent with best practice (Wacker 2004) for formal conceptual measures of one

construct to be used to measure a separate and different construct. Simply put, the measures do not reflect the theoretical construct the authors suggest they do. This repetition of meaning in both the IV and DV constructs renders all findings suspect.

Similar methodological issues are seen in the work of Cousins et al. (2006). For example, Cousins et al. (2006) developed their three items for the relational capital dimension by using and modifying measures from earlier papers by Kale et al. (2000), Dyer and Singh (1998), Madhok (1995) Dyer (1996) Badaracco (19991) and Mohr and Spekman (1994). However, a review of these papers indicates that items used in these papers were not measuring “relational capital” and did not express in their research that they followed best-practice in developing or testing their measures (such as the one described by Menor and Roth 2007).

Liao and Welsch (2005) are among the first to offer a full model of social capital *and the interrelations* of the three social capital dimensions. In seeking to test how entrepreneurs differ from non-entrepreneurs in levels of social capital, these authors found, surprisingly, that entrepreneurs did not have higher levels of social capital than non-entrepreneurs. They note that it was the “dynamic process” (p. 359) of the interactions of the dimensions and the ability to convert and connect the dimensions of social capital that created performance outcome improvement. Liao and Welsch’s finding supports Adler and Kwon’s (2002 p. 35) assertion that social capital is more involved than just who you know and how you know them. Liao and Welsh (2005) is the only empirical, survey-based piece of literature we find that investigates the full interaction of the three dimensions of social capital. However, their development and conceptualization of the metrics leave *much* to be desired and renders the empirical findings of their paper, in our opinion, to be very much in question. The items they used are developed from secondary data and no rigorous development or testing procedures are mentioned in their work. For example, Liao and Welsh (2005) measured social capital by having respondents answer items on a Likert scale of 1 to 5, with 1 for the “completely disagree” and 5 for “completely agree.” A sample of their items attempting to measure social capital include:

- “many friends have started new firms”
- “many of my family and kin have started new firms.”

Obviously, these measures seem to have little relevance to the OM conceptualization of social capital; rather, these appear to be measures of research convenience as opposed to rigorously developed empirical measures. A review of alternative items for structural capital—see the appendix for examples—leave many researchers unconvinced (Stone 2001) that these items are truly measuring the social capital and the associated dimensions with validity and reliability. In addition, Liao and Welsh (2005) measure relational capital by the following items:

- “Young people are encouraged to be independent and start their own businesses,”
- “State and local governments provide good support for those starting new firms,”
- “Banks and other investors go out their way to help new firms get started,” and
- “Other community groups provide good support for those starting new firms.”

Again, these metrics do not appear to be consistent with Nahapiet and Ghoshal’s conceptualization of the dimensions. Finally, these authors measure cognitive capital by the items:

- “Those with successful business get a lot of attention and admiration,”
- “There are many examples of well respected people who made a success of themselves starting a new businesses,”
- “The local media does a good job of covering local business news,” and
- “Most of the leaders in this community are people who own businesses.”

These metrics are largely inconsistent with OM literature’s conceptualization of social capital and its dimensions. Liao and Welsh (2005) provided no evidence of using a



currently acceptable method of item development and, consequently, the value of their findings is suspect. For example, the item “State and local governments provide good support for those starting new firms,” is not consistent with the definition of relational capital (see section 2.3.1 for the formal definition of the relational dimension). This item simply does not meet the “face validity” test for an item that approximates the relational capital construct as defined by Nahapiet and Ghoshal (1998). Liao and Welsh’s (2005) research, therefore, leaves open a significant opportunity and need for additional research. While the empirical testing of their model left much to be desired, we do draw from its theoretical implications (which were found to be much stronger than their empirical work) in the social capital model presented in this dissertation.

While the dimensions of social capital—as constructs—have been tested in previous research (Lawson et al. 2008, Krause et al. 2007, Maurer and Ebers 2006), we believe that evaluating the metrics holistically will improve our research.

In summary, our review of OM empirical research into social capital supports the concerns expressed by Stone (2001 p. viii) that “where social capital has been measured to date, it has often been done so using questionable measures, often designed for other purposes, and without sufficient regard to the theoretical underpinnings of the concept to ensure validity or reliability.” At a meta-level, a review of the development of the measures for social capital in existing OM and SCM research highlights the need for better empirically validated social capital items and measures. Social capital has value to OM researchers—the challenge is to solidify the theoretical foundations of the lens so that future OM researchers can confidently use the social capital lens to generate clearer findings that enhance our operational knowledge.

## **2.5 Interactions of the Three Dimensions**

Numerous researchers have explored and sought to explain the relationship between inter-organizational relationships and value creation. At a broad level, interorganizational relationships have been studied in large part under the umbrella of

“supplier development.” Interorganizational relationships have been investigated via numerous methodologies and theoretical frameworks (such as, but certainly not limited to, resource dependence theory, transaction cost economics, resource-based view of the firm, knowledge-based view of the firm, information processing theory, and marketing channel theory). However, at its basic level, a full picture of why, what, and how networking achieves positive performance outcomes is not fully understood. We believe—like Krause et al. (2007)—that social capital provides an opportunity to better understand interorganizational relationships. And while there is still no clear unified consensus concerning exactly what social capital comprises (Moran 2005; Adler and Kwon 2002) the central tenant of most social capital research within the operations management arena is that when “organizations invest in relation-specific assets, engage in knowledge exchange, and combine resources through governance mechanisms, a supernormal profit can be derived on the part of both exchange parties” (Krause et al. 2007 p. 529).

One of the challenges facing social capital theory in OM is in understanding how the separate dimensions interact with each other to produce performance outcomes (Inkpen and Tsang 2005, Krause et al. 2007, Nahapiet 2008). We believe that adding clarity to remove the ambiguity of these interactions would go a long way towards bolstering social capital research. At present, these dimensions have been hypothesized to relate in a number of various ways. Our conceptualizations of the relationships are consistent with the hypothesized relationships suggested by Liao and Welsh (2005). However, the majority of OM researchers who have delved into social capital have limited their study of social capital to less than all of the dimensions (Burt 2005, Cousins et al. 2006, Lawson et al. 2008) or considered the three dimensions entirely independent of each other (Krause et al. 2007).

Forthcoming work (accepted by the *Journal of Operations Management (JOM)* but not yet in print) by Villena et al. (2011) investigates the relationship between social capital and negative performance consequences. In this study these authors, *again*, consider each of the three dimensions of social capital independently. Our work supports

the importance of considering each dimension in an interactive manner. In fact, our research would suggest that considering the dimensions of social capital independently leaves open the possibility of there being significant gaps in the ability of OM researchers to draw meaningful and accurate interpretations from their findings.

We believe that considering the dimensions in isolation misses much of the essence of the underpinnings of social capital theory.

## **2.6 Organizational performance**

In this dissertation it is our goal to measure the impact of social capital on three different aspects of firm performance. We in no way attempt to make the claim that these are inclusive of all performance indicators for a firm, as there are innumerable ways to measure performance. A cursory glance of OM literature reveals a partial list of performance indicators such as cost, cost efficiency, degree of innovation, delivery performance, customization responsiveness, delivery lead times, delivery speeds, dependability, flexibility, agility, inventory, labor productivity, JIT performance, satisfaction, product quality, service quality, repurchase levels, benchmark comparisons, speed to market, customer loyalty, business sustainability, financial performance, return on assets, market share, marketing competency, and many others. We have chosen three commonly used metrics that display a range of performance benefits to a firm that represent key competitive areas of a firm (Krause et al. 2001). Specifically, we will look at outcomes of cost improvements, profitability, and innovation. We have selected these three metrics of organizational performance for two reasons: 1) they have been commonly used and proven as important both in OM research and to practicing organizations; and 2) they are relevant to our sample population.

Several other performance metrics were seriously considered but were deemed less than ideal for our sample respondents after an initial testing and review. For example, while market share may be a valuable indicator of firm performance, our respondents very likely would not know this information. Preliminary discussions with

practitioners showed that many retailers do not use market share as a benchmark and thus were poorly informed on assessing their firm's overall market share.

We use existing OM and SCM conceptualizations of these performance outcomes in this dissertation.

### **2.6.1 Innovation**

Innovation refers to the capability of the organization to introduce new products, new services, new offerings and new features (Koufteros et al. 2001). Innovation has long been a topic of interest in OM research but has been looked at primarily from the vantage point of manufacturing. Typical studies of innovation look at integrated product development practices (Koufteros et al. 2002) or concurrent engineering and product design (Koufteros et al. 2005). The concept of innovation, though, is relevant for retail and services as well. For example, in retail environments innovation could include subtle innovative improvements such as better marketing, more effective signage, new combinations of product bundles for sale, improved store layouts, faster means of customer check out, or heightened levels of customer responsiveness.

Based on preliminary discussions with retailers we found that the conceptual space for process improvement and innovation showed significant overlap. Many of the fundamental process measures used in manufacturing – cycle times, production rates, work-in-process measures—have less importance to retailers.

Numerous OM authors have supported the importance of innovation and there is substantial OM and SCM literature for us to draw from in supporting innovation as a desirable performance outcome for firms. We draw from Koufteros et al. (2002, 2005) in developing our innovation construct.

### **2.6.2 Profitability**

Profitability is conceptualized as the return received on a business undertaking after all operating expenses have been met (Koufterous et al. 2005). We draw from existing OM literature for our conceptualization of profitability (Koufterous et al. 2005, Koufterous et al. 2002, Rozenzweig and Roth 2004).

### **2.6.3 Cost improvements on end products**

Cost improvements on end products are conceptualized as an outcome of actions that result in the ability to sell a product or service at a cost lower than the cost possible without the action (Olson and Boyer 2003). Cost improvements are crucial as firms strive to increase customer value by providing improved products and services to customers at a lower cost (Krause et al. 2001). We draw from Krause et al. (2001) and Olson and Boyer (2003) in developing our cost improvement construct. OM literature and measures for cost improvements have focused primarily on cost savings during the manufacturing and product design stages which may not be fully appropriate for our study here. During our pre-testing processes we will ensure our measures for cost improvements are relevant to our target population.

## **2.7 Moderating variables and contingency theory**

Authors consistently suggest that a key area of need in better understanding how social capital impacts firm performance is in appreciating how social capital develops and works in different environmental situations (Krause et. al. 2007). Nahapiet (2008) suggests that “as understanding of both social capital and interorganizational relationships develops, there is mounting evidence that the precise relationships between aspects of social capital and effectiveness are complex and frequently contingent” (p. 595). A review of OM literature indicates that some aspects of social capital may be

more important than others for different performance outcomes (Uzzi et. al. 2006, Amaral and Uzzi 2007), for performance outcomes in dynamic versus relatively stable industries (Rowley et al. 2000), and at different times in the development stages of a firm (Liao and Welch 2005, Maurer and Ebers 2006). Nahapiet and Ghoshal (1998) also suggest that a firm's motivation and anticipation of expected positive outcomes also play a contingent role in the effectiveness of social capital development.

We agree with these researchers that contingent factors are important in studying social capital. While there are numerous potentially valuable and interesting factors worth studying, the practical limits of this dissertation require us to choose some—and certainly not all—of the important contingent factors to consider.

We consider environmental turbulence and firm motivation in this study because we believe that these will provide interesting and applicable insight. OM researchers and practitioners alike will benefit from clarity on how social capital is affected by levels high uncertainty and risk faced by a firm. Should a firm invest more or less in social capital in times of high uncertainty? Similarly, as our review of social capital research has demonstrated, creating social capital is not an instant or free process, but rather a time and resource intensive commitment for the parties involved. Consequently, we seek to better understand how these two contingency factors affect the relationship between social capital and firm performance.

### **2.7.1 Environmental Turbulence**

Environmental turbulence is defined as the degree of uncertainty and risk faced by a firm (Cao and Dowlatshahi 2005; Ojha 2008). We anticipate that the impacts of social capital and intellectual capital on firm performance will be moderated by environmental turbulence because as a firm's operating environment becomes more turbulent, the benefits of social capital should be more impactful on firm performance—at least to a point. There is some evidence to support the notion of a curvilinear relationship between social capital and performance outcomes as moderated by environmental turbulence. In

circumstances of low environmental turbulence, the benefits of social capital may be minimal while as environmental turbulence increases the performance benefits may also be expected to increase (Ojha 2008). However, if environmental turbulence increases too much, then the benefits of social capital may become less impactful as the turbulence becomes greater than the network's ability to cope, plan and proactively address the turbulence (Ojha 2008). The key underpinnings of the construct are a measure of the complexity, risk and uncertainty faced by a firm.

We draw from the research of Ojha (2008), whose research into environmental turbulence was influenced by the work of Cao and Dowlatshahi (2005). Our environmental turbulence construct will seek to capture the level of uncertainty and risk faced by a firm.

### **2.7.2 Motivation**

Where opportunities for social exchange exist, we anticipate a prerequisite level of motivation to be present in a firm prior to developing social capital. Fundamentally, the parties in a relationship must have an appreciation for the fact that new knowledge and unforeseen potential benefits lie ahead for their firm by working together (Youngdahl and Kellogg 1997). As our review of social capital research has demonstrated, creating social capital is not an instant or free process, but rather a time and resource intensive commitment for the parties involved. Engaging firm partners can drain resources and by its very nature, it is only over prolonged engagement that a firm can develop the structural, cognitive and relational capital needed to fully develop new and novel insight and knowledge. Thus, we would expect that it is only when a firm is committed to putting forth the resources and time required to develop social capital that they would see performance benefits.

We will draw from research by Jambulingham et al. (2005) and Youngdahl and Kellogg (1997) in developing our motivation construct. Our motivation construct seeks to capture the level of motivation our target firm has towards developing social capital.

## 2.8 Our research framework and theoretical model

This dissertation seeks to better understand the interactions of the dimensions of social capital. In this section we seek to establish our research hypotheses. We first consider the relationships amongst the dimensions of social capital and its output (see Figure 3). Later in this section we offer our full causal model which includes all of our working hypotheses and adds the performance outcomes to the research model.

A fundamental principle of social capital is that the ties and interactions between actors provide for access to information and resources (Burt 1992). Therefore, structural capital — actual ties and interaction between actors — is a prerequisite for the development of cognitive and relational capital. In addition, structural capital, in some instances, may have a direct impact on the creation of intellectual capital.

Structural capital consists of the actual network of relationships between actors. Therefore, structural capital essentially defines the *potential of possible ties* that give access to resources. For this reason, structural capital will impact the establishment and development of both the relational and cognitive dimensions of social capital. Without the network of *structural* ties, social capital cannot exist. We formulate these propositions here as formal hypotheses:

**Hypothesis 1: The structural dimension of social capital positively influences intellectual capital.**

**Hypothesis 2: The structural dimension of social capital positively influences the cognitive dimension.**

**Hypothesis 3: The structural dimension of social capital positively influences the relational dimension.**

The cognitive dimension captures the concepts of shared norms, systems of meaning



gs and values, and, as such, we can expect the cognitive dimensions to directly impact the development of social capital and the development of relationships as well as directly impacting the creation of intellectual capital. Relationships developed with shared norms and values can be expected to be stronger relationships (Moran 2005, Burt 1992). We formulate these propositions here as formal hypotheses:

**Hypothesis 4: The cognitive dimension of social capital positively influences the relational dimension.**

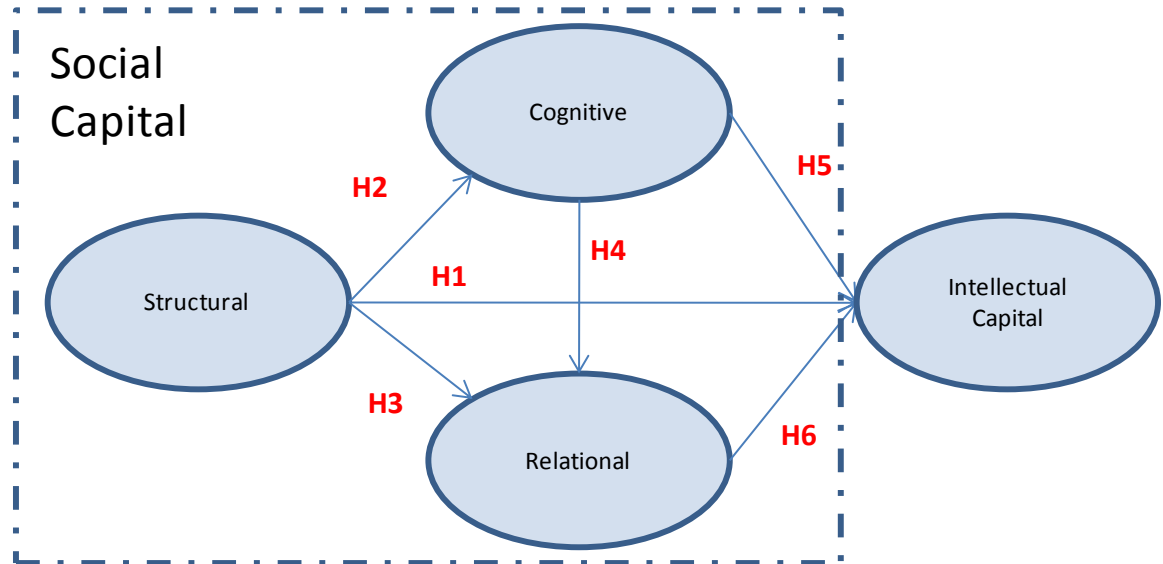
**Hypothesis 5: The cognitive dimension of social capital positively influences intellectual capital.**

The relational dimension focuses on the kinds of personal relationships. As such, both structural ties and cognitive dimensions will impact the development of a shared, relational history of interaction. Subsequently, we would expect the relational dimension to have a strong relationship with the development of social capital. We formulate this proposition here as a formal hypothesis:

**Hypothesis 6: The relational dimension of social capital positively influences intellectual capital.**

The relationships suggested by these hypotheses are shown in Figure 3.

**Figure 3. The hypothesized relationships amongst the dimensions of social capital.**



Consistent with Nahapiet and Ghoshal's (1998) conceptualization of social capital and current OM literature (Kogut and Zander 1992, Levinthal and March 1993, Liebeskind 1996, Spender and Grant 1996, Conner and Prahalad 1996, Nonaka 1994, and Teece et al. 1997) we suggest that intellectual capital will positively impact firm performance. We formally state this hypothesis as:

**Hypothesis 7: Intellectual Capital positively influences performance outcomes.**

More specifically, in this dissertation we will consider three separate measures of firm performance: innovation, cost improvements and profitability. We state these formally hypotheses as:

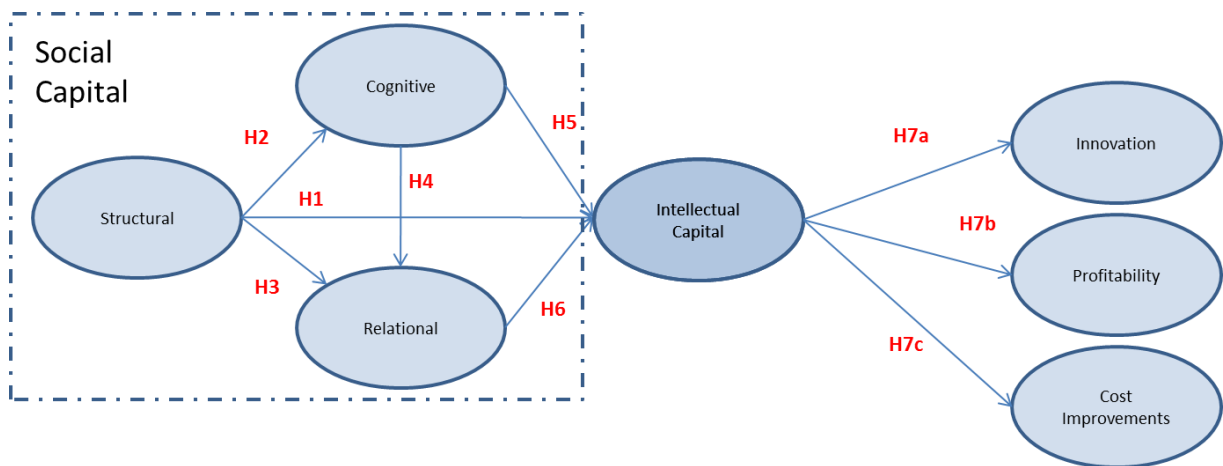
**Hypothesis 7a: Intellectual Capital is positively related to a firm's innovation.**

**Hypothesis 7b: Intellectual Capital is positively related to a firm's profitability.**

**Hypothesis 7c: Intellectual Capital is positively related to a firm's ability to create cost improvements.**

The relationships suggested by these hypotheses are shown in Figure 4.

**Figure 4. The hypothesized relationships between intellectual capital and firm performance.**



Consistent with calls to view social capital within a contingent framework (Krause et al. 2007, Moran 2005) we suggest environmental turbulence and firm motivation will moderate the relationship between intellectual capital and performance outcomes. Establishing social capital is a time consuming commitment for a firm. Thus, we would expect that it is only when a firm is committed to putting forth the resources and time required to develop social capital that we would expect to see performance

benefits. In addition, as we have seen in other work (Maurer and Ebers 2006), that the performance effects of social capital are dependent on the industry conditions faced by a firm. Creating ‘fit’ between a firm’s intellectual capital and its environment is essential to a firm achieving its desired performance outcomes. As our environmental turbulence construct is a measure of risk and uncertainty faced by a firm, we believe that to the point where environmental turbulence can be identified, interpreted and managed by the network of contacts there will be a positive impact on performance. However, in cases of extreme environmental turbulence networks will lose their ability to proactively manage the risk and uncertainty.

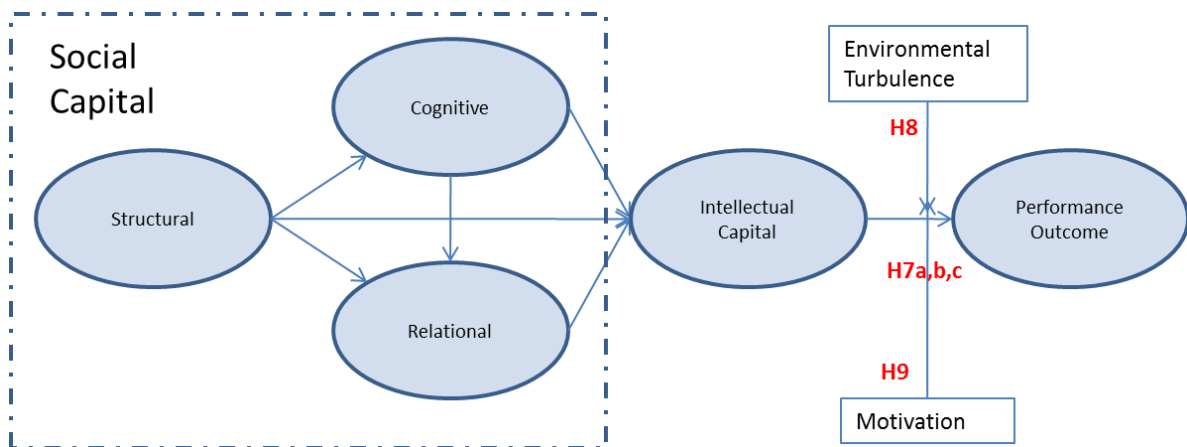
We suggest these as formal hypotheses:

**Hypothesis 8: The impact of intellectual capital on performance outcomes is curvilinearly moderated by environmental turbulence.**

**Hypothesis 9: The impact of intellectual capital on performance outcomes is positively moderated by motivation.**

The relationships suggested with these hypotheses are shown in Figure 5.

**Figure 5. The hypothesized model of social capital and performance outcomes.**



## 2.9 Additional Control Variables

After discussions with the National Association of Convenience Stores (NACS), practitioners and OM researchers, several potentially relevant exploratory control variables were identified that warranted our measuring and analyzing in this dissertation. Specifically the concepts of firm size, geographical dispersion of store locations within a market, and franchise participation were deemed to be relevant considerations for our dissertation design.

There is an opportunity to add clarity as to whether small or large firms are more likely to demonstrate supply chain social capital. In this dissertation firm size was conceptualized in two ways: number of stores operated and number of employees employed by a firm.

The concept of geographical dispersion is intended to give an approximation of how “dense” a firm is with their store locations inside a given market. We approach this solely from an exploratory standpoint: does geographical dispersion impact social capital development?

Franchise participation was also deemed to be a variable worth our considering. The intent of capturing franchise participation was to determine if a firm’s operating as a franchisee serves as a substitute for traditional supply chain social capital. Franchisors stand to provide substantial supply chain support in the forms of coordinating supply chain relationships between franchisees and traditional supply chain partners. Specifically, franchisors *potentially* stand to provide supply chain support by coordinating and facilitating innovation, product selection, and inventory management and in negotiating better terms with suppliers.

We capture data on these potentially relevant exploratory control variables as part of our dissertation.

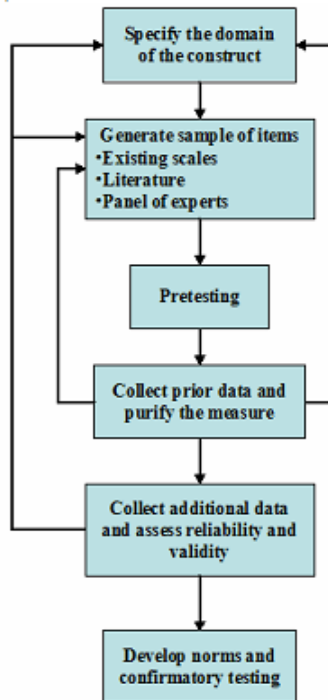
## CHAPTER THREE

### METHODOLOGY

In this chapter we describe the methodology we used to find answers to our research questions. Fundamentally, several high-level issues were pressing from the outset: first, assuring that the measures we used were psychometrically sound; secondly, assuring that we drew samples from a suitable and appropriate population; and thirdly, assuring that we had adequate power in our sample size to test individual relationships among constructs as well as sufficient power to test the structural model as a whole.

In this dissertation we followed “best practice” in developing reliable and valid measures and in testing our proposed hypotheses and model. We drew from the iterative approach suggested by Malhotra and Grover (1998). We present this process in Figure 6.

**Figure 6. The iterative approach suggested by Malhotra and Grover (1998).**



In chapter 2 we specified the domain of our constructs and developed our hypotheses and working model. In this chapter we first summarize the process we used to generate our sample items—which were drawn when possible from existing metrics and literature. Next, we outline in this chapter the process we used for pretesting and purifying and our measures and for collecting additional data needed to ensure the reliability and validity of our measures. We also outline our population, our sampling process and the statistical tools we used for analyzing our data.

### **3.1 The need for better measures—our process for psychometrically sound measurement**

Following our extensive literature review, we believed more succinct, accurate, reliable and empirically tested measures were needed for social capital. It bears noting that in Roth et. al.'s (2008) review of OM metrics, no items were included for social capital or any of its dimensions.

In this dissertation we developed and refined measures for social capital by using the process described in Menor and Roth (2007). The two stages of this process—“front end” and “back end”—are summarized in Figure 7 below (taken from Menor and Roth 2007).

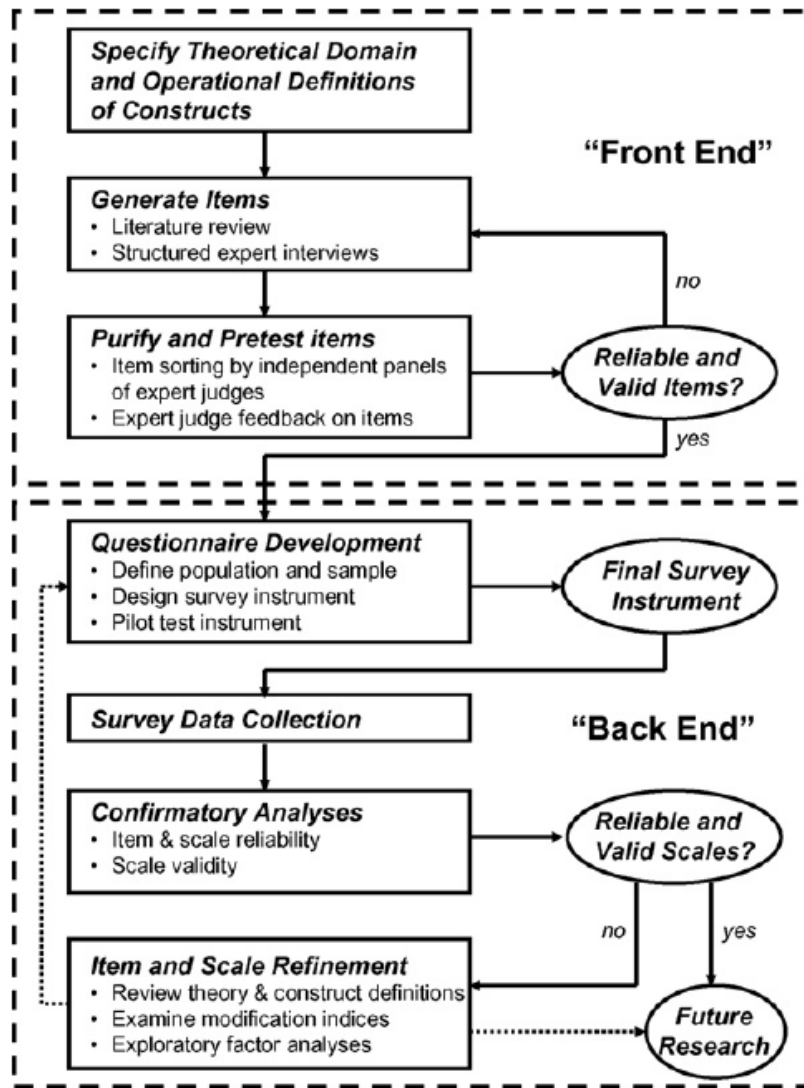
The first task in our process was to thoroughly ground ourselves in the theoretical and empirical work that has been conducted in social capital research to date. In particular, we identified the existing OM metrics used for the measurement of social capital. We attempted an exhaustive review of the topic of social capital in OM literature. As a part of this process, we searched in detail through a list of OM journals that mirrored Roth et al.'s (2008) list of production and operation related journals. These are: *Journal of Operations Management (JOM)*, *Production and Operations Management (POM)*, *Manufacturing and Service Operations Management (M&SOM)*, *Decision Sciences*, *Journal of Service Research*, *International Journal of Production Research*, *Management Science*, and *International Journal of Operations and Production*

*Management.* All papers with Social Capital included as subject, keyword or title from 1998 to present were included in the search. In addition, we searched databases (such as ABI and EBSCO) to identify other relevant papers.

We expanded our review of social capital into the social sciences as well. As we saw in social capital literature base we considered in section 2.3, the social sciences have heavily influenced the development of social capital theory in the OM field. In fact, many of the leading OM researchers on networks and teams (Ronald Burt, for example) are sociologists by training and have straddled the research line between sociology and operations management. Where applicable we ought to incorporate key findings and insights from the social sciences into our theoretical framework. Social science metrics, however, were typically deemed inappropriate for our uses in this dissertation.



**Figure 7. Menor and Roth’s (2007) two-stage approach for new measurement development.**



In the appendix of this dissertation we have included 5 tables. In Appendix Table 1 we cover conceptualizations of social capital from non-survey based works. This table includes both conceptual pieces as well as modeling based papers. This table shows that while there is some broad-based consensus of social capital theory domain, there is not a unified model for true “social capital” theory. In Appendix Table 2, we show empirical

and survey based measures for the relational dimension of social capital. In Appendix Table 3, we show empirical and survey based measures for the structural dimension of social capital. In Appendix Table 4, we show empirical and survey based measures for the cognitive dimension of social capital. As we have noted previously, research on this dimension has been scarce—we have identified Krause et al. (2007) as leading the way into exploring this construct. In Appendix Table 5, we show empirical and survey based measures of social capital performance outcomes. Based on the existing theoretical and empirical research on social capital we judge the area of social capital and its dimensions to be largely content valid. Previous research was used as the starting point for measurement items and was conserved to the fullest extent possible while attempting to reduce measurement error of these complex variables and to ensure we covered the construct domain with suitable validity and reliability.

After a thorough review of these metrics, the most relevant and applicable were sorted and established into a Q-sort instrument which was built via an online survey administration website: qualtrics.com. This Q-sort instrument was distributed to industry professionals, professors, doctoral candidates and management students to ensure that the metrics were reliable. All analysis followed in accordance with the methods recommended by Menor and Roth (2007). Specifics of the Q-sorting process are included later in this chapter.

### **3.2 Research design**

This dissertation used explanatory cross-sectional survey research design. We believed there was a pressing need to establish a valid and reliable understanding of existing social capital to build a foundation for effective and meaningful social capital research. Cross-sectional survey research stands to assist in fulfilling this need. However, one limitation of this research design is its cross-sectional use of data as opposed to a longitudinal study. As temporal precedence is a prerequisite to establishing true causality, future research may wish to consider a longitudinal research design.

Notwithstanding this limitation, survey research is uniquely effective when researchers are facing the challenge of time limitations. Moreover, concerns over the willingness of research subjects to participate in a long-term, in-depth research study lead us to pursue a survey-based research design. We believe survey research is a suitable and applicable research design for this dissertation.

Survey research is a method of gathering data from respondents that we believe to be representative of some well-defined population. Two notable limitations of cross-sectional survey data are 1) the risks of inaccurate responses associated with self-reported data, and 2) the lack of the ability to establish temporal precedence with co-varying factors (and thus we have an inability to establish causality). However, by using best-practice techniques in the deployment of this dissertation we address *a priori* the limitations of survey based research to our fullest ability. Moreover, we follow and use best practice (Podsakoff et al. 2003) in designing our research and in *post hoc* statistical analysis and control.

We consider in detail in following sections of this chapter our unit of analysis and intended sample frame, but to briefly summarize our decisions and rationale, we surveyed senior managers (typical titles of respondents include CEO, President, COO, Owner, or Sr. Vice President), in companies that are retail members of the National Association of Convenience Stores (NACS). NACS is an international trade association representing more than 2,200 retail and 1,800 supplier company members. These retail members represent the vast majority of the 144,875 convenience stores across the United States (as of December 31, 2008). These companies reported total annual sales in excess of \$624 billion for 2008, with \$450 billion of that amount coming from motor fuels sales. 49 of the 50 largest convenience store chains in the US are members of NACS. However, the vast majority of NACS retailers are small operators with over 70% of the membership operating 10 or fewer stores. In fact, of the 145,000 convenience stores in the United States, 62 percent are owned and operated by someone who only has one store. The membership of NACS tracks very closely with the overall characteristics of the convenience store industry (Source: NACS).

There are a number of reasons why we believe a small-business heavy population was appropriate for this dissertation. Specifically, we chose the convenience store industry for the following four reasons:

1. Small firms have less slack resources than large firms—therefore, social capital is likely to play an increasingly important role in small businesses (Daniel et al. 2004, George 2005);
2. The vast majority of US firms are “small businesses”—over 99% (source: <http://www.census.gov/epcd/www/smallbus.html>);
3. Small businesses are growing faster in number in the US (both in absolute numbers and as a percentage of the total) than large businesses (source: <http://www.census.gov/epcd/www/smallbus.html>);
4. Senior managers of small businesses are uniquely qualified to discuss the true role of social capital for the *entire* firm. This would be exceedingly difficult to measure firm-wide for a large company.

The most current data available from the SBA/US Government (2010) indicates that businesses with less than 500 people account for more than 99.6% of all US firms. In fact, firms with less than 200 employees account for a whopping 98% of all US firms that have employees.

Traditional OM research has focused heavily on large manufacturers at the expense of small companies and retail operations. We believe there are several reasons for this: 1) the OM field developed from a manufacturing perspective (with issues such as inventory management, planning and control, and process flow analysis); 2) the OM field developed during a time when manufacturing was a dominant part of the American economy; and 3) leading OM journals only recently have begun accepting service and retail-oriented research populations as suitable research populations for OM study. We believe this dissertation makes a needed contribution towards expanding the relevance and scope of OM research.

### **3.3 Unit of analysis**

The unit of analysis in this dissertation is the firm. Central to both the knowledge-based view of the firm (Grant 1996) and the resource-based view of the firm (Barney 1991) is the proposition that intellectual capital and knowledge creation can create competitive advantage for a *firm*. Accordingly, we believe the firm is the appropriate level at which to investigate social capital. In addition, by looking specifically at small firms we avoid two challenges that OM researchers typically encounter when investigating large manufacturing firms: 1) multiple, separate strategic business units within a single firm; and 2) a difficulty in identifying an appropriate and knowledgeable respondent. The firms in our sample frame will have a distinct marketplace and a distinct set of competitors allowing for meaningful analysis at the firm level.

### **3.4 Sample frame**

The population of interest for our research is all US based convenience stores chains. Specifically, we limit our survey population to US based convenience stores chains that are members of NACS.

It is also worth noting that over the last 12 years, again, according to SBA/US government data, small businesses have been growing in number at a double digit rate in the US while large firms have been growing in number at a rate of less than 0.5% per year. We believe that this rapidly growing population of small businesses as a research population greatly increases the practical relevance of this dissertation.

### **3.5 Sampling**

We used the NACS retail membership list to contact the appropriate senior manager(s) for convenience store industry retailers. We contacted these managers via email following best practice (Dillman 2000) and asked them to participate in an online survey. A sample copy of the invitation email is attached in the appendix of this dissertation. All respondents voluntarily agreed to participate in the survey by following a provided link to the web-based survey instrument.

### **3.6 Respondent**

Our respondents were high-level managers at each firm. Consequently, each respondent was believed to be able to knowledgeably respond to questions about strategic-level issues and performance levels for the firm. The titles for the individuals we contacted were president, senior vice president, chief operating officer, chief executive officer and the like. In the survey process we only sent emails to managers that had been previously identified as high-level managers at each firm. To ensure accuracy, we captured respondents' title and role in the data collection process to double-check that we included only appropriate respondents. During this process we included an "other" option in case a respondent's title had changed. If a respondent selected "other" as his/her title then the respondent was given an opportunity to enter his/her appropriate. This process is discussed in more depth in our results chapter.

### **3.7 Power analysis and sample size**

Prior to collecting any data for this dissertation, an important step was to first calculate the needed sample size to ensure adequate power in this study. Our required sample size was impacted significantly by our desire to have suitable power to test individual relationships among constructs as well as sufficient power to test the structural model as a whole. Maxwell (2000) provides guidance for calculating required sample

sizes for the power to accurately test individual relationships (path coefficients) and MacCallum et al. (1996) offer guidance for determining the sample necessary to achieve satisfactory power to test the structural model as a whole.

Maxwell (2000) recommends determining a required sample size based on the maximum number of independent variables (IVs) that lead to a specific dependent variable (DV). In our model, the highest number of IVs leading to a DV occurs when 3 IVs (the cognitive, structural, and relational dimensions) impact the DV intellectual capital (see Figure 2). Based on previous OM literature, we would expect the correlations between these three IVs and the DV to be in the 0.4 to 0.6 range, resulting in a sample size requirement of 178 data points.

Using MacCallum et al.'s (1996) process to determine sufficient power to test the whole structural model in SAS shows that, consistent with best practice in SEM a sample of 200 will give us adequate power for our model.

Typically, most SEM literature recommends researchers obtain a “large” sample size which is typically identified as 200-plus respondents. We therefore targeted a sample respondent base of more than 200 respondents. Dillman (2000) suggests that a 20% respondent threshold be used. To ensure that we have an adequate response base from which to draw conclusions, we contacted 2,000 individual respondents for their input.

### **3.8 Operationalization of the constructs**

In this section we summarize our constructs, their definitions, and the literature sources for each in table 3.1. For each construct that we measure in this dissertation we offer our formal operational definition. In addition we offer a list of four initial measures and the primary source(s) for these. Our goal was to take these four “best” measures through the full Q-sort process to determine that all show sufficient preliminary validity

and reliability to warrant inclusion in the final questionnaire. Again, a full and complete list of the source metrics for the social capital constructs can be found in the appendices.



**Table 3.1 Constructs and Definitions.**

<u>Construct</u>	<u>Definition</u>	<u>Source</u>
Structural Dimension	properties of the social system and of the network of relations as a whole	Nahapiet and Ghoshal (1998)
Relational Dimension	the kind of personal relationships a people have developed with each other through a history of interactions	Nahapiet and Ghoshal (1998)
Cognitive Dimension	those resources providing shared representations, interpretations, and systems of meaning among parties	Nahapiet and Ghoshal (1998)
Intellectual Capital	knowledge and knowing capability of a social collectivity (such as an organization)	Nahapiet and Ghoshal (1998)
Cost Improvements	actions that result in the ability to sell a product or service at a cost lower than the cost possible without the action	Krause et al. (2001)
Innovation	the capability of the organization to introduce new products, new services, new offerings and new features	Krause et al. (2001)
Profitability	the return received on a business undertaking after all operating expenses have been met	Koufterous et al. (2005), Diaz et al. (2003)
Environmental Turbulence	the degree of uncertainty and risk faced by a firm	Ojha (2009)

Motivation	an appreciation for the fact that new knowledge and unforeseen potential benefits lie ahead for their firm by working together	Jambulingham et al. (2005), Youngdahl and Kellogg (1997)
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For each of the constructs associated with social capital we thoroughly reviewed existing items in OM and SCM literature. We adapted these, sometimes extensively, to create metrics that we believe hit at the core of each construct and that were relevant to our study population. In addition, for our other constructs we drew from existing items in OM and SCM literature. We use these items in our pretesting process to ensure validity and reliability.

Our initial items were:

**Structural Dimension:** concerns the “properties of the social system and of the network of relations as a whole.” (Nahapiet and Ghoshal 1998 p. 244)

**Measures: Adapted from Lawson et al. 2008**

1. Our firm communicates directly with key suppliers concerning important issues
2. Our firm knows who to contact with key suppliers to get things accomplished
3. Our firm has two-way communication with key suppliers rather than one-way communication
4. Our firm has frequent contact with key suppliers

**Relational Dimension** concerns “the kind of personal relationships a people have developed with each other through a history of interactions.” (Nahapiet and Ghoshal 1998 p. 244)

**Measures: Adapted from Kale et al. 2000, Cousins et al. 2006; Lawson et al 2008**

1. Our relationship with key suppliers is characterized by close, personal interaction
2. Our relationship with key suppliers is characterized by mutual respect
3. Our relationship with key suppliers is characterized by mutual trust
4. Our firm is characterized by having personal friendship with key suppliers

**Cognitive Dimension** refers to “those resources providing shared representations, interpretations, and systems of meaning among parties.” ( Nahapiet and Ghoshal 1998 p. 244)

**Measures: Adapted from Krause et al. 2007**

1. Our firm and key suppliers share the same business values
2. Our firm and key suppliers often agree on what is in the best interest of the relationship
3. Our firm and key suppliers share our goals for this business
4. Our key suppliers understand how we do business in our firm

**Intellectual capital** is the “knowledge and knowing capability of a social collectivity (such as an organization)” (Nahapiet and Ghoshal 1998 p. 245)

**New construct: items developed for this study**

1. Our key suppliers have helped our firm better understand our business
2. Our key suppliers have helped our firm identify new opportunities within our business
3. Our key suppliers and business partners have helped our firm learn how to better satisfy our

customers

4. Our key suppliers and business partners have helped our firm learn how to be more effective

**Cost improvements** as actions that result in the ability to sell a product or service at a cost lower than the cost possible without the action (Krause et al. 2001)

**Measures: Adapted from Krause et al. (2001)**

1. We are able to offer our products at better prices than our competition
2. The total costs we pay for our products is lower than that of our competitors
3. Our key suppliers help us keep our costs lower than our competitors
4. Our firm is able to offer better value to our customers

**Innovation (adapted from Krause et al. 2001)**

**Definition:** to the capability of the organization to introduce new products, new services, new offerings and new features

1. Our firm successfully offers new and better products and/or services.
2. Our firm successfully innovates
3. Our firm successfully creates new and better ideas to improve our company.
4. Our firm successfully works with key suppliers to improve our businesses in new ways

**Profitability (Adapted from Koufterous et al. 2005, Diaz et al. 2003)**

**Definition:** the return received on a business undertaking after all operating expenses have been met

1. What is your firm's profitability relative to the average in the industry?
2. How is your firm's return on investment relative to the average in the industry?
3. How is your firm's return on total sales relative to the average in the industry?
4. Your profitability is better than your competition

**Environmental Turbulence (Adapted from Ojha 2009)**

**Definition:** the degree of uncertainty and risk faced by a firm

1. How turbulent is the technology in your industry?
2. How turbulent are supplier relationships in your industry?
3. How turbulent is the rate of change in your customers requirements?
4. How turbulent are the changes in your firms product offering?

**Motivation from Roth Book: Jambulingham et al. (2005) and Youngdahl and Kellogg (1997)**

**Definition:** an appreciation for the fact that new knowledge and unforeseen potential benefits lie ahead for their firm by working together

1. My firm is motivated to work at developing relationships with key suppliers.
2. Our employees are motivated to build relationships with key suppliers.
3. Our company believes strong relationships with key suppliers can help us be more competitive

4. Our employees believe it is important to work hard at building relationships with key suppliers.

Based on our conceptualization of our constructs we considered them to be reflective constructs.

Conceptually formative indicators and reflective indicators differ in three important ways (Roberts and Thatcher 2009): 1) causality — constructs are viewed as causes of *reflective* indicators (Bollen 1989); 2) interchangeability — for *reflective* indicators the removal of one of the indicator items *does not* change the essential nature of the construct (Little et al. 1999); and 3) validity — *reflective* indicators should demonstrate internal consistency (Nunnally and Bernstein 1994). Stated differently, validity means that we would expect for our reflective indicators to be correlated.

The measures we use for our conceptualizations of the social capital dimensions and intellectual capital are defining characteristics of the construct and changes in the construct will cause changes in the indicators. Our indicators share a common theme. Moreover, eliminating an indicator from a factor will not alter the conceptual domain of the constructs. Therefore we conclude that our constructs for the social capital dimensions and for intellectual capital (as well as our firm performance constructs) are reflective and not formative.

### **3.9 Initial Q-Sort**

The preliminary items shown in section 3.8 were the starting point for our Q-sorting process. The final items used after the Q-sort process are shown in the results chapter (Chapter 4).

### **3.10 Triangulation, Multi-item variables and Content Validity**

Consistent with best practice (Churchill 1979, Malhotra and Grover 1998) we used multi-item measures for all of our constructs. Multi-item measures can better specify the construct domain, better identify fine distinctions between respondents, have a higher level of reliability and better encompass the full domain of a construct (Malhotra and Grover 1998). We attempted to ensure that we have strong content validity by using multi-item scales. We use Cronbach's alpha (Nunnally and Bernstein 1994) to verify that our multi-item scales "hung together." During our pretesting phase we ensured that all of our multi-item scales demonstrated high inter-item correlations. We investigated to see if we had any items that showed low inter-item correlations. Items with low inter-item correlations would have been dropped from our questionnaire as needed (Nunnally 1978) but none of our items demonstrated low inter-item correlations.

Construct validity deals with having a well-defined social concept—such as one of the dimensions of social capital—and then selecting measures or indicators that uniquely identify with the construct. Good construct validity requires that constructs demonstrate both convergent and discriminate validity. As theory suggests that each construct we are seeking to measure is unique and separate from our other constructs, we ensure that the items seeking a construct are similar to each other (convergent validity) but are separate and unique from other constructs (discriminant validity).

Convergent validity is typically assessed using Fornell and Larcker's (1981) average variance extracted method (AVE). If the AVE of a construct is greater than 0.50 then the measurement error variance of a construct is less than variance explained by the commonality of the items representing the construct. We will assess discriminant validity two ways. First we will look to see if items load strongly on more than one construct (an  $r = .85$  threshold is often used). If so, this can suggest that items cross-load on multiple constructs and do not demonstrate discriminant validity. Additionally, if the square root of the AVE is greater than all the inter-construct correlations, then Fornell and Larcker (1981) suggest that discriminant validity is present. The results of these methodological test are shown in our results chapter.

### **3.11 Instrumentation and Pre-testing**

After specifying the operational domain and definitions of our constructs and generating items, we developed an instrument for pretesting of the items. This process was twofold. First, we had several OM and SCM experts review our constructs and items and evaluate them for clarity and accuracy. After we received a consensus that our items and constructs were clear, accurate and relevant, we sought to further purify and pretest our items by having graduate and undergraduate management students, management professors and practitioners perform a Q-sorting process where items were identified with their corresponding construct. This iterative approach was repeated until we had valid and reliable measures consistent with the standards identified by Menor and Roth (2007).

Our proposed Q-sort document was created via an online survey administration website, qualtrics.com.

### **3.12 Pilot data**

After we completed Q-sorting our items we pilot-tested our “final” questionnaire with a group of convenience store executives who met the requirements of our target population as defined in section 3.6. Pilot test results were satisfactory and this proved be our final version of our questionnaire. The pilot test ensured that based on preliminary data that we did not have any significant problems with our instrument. We targeted a pilot test sample size greater than the number of factors that we were testing to ensure we had adequate sample size for factor analysis. We anticipated needing 35-40 respondents for adequate pilot testing and were able to obtain 40 useable pilot test responses. Full results of our pilot test are discussed in our results chapter.



### **3.13 Full data analysis plan**

After verifying that pilot test results were acceptable, we considered Podsakoff et al.'s (2003) as a guideline for reducing common method biases—specifically those related to the design of our survey questionnaire and for *post hoc* identification and reduction of common method bias.

We tested the full causal model hypothesized in Chapter 2 of this dissertation via structural equation modeling (SEM). We followed best practice with SEM (Byrne 2006, Roberts et al. 2009). Sobel's test was used in the analysis of our mediating constructs and the March et al. (2004) approach was used for assessing the two hypothesized moderating variables. In all analysis we followed the guidelines established by Kline (2005), Byrne (2006) and Roberts et al. (2009) as guidelines to ensure that we followed best SEM practice in our analysis of our survey data.

### **3.14 Non-response bias**

While there is no true way to measure non-response bias, Armstrong and Overton (1977) suggests that wave extrapolation is an effective tool to use for addressing the issue.

In wave extrapolation the assumption is made that slow or late respondents are more akin to non-respondents than are early respondents. Respondents who responded in later waves – after a length of time has passed or after a phone call, for examples—are compared against respondents who responded in earlier waves. In this process key variables are compared across the wave respondent groups.

## CHAPTER FOUR

### RESULTS

#### 4.1 Introduction

In the previous three chapters we discussed why and how this dissertation stands to make a strong theoretical and practical contribution to the OM and SCM fields. In this chapter, we seek to present our research results and demonstrate they are reliable and valid. In the next chapter, Chapter 5, we discuss the implications of our findings. In this chapter we first report the results from our pretesting and then grapple with analyzing our pilot test data and pilot questionnaire. Then, in the remaining sections of this chapter, we do the following: 1) summarize the results from our pre-testing; 2) summarize the convenience store industry and compare this data with our pilot test data; and 3) evaluate the results of our hypothesized model with the results from our final data collection.

#### 4.2 Item Purification and Pre-Testing

In this study, the measurement items for four new latent constructs were developed. While existing literature was researched thoroughly, as discussed previously, adequate measurement items for our needs in this dissertation were not available for the constructs of the structural dimension of social capital (SD), the relational dimension of social capital (RD), the cognitive dimension of social capital (CD) and the intellectual capital construct (IC). Items were, therefore, developed for this dissertation. For the measurement items associated with the latent constructs of social capital and intellectual capital we conducted four rounds of Q-sorts. In the first two rounds MBA students were used to review the items for readability, clarity and face validity. The first two rounds showed significant cross-loading between items for separate constructs (which we assessed via “hit” ratios) and a number of items were dropped, revised or re-worded.

Two final independent rounds were conducted using a sample of 40 PhD, MBA and undergraduate management students. Consistent with the process outlined by Menor and Roth (2007), in the final analysis all items had hit-ratios in excess of 75% and were deemed acceptable for use in the pilot test. “Hits” consisted of respondents being able to correctly identify measurement items with their corresponding construct definition (Moore and Benbasat 1991). For the constructs and measurement items drawn from existing literature a panel of three management PhDs, two PhD management students and seven practitioners with extensive experience in the convenience store field examined the measurement items for face validity, clarity and relevance. Items selected for use in the pilot instrument with these established constructs passed this test.

In chapter 3 we offered the original measures we proposed. Once the Q-sorting process was satisfactorily completed and existing items reviewed, we deemed our items as having tentative reliability and validity and proceeded to test a pilot survey instrument.

### **4.3 Pilot Test Questionnaire**

To collect data for our pilot questionnaire, an initial email was sent to 500 respondents who were upper-level managers at convenience store firms. 40 responses were returned for a response rate of 8%.

A first step in analyzing the pilot test data was to evaluate each construct’s reliability. This was done using SPSS 19.0 to generate a Cronbach’s alpha coefficient for each construct. These results are summarized in Table 4.1. All constructs had sufficient alpha coefficients ( $\alpha > 0.70$ ) to suggest preliminary acceptability for inclusion in the final survey instrument.

**Table 4.1. Cronbach’s alpha coefficients for constructs in pilot test.**

Pilot Test Construct Reliabilities	Reliability Statistics	
	Cronbach's Alpha	N of Items
Structural Dimension	0.975	4
Relational Dimension	0.851	4
Cognitive Dimension	0.901	4
Intellectual Capital	0.898	4
Innovation	0.890	4
Profitability	0.897	3
Cost Improvements	0.862	3
Motivation	0.872	3
Environmental Turbulence	0.855	4

While our initial alpha coefficients were acceptable, it is important to note that acceptable reliabilities do not serve as an indicator of factor unidimensionality. For a preliminary analysis of the unidimensionality of our factors we conducted a principal component analysis (PCA) in SPSS 19.0.

Our PCA was conducted for the newly developed scales of SD, RD, CD and IC in an effort to ensure that our instrument was capturing the intended latent constructs. A scree-plot analysis clearly identified four factors on the steep part of the slope. While each of the four factors had an eigenvalue in excess of 1.0, the basis for four factors being represented was based primarily on the scree-plot. Our PCA used varimax rotation for its analysis of our items for the four newly developed constructs used in the pilot questionnaire. Four components (“factors”) were identified during the PCA with each factor having eigenvalues in excess of 1.0. Fifteen of the sixteen items used to measure our four constructs showed sufficient loading on the expected factor (greater than 0.70) and sufficient discriminatory validity (cross loadings of less than about 0.30 on other factors). The PCA results are shown in Table 4.2. The one item that showed insufficient validity and reliability is item 4 on the relational dimension which asks respondents “Our

firm values our relationships with key suppliers.” This measurement item cross-loaded on both the relational and the cognitive dimension. While potentially problematic, this item was kept in the survey for further analysis with the full and final data collection results because it had passed significant scrutiny during the Q-sorting process. Moreover, it is important to note that varimax rotation is an orthogonal rotation method where each factor is constrained to be completely independent of all other factors in the PCA. This is an overly strict restriction (which is not mandated in the confirmatory factor analysis portion of SEM analysis) and our cross-loading may be an indication of model misspecification caused by the orthogonal rotation. We revisit this item later in this chapter on the section addressing our full measurement model.

**Table 4.2 shows the PCA factor loadings for 16 measurement items.**

Structural Dimension	Component			
	1	2	3	4
Our firm knows who to contact with key suppliers to get things accomplished	0.96	0.127	0.116	0.094
Our firms knows how to reach the right people at our key suppliers	0.909	0.045	0.111	0.302
Our firm works at making sure we know who to call to correct supplier problems	0.935	0.09	0.054	0.173
Our firm has clearly identified people to contact at our key suppliers	0.962	0.107	0.073	0.053
Relational Dimension	Component			
	1	2	3	4
Our relationship with key suppliers is characterized by close, personal interaction	0.29	-0.084	0.16	0.713
Our relationship with key suppliers is characterized by a history of respect	0.171	0.281	0.33	0.765
Our relationship with key suppliers is characterized by a history of trust	0.075	0.293	0.24	0.715
Our firm values our relationships with key suppliers	0.165	0.608	-0.052	0.493
Cognitive Dimension	Component			
	1	2	3	4
Our firm and key suppliers share the same business values	0.216	0.743	0.128	0.05
Our firm and key suppliers often agree on what is in the best interest of our relationship	-0.032	0.782	0.298	0.052
Our firm and key suppliers share our goals for this business	0.019	0.898	0.061	0.039
Our firm and key suppliers agree on how we should do business together	0.064	0.75	0.181	0.264
Intellectual Capital	Component			
	1	2	3	4
Our firm effectively learns new opportunities	0.114	0.285	0.715	0.121
Our firm successfully learns how to better satisfy our customers	0.163	0.152	0.852	0.072
Our firm successfully learns how to be more competitive	0.267	-0.019	0.887	0.207
Our firm discovers new ways to be a better firm	-0.165	0.174	0.793	0.165

#### **4.4 Sample and Firm Characteristics**

In this section we attempt to answer two questions: 1) is our pilot test respondent suitably positioned to respond on behalf of the entire firm (which is our UOA); and 2) do the demographics of our pilot test respondents reflect the actual convenience store industry.

In an effort to ensure that our respondents are suitably positioned to answer the survey on behalf of the firm, we ask the question: “Which title best describes your position in your firm?” For those who select “other” as most appropriate a follow up question of “If you selected "Other" as your title, what is your title in your firm?” is asked. Respondents are then able to enter their title as needed. The question of position title is set as a mandatory question on the survey (respondents cannot move beyond the question until he/she answers the question). The IRB at Clemson, therefore, requested that we offer a “Prefer Not to Answer” option for all mandatory questions. No respondents selected this “Prefer Not to Answer” option. Three respondents selected “Regional/District Manager” as their title. For each of these respondents, their firm operated 10 or less stores and they were, therefore, judged to be a suitable respondent for the entire firm. Four respondents did not choose a senior manager title but were deemed suitable based on other information provided (for example, indicating a title of “Other” and providing that they were “Owner and President”). Consequently, these respondents were deemed appropriate and acceptable respondents for their firm. Table 4.3 shows the absolute number and percentage of each title selected by the 40 sample respondents.

**Table 4.3 Respondent Position in Firm**

Owner or Part Owner	CEO, CIO, President, Chairperson or CFO	Vice-President Sr. VP or Exec. VP	Director or General Manager	Buyer or Category Mgr.	Regional/District Manager	Prefer Not to Answer
11	2	9	7	6	5	0
27.5%	5.0%	22.5%	17.5%	15.0%	12.5%	0.0%

The 2009 NACS State of the Industry reports (referencing data provided by TDLinx, a service of the Nielsen Company) that the C-store industry in the US has 144,541 total convenience stores (2009 year-end data). Table 4.4 shows the total number of US convenience stores with their corresponding firm size (based on total number of stores operated by the firm). Our pilot respondents are slightly over-skewed towards mid-size firms (11-100 store chains), but overall follow the distribution of the industry as a whole. One respondent failed to answer this question for n= 39.

**Table 4.4 Respondent Firm Size**

Store Count	Pilot Response	Pilot %	Industry Count	Industry %
1-10 Stores	17	43.6%	96,616	66.8%
11-50 Stores	6	15.4%	12,298	8.5%
51-100 Stores	5	12.8%	5,147	3.6%
101+ Stores	11	28.2%	30,480	21.1%
Total	39	100.0%	144,541	100.0%

In this dissertation we sought to determine if a firm's operating as a franchisee may serve as a substitute for traditional supply chain social capital. Franchisors stand to provide substantial supply chain support in the forms of coordinating supply chain relationships between franchisees and traditional supply chain partners. Specifically, franchisors stand to provide supply chain support by coordinating and facilitating



innovation, product selection, and inventory management and in negotiating better terms with suppliers. As franchisors typically demand a hefty fee (Seven-11, for example, charges 25% of gross profit in addition to start-up and annual fees) the challenge will be to see if franchisors provide firm performance benefits in excess of their fees. Specifically we will seek to answer: Will being a franchisee boost overall firm performance despite the heavy fees? Will being a franchisee serve as a substitute for traditional supply chain social capital?

Unfortunately, despite discussion with NACS, TDLinx and industry professionals, there does not appear to be a reliable, published number of total c-store franchisees available for our use and comparison. Compounding the challenge of quantifying the number of franchisees is the misconception by those outside the c-store industry that offering “branded gas” is equivalent to being a “franchise.” For example, 29 of our 40 respondents indicated that they sell branded gas (for example Shell, Exxon, BP or Citgo) while only 4 respondents indicated they are affiliated with a franchise. Branded gas signifies only that a c-store firm has fuel contracts in place that provide, among other contractual obligations, for the firm to fly the brand signage at the store and to buy product from the branded supplier. Being “branded” does not provide for supply chain support (for example, offering expertise in the development of inventory management systems or with product innovation). However, by analysis we can approximate the number of franchisees in the US c-store market. The four largest franchisors operating in the US (source: NACS) are Seven-11, Couche-Tard (also operating the brands Circle K and Mac’s) BP’s AM/PM, and Cenex (according to NACS). By far the largest franchisor is Seven-11 which operates approximately 1,200 corporately run stores and partners with approximately 4,800 franchised locations. AM/PM has approximately 800 franchise locations as does Cenex and Couche-Tard (company websites). According to NACS, while there are a number of other small franchisor groups, they estimate the total number of franchisor stores to be at well less than 10% of the 144,541 c-stores in operation (for a total of less than 14,500 stores in the

US). In addition, consolidation in the industry (for example, Seven-11 bought White Hen, The Pantry bought Kangaroo and Couche-Tard acquired Exxon's On The Run stores) has, perhaps, begun to limit the number of franchisee options available for c-store operators. Four of our 40 respondents indicated that they are affiliated with a franchisor. These results are displayed in Table 4.5 and appear to be consistent with the overall industry.

**Table 4.5 Respondent Affiliation with Franchises**

Is your company affiliated with a franchise (for example 7-eleven)?

<b>Response</b>	<b>Frequency</b>	<b>%</b>
Yes	4	10.0
No	35	87.5
Prefer Not to Answer	1	2.5
Total	40	100.0

While there is extensive literature available on the convenience store industry, the vast majority of this focuses on details outside the scope of this study: size of individuals stores, space dedicated to product categories, margins by product category, same store volume trends, pay rates by position, etc. Moreover, despite pledges of extreme confidentiality, NACS will not share any data with researchers other than the summarized findings (used here) that are readily available to practitioners and researchers for a fee in their annual State of the Industry report. From a holistic view, our pilot sample appears to reflect the c-store industry well.

#### **4.5 Final Survey Questionnaire and Final Social Capital Constructs**

In this section we briefly review, in light of the pilot test results presented earlier in this

chapter, the final constructs and items we used in the questionnaire we distributed for this dissertation.

### **Structural Dimension**

The structural dimension concerns the “properties of the social system and of the network of relations as a whole” (Nahapiet and Ghoshal 1998 p. 244). This dimension has been explored in depth and strongly influenced by the work of Burt (1995, 2000, 2007) and deals with who you reach and how you reach them. The structural dimension encompasses network components and facets such as the presence or absence of ties between parties, the configuration of a network (such as the hierarchy within an organization), and concepts such as denseness of relationships, structural holes in networks, the presence or absence of network ties between different people, formal and/or informal (such as appropriable networks) network configuration, and the density and connectivity of a network. The final items we used for the SD were:

<b>The following questions concern who you know and who you are able to contact...</b>	<b>Scale of Agreement</b>				
	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Our firm knows who to contact with key suppliers to get things accomplished	1	2	3	4	5
Our firm knows how to reach the right people at our key suppliers	1	2	3	4	5
Our firm works at making sure we know who to call to correct supplier problems	1	2	3	4	5
Our firm has clearly identified people to contact at our key suppliers	1	2	3	4	5

### **Cognitive Dimension**

The cognitive dimension refers to “those resources providing shared representations, interpretations, and systems of meaning among parties” (Nahapiet and

Ghoshal 1998 p. 244). This dimension (Nahapiet 2008, Krause et al. 2007), encompasses the shared meanings and shared interpretations between parties in a relationship. The cognitive dimension captures the concepts of shared norms, systems of meanings and values, and, as such, we can expect the cognitive dimension to directly impact the development of social capital and the development of relationships. Tsai and Ghoshal (1998) suggest that cognitive capital is embodied in the shared visions and collective goals of organizational partners and is encapsulated by shared perceptions, expectations and interpretations. Relationships developed with shared norms and values can be expected to be stronger (Moran 2005, Burt 1992). Weick et al. (1995) asserts that when there is congruence on goals and values and when interpretations are shared by and across organizational partners this cognitive capital becomes on-going, cumulatively supportive, and self-reinforcing. The final items we used for the cognitive dimension were:

The following questions concern shared goals and values between you and your supply partners...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm and key suppliers share the same business values	1	2	3	4	5
Our firm and key suppliers often agree on what is in the best interest of our relationship	1	2	3	4	5
Our firm and key suppliers share our goals for this business	1	2	3	4	5
Our firm and key suppliers agree on how we should do business together	1	2	3	4	5

### **Intellectual capital**

Nahapiet and Ghoshal (1998 p. 245) define intellectual capital as the “knowledge and knowing capability of a social collectivity [such as an organization].”

Fundamentally, new organizational intellectual capital is derived by a firm’s ability to combine and exchange information throughout its social network. There are other ways to develop intellectual capital than through social capital networks (such as research and

development departments, for example). However, inherent in this intellectual capital construct is the idea that through the combination of knowledge among disparate parties and the exchange back and forth between parties new knowledge can be created and leveraged (Moran and Ghoshal 1996).

The term intellectual capital is consistent with the view of knowledge as developed in OM literature (Kogut and Zander 1992, Levinthal and March 1993, Liebeskind 1996, Spender and Grant 1996, Conner and Prahalad 1996, Nonaka 1994, and Teece et al. 1997) where internal firm knowledge is a source (often viewed as *the* source) of competitive advantage to a firm. We note here that there is no *unified* OM theory of knowledge, knowledge creation or knowledge management from which we can draw, but central topics include issues of explicit and tacit knowledge (Kogut and Zander. 1992, Levinthal and March 1993, Nonaka 1994), the iterative approach to knowledge creation (Nonaka 1994, Teece et al. 1997), the issue of absorptive capacity and causal ambiguity (Szulanski 1996) and knowledge appropriation as the boundary condition of a firm (Liebeskind 1996). A full review of knowledge, knowledge management and knowledge creation is well beyond the scope of this dissertation. However, of relevance here is the notion that inherent in all these conceptualizations of knowledge is awareness that knowledge can be created through meaningful combination and exchange through social interactions and that knowledge and intellectual capital can be a source of sustainable competitive advantage. We seek to capture this essence through the concept of intellectual capital. The final questions we used for intellectual capital were:

The following questions concern the knowledge capability of your firm ...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm effectively learns new opportunities	1	2	3	4	5
Our firm successfully learns how to better satisfy our customers	1	2	3	4	5
Our firm successfully learns how to be more competitive	1	2	3	4	5
Our firm discovers new ways to be a better firm	1	2	3	4	5

## Performance Measures

We measure three commonly used metrics that display a range of performance benefits to a firm that represent key competitive areas of a firm (Krause et al. 2001). Specifically, we will look at outcomes of cost improvements, profitability, and innovation as these have been deemed relevant to the convenience store industry by a panel of academics and practitioners alike. We use existing OM and SCM conceptualizations of these performance outcomes in this dissertation.

## Innovation

Innovation refers to the capability of the organization to introduce new products, new services, new offerings and new features (Koufteros et al. 2001). Innovation has long been a topic of interest in OM research but has been looked at primarily from the vantage point of manufacturing. Typical studies of innovation look at integrated product development practices (Koufteros et al. 2002) or concurrent engineering and product design (Koufteros et al. 2005). The concept of innovation, though, is relevant for retail and services as well. For example, in retail environments innovation could include subtle innovative improvements such as better marketing, more effective signage, new combinations of product bundles for sale, improved store layouts, faster means of customer check out, or heightened levels of customer responsiveness. Numerous OM authors have supported the importance of innovation and there is substantial OM and SCM literature for us to draw from in supporting innovation as a desirable performance outcome for firms. We drew from Koufteros et al. (2002, 2005) for our innovation construct measurement items.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm continuously improves our efficiency	1	2	3	4	5
Our firm successfully innovates	1	2	3	4	5
Our firm continuously improves the service we offer customers	1	2	3	4	5
Our firm remains up-to-date on industry "best practices"	1	2	3	4	5

## Cost Improvements

Cost improvements are the result of actions that allow for the ability to sell a product or service at a cost lower than the cost possible without the action (Olson and Boyer 2003). Cost improvements are crucial as firms strive to increase customer value by providing improved products and services to customers at a lower cost (Krause et al. 2001). We drew from Krause et al. (2001) and Olson and Boyer (2003) for our cost improvement construct measurement items.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
We are able to offer our products and services to our customers at better prices than our competition	1	2	3	4	5
The total costs we pay for our products is lower than that of our competitors	1	2	3	4	5
Our firm is able to offer competitively priced products	1	2	3	4	5

## Profitability

Profitability is defined as the return received on a business undertaking after all operating expenses have been met (Koufterous et al. 2005). We draw from existing OM literature for our conceptualization of profitability (Koufterous et al. 2005, Koufterous et al. 2002, Rozenzweig and Roth 2004). In addition, we use NACS State of the Industry guidelines in an effort to obtain objective profitability data.

The following questions concern your firm's profitability relative to your competition and your ability to sell products and services at a low cost ...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm's profitability is greater than the average in the industry	1	2	3	4	5
Our firm's return on investment is greater than the average in the industry	1	2	3	4	5
Our firm's profit margin is greater than the average in the industry	1	2	3	4	5

In addition, we sought to capture profitability as an objective, quantifiable amount. Based on results from NACS’s State of the Industry report we asked the two objective measures of final performance.

For 2009, was your average monthly per store gross profit (before expenses):	Less than \$25,000	\$25,000 to \$34,999	\$35,000 to \$44,999	\$45,000 to 54,999	\$55,000 or greater
For 2009, was your average monthly per store operating profit (after expenses):	Less than \$9,999	\$10,000 to \$44,999	\$15,000 to \$19,999	\$20,000 to 24,999	\$25,000 or greater

**Moderating variables: Motivation and Environmental Turbulence**

Authors consistently suggest that a key area of need in better understanding how social capital impacts firm performance is in appreciating how social capital develops and works in different environmental situations (Krause et. al. 2007). Nahapiet (2008) suggests that “as understanding of both social capital and interorganizational relationships develops, there is mounting evidence that the precise relationships between aspects of social capital and effectiveness are complex and frequently contingent” (p. 595). A review of OM literature indicates that some aspects of social capital may be more important than others for different performance outcomes (Uzzi et. al. 2006, Amaral and Uzzi 2007), for performance outcomes in dynamic versus relatively stable industries (Rowley et al. 2000), and at different times in the development stages of a firm (Liao and Welch 2005, Maurer and Ebers 2006). Nahapiet and Ghoshal (1998) also suggest that a firm’s motivation and anticipation of expected positive outcomes also play a contingent role in the effectiveness of social capital development. We measure firm motivation by drawing on metrics established by Jambulingham et al. (2005) and Youngdahl and Kellogg (1997). We expect firm motivation to be positively associated with social capital.



The following questions concern your firm's attitude towards industry conditions...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our employees are motivated to build relationships with key suppliers	1	2	3	4	5
Our employees believe it is important to work hard at building relationships with key suppliers	1	2	3	4	5
At our firm building close relationships with key suppliers is important	1	2	3	4	5

Environmental turbulence is defined as the degree of uncertainty and risk faced by a firm (Cao and Dowlatshahi 2005; Ojha 2008). We anticipate that the impacts of social capital and intellectual capital on firm performance will be moderated by environmental turbulence because as a firm's operating environment becomes more turbulent, the benefits of social capital should be more impactful on firm performance—at least to a point.

While we acknowledge that the variation of environmental turbulence *may* be somewhat constrained by our focusing on one specific industry, we anticipate that individual firms will differ significantly on the individual firm's perception of the complexity, risk and uncertainty faced by a firm.

The key underpinnings of the construct are a measure of the complexity, risk and uncertainty faced by a firm. We suggest that in mild to moderate environmental turbulence the relationship between social capital and firm performance will be stronger than in instances of extreme environmental turbulence.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our industry has a high-level of risk	1	2	3	4	5
Our industry has a high-level of uncertainty	1	2	3	4	5
It is difficult to successfully plan for the long-term in our industry	1	2	3	4	5
Our industry is very turbulent	1	2	3	4	5

## Firm Size

Firm size was measured in two ways: number of stores operated and number of employees employed by a firm. The questions we used for determining firm size were:

How many employees does your firm employ?	Less than 20	Between 21 and 49	Between 50 and 99	Between 100 and 199	200 or more
How many stores does your firm operate?	1	2 to 4	5 to 10	11 to 20	21 to 50
	51 to 100	More than 100			

## Geographical Dispersion

Geographical dispersion was asked using the item:

If you operate more than 1 store, what is the approximate average distance (in miles) between your stores?	Less than 5 miles	5 to 10 miles	11 to 19 miles	Between 20 and 50	50 or more miles
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## Franchise Participation

We obtained information on a respondent firm's franchise status by asking the following question:

Is your company affiliated with a franchise group (such as 7-11)?	Yes	No
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## Franchise Support

Firms that were identified as being affiliated with a franchise were offered a section of questions which sought to gauge to what extent their franchisor serves to

provide supply chain support. The intent of these questions was to determine if a firm's operating as a franchisee serves as a substitute for traditional supply chain social capital. Franchisors stand to provide substantial supply chain support in the forms of coordinating supply chain relationships between franchisees and traditional supply chain partners. Specifically, franchisors stand to provide supply chain support by coordinating and facilitating innovation, product selection, and inventory management and in negotiating better terms with suppliers. We sought to gauge this franchisor support as a substitute for traditional supply chain social capital with the following items:

The following questions concern your firm's relationship with your franchisor...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our franchisor helps coordinate our relationship with our other supply chain partners.	1	2	3	4	5
Our franchisor provides support in selecting what products to sell in our stores.	1	2	3	4	5
Our franchisor provides support in maximizing our profit margins.	1	2	3	4	5
Our franchisor provides support in analyzing our store sales in order to improve our sales.	1	2	3	4	5
Our franchisor provides merchandising support.	1	2	3	4	5
Our franchisor helps our firm secure lower prices from our vendors.	1	2	3	4	5
Our franchisor supports our firm by making our distribution network easier to manage.	1	2	3	4	5
Our franchisor supports our firm by helping us advertise and promote our business.	1	2	3	4	5

With the pilot test providing preliminary support for our social capital related constructs and items (with one *potentially* problematic item), all items were presented to our final respondents as indicated in the previous two sections. A full copy of our survey instrument is included in the appendix of this dissertation.

#### **4.6 Final Sample Characteristics and Data Screening:**

Our data were collected over a 10 day period in response to our email requests. 2,000 potential respondents were contacted via email with a summary of this study and a link to the online survey questionnaire hosted at Qualtrics.com. A total of 239 responses were received. Twenty-one of these responses were case-wise deleted for incompleteness or for respondents not being consistent with our sample frame (i.e. respondents had changed job positions) giving us an effective approximate response rate of 10.9%. A total of 218 responses were analyzed in SPSS 19.0. An initial screening of the final data showed that the reliabilities of our factors appeared acceptable ( $\alpha > 0.80$ ). Our responses also showed an acceptable level of skewness (positive but less than 3.0) but a significant level of positive kurtosis ( $> 3.0$ ). Because kurtosis cannot be cured by transforming variables we opted to leave our variables as originally received. Log10, LN, Inverse and Square root transformations did nothing to improve the normality of our data. The implications of our non-normal data is that we will rely on robust methods throughout our analysis. Robust methods have been developed to ensure accurate analysis of non-normal data. All fit measurements and confidence intervals reported in this dissertation are “robust” unless otherwise noted.

An additional 16 cases were discarded as they were determined to be excessive multivariate outliers (Mahalanobis distances well outside a  $p = .001$  level on the  $\chi^2$  table). After the deletions of these 16 cases we were left with a 202 usable cases that had no excessive outliers (judged primarily by their being close to the  $p = .001$   $\chi^2$  level and their having a smooth distribution among adjacent cases).

Our data showed very little missing data. Seventeen cases had at least one missing data point (8.4% of all cases) but only a total of 66 data points were missing in total (less than a tenth of a percent of all data). None of the cases used in this dissertation had more than 4 missing data points (or less than 5% of all data points asked for from each respondent). Consequently, missing data was not considered to be a major factor. EM imputation in EQS was used to provide data points for the 66 missing data points. For these final cases and data points we re-calculated reliabilities in SPSS. The final

reliabilities for the items used in our final measurement and structural models are shown in Table 4.6.

**Table 4.6 Final Construct Reliabilities**

<b>Construct</b>	<b>Reliability Statistics</b>	
	<b>Cronbach's Alpha</b>	<b>N of Items</b>
Structural Dimension	0.966	3
Relational Dimension	0.862	3
Cognitive Dimension	0.889	3
Intellectual Capital	0.861	3
Innovation	0.816	3
Profitability	0.956	2
Cost Improvements	0.862	3
Motivation	0.832	3
Environmental Turbulence	0.847	3

The demographics of our final respondents are shown tables 4.7 through 4.11. The results of the final respondents did not differ significantly ( $p \geq .05$ ) from the pilot test data.

All of our potential respondents were screened by NACS as being a “senior manager” prior to our contacting them. To ensure accuracy, we again captured their title during the questionnaire process. Several respondents failed to both indicate a position in their firm and failed to write in their current title. These responses were case-wise discarded during the initial data screening. Nineteen respondents initially selected their title as “other” and wrote in their actual title. Upon review of each respondent, these were deemed to be respondents that met the requirements of our sample respondent profile. These write-in responses included titles such as “President and Owner,” “Owner and CEO,” “Area Supervisor,” “Operations Manager,” “Chief Marketing Officer,” and

“Principal.” Where respondents indicated multiple titles (for example, President and Owner) the respondent was classified in the more senior position (i.e. in the “Owner” group rather than in any of the management positions).

**Table 4.7 Respondent Position in Their Firm.**

Owner or Part Owner	CEO, CIO, President, Chairperson or CFO	Vice President, Sr. VP or Exec. VP	Director or General Manager	Buyer or Category Mgr.	Regional/District Manager	Prefer Not to Answer
67	18	42	33	22	20	0
33.2%	8.9%	20.8%	16.3%	10.9%	9.9%	0.0%

**Table 4.8. Number of Stores in Respondent’s Firm.**

1	2 to 4	5 to 10	11 to 20	21 to 50	51 to 100	More than 100
53	27	12	18	17	30	45
26.2%	13.4%	5.9%	8.9%	8.4%	14.9%	22.3%

**Table 4.9 Number of Employees in Respondent’s Firm.**

Less than 20	21 to 100	101 to 200	201 to 500	More than 500
57	38	20	20	67
28.2%	18.8%	9.9%	9.9%	33.2%

**Table 4.10. Geographical Dispersion of Stores in Respondent’s Firm.**

Less than 5 miles	5 to 20 miles	20 to 50 miles	Greater than 50 miles	N/A (1 store)	Did Not Answer
53	67	24	16	37	5
26.2%	33.2%	11.9%	7.9%	18.3%	2.5%

**Table 4.11. Respondents' indicating their firm is a Franchise.**

Yes	No	Prefer not to Answer
19	177	6
9.4%	87.6%	3.0%

#### **4.7 Reliability and Validity Analysis**

SEM was used as our primary tool in analyzing the measurement and structural models used in this dissertation. SEM use requires that several assumptions be met (or if not met, at least adequately addressed): 1) that data be ratio or interval in nature; 2) that variables have at least 4 values; 3) that data be multivariate normal; 4) that models be over-identified (positive degrees of freedom); and 5) that sample size be sufficient for effective analysis.

The data collected for this dissertation has no categorical/binary variables and uses Likert scales with 5 intervals. We examined Mardia's normalized estimate (in EQS) to assess multivariate normality. As suggested in our analysis in SPSS, Mardia's normalized estimate suggested significant levels of non-normality (kurtosis) in our data. Our Mardia's normalized estimates were consistently between 19 and 21 which is well above the 5.0 threshold cut-off value Bentler (2005) suggests as an indicator of normally distributed data. As such, we rely on EQS's robust methods option to adjust analysis for this non-normality. Under "robust" methods CFI, RMSEA and the 90% confidence estimates related to RMSEA are valid despite the violation of the normality assumption. All fit measurements and confidence intervals reported in this dissertation are "robust" unless otherwise noted.

We began our SEM with a measurement model analysis. In the full measurement model, all factors were allowed to freely correlate with each other. Our initial fit in this model was below the suggested cutoffs for "good" fit so we used the LM process in EQS to consider each item for potential misfit – primarily in looking at cross loadings between

factors by items that should be measuring a single factor. If our LM tests suggested that our fit could be significantly improved, we removed the potentially problematic item and re-ran the full measurement model and then reconsidered both our fit indices and the newly regenerated LM test output. During this process, a total of 6 items were dropped from our measurement model – one item each from our structural, relational, cognitive, intellectual capital, innovation, and profitability factors.

The items we dropped from our measurement model are as follows:

Construct	Item #	Dropped Item
Structural Dimension	11_2	Our firms knows how to reach the right people at our key suppliers
Relational Dimension	12_1	Our relationship with key suppliers is characterized by close, personal interaction
Cognitive Dimension	13_2	Our firm and key suppliers often agree on what is in the best interest of our relationship
Intellectual Capital	14_4	Our firm discovers new ways to be a better firm
Innovation	15_3	Our firm continuously improves our efficiency
Profitability	16_3	Our firms profit margin is greater than the average in the industry

While there is *no definitive way of knowing for sure why these items are problematic*, it warrants our giving consideration to these problematic items in an effort to advance our ability to improve our item generation and refinement process in future research. For two items in particular we were able to generate a plausible reason for the items demonstrating multi-dimensionality.

For the structural item we deleted upon reflection we found this to be the only structural item we used that used the term “how” as opposed to the term “who.” It is possible this concept allowed respondents to deem some depth into the relationship that was not intended in the item. For the profitability item we deleted, upon reflection we found that profit margin is likely a problematic measure as some major c-store chains use a high-volume, low margin approach. Consequently, these firms may have chosen to offer low margins but remain more profitable than their competition.

In addition to removing 6 items from our measurement model, LM tests in EQS suggested we could improve our model fit by allowing 3 error covariances. Each of these



error covariances occurs between error terms associated with items measuring the same factor. Also, it is worth noting that the potentially problematic cognitive dimension item discussed in the section following our pilot test results was *not* dropped upon analysis of the full data. This item, consistent with our findings from the Q-sort process, did demonstrate adequate convergent and discriminant validity for inclusion in our final model. It is possible that by eliminating 5 other items that demonstrated comparatively lower levels of unidimensionality, we may have helped this item load more unidimensionally on its intended factor. More likely, however, is that when we eliminated the restrictions associated with orthogonal rotation that we used in analyzing the pilot data, we allowed for a better fit for our model between items and factors.

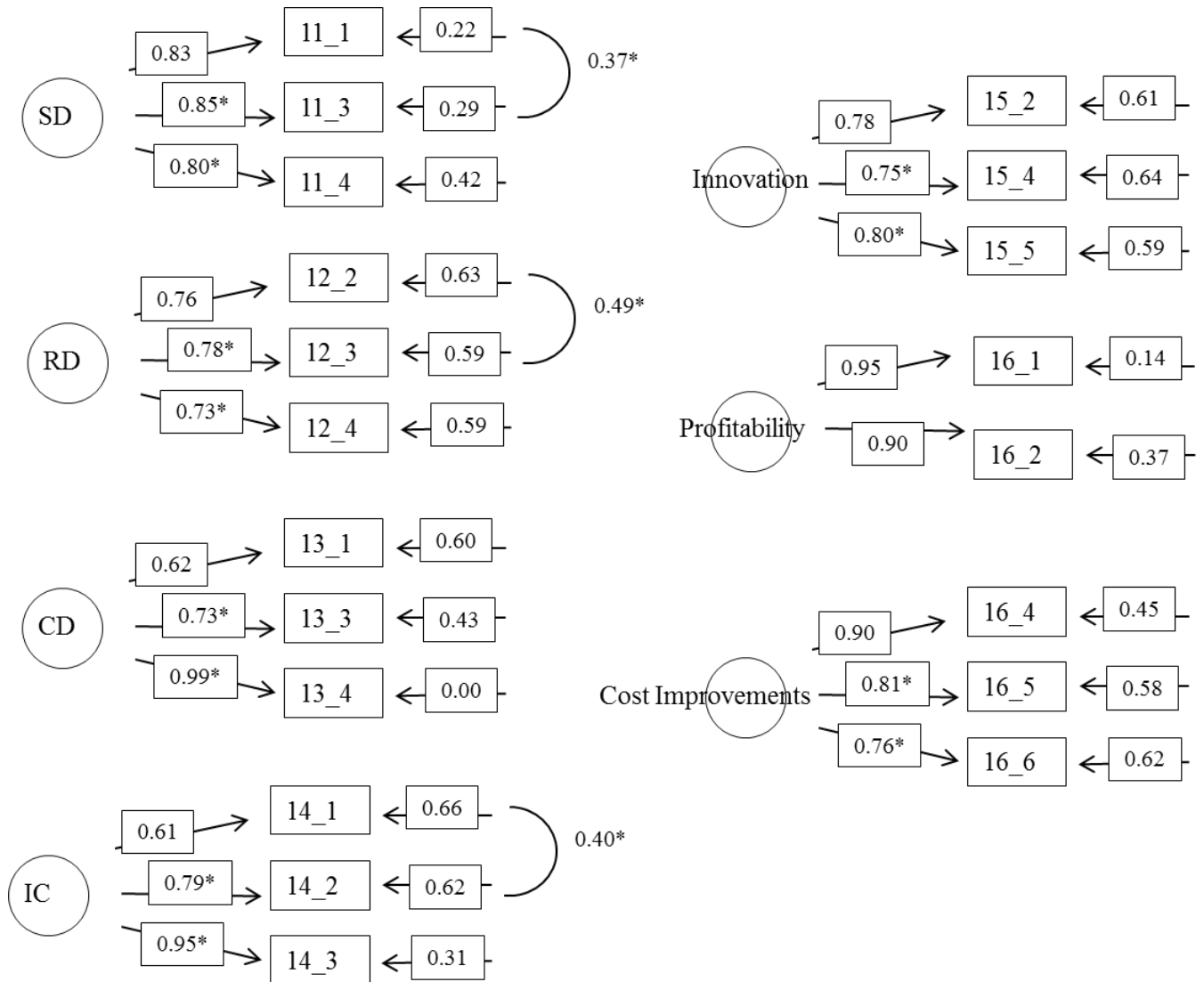
Figure 8 shows the final set of items and covariance that are carried throughout this dissertation into our structural analysis.

While the factor correlations are not shown in our measurement model due to viewing simplicity, these are shown in Table 4.12.

**Table 4.12 Covariance Matrix with AVE of Measurement Model**

	SD	RD	CD	IC	IN	PR	CI
SD	0.68						
RD	0.68	0.57					
CD	0.44	0.83	0.63				
IC	0.30	0.47	0.43	0.63			
IN	0.18	0.37	0.43	0.81	0.60		
PR	0.05	0.38	0.40	0.95	0.82	0.86	
CI	0.29	0.19	0.16	0.37	0.49	0.51	0.68
Sq. Rt. AVE	0.83	0.76	0.80	0.80	0.78	0.93	0.83

**Figure 8. Final Measurement Model where all factors were allowed to freely correlate with each other. For viewing simplicity, factor correlations are not shown. Note the error covariances occur between error terms associated with items measuring the same factor. These error covariances are retained through all subsequent analysis in SEM even if not explicitly shown.**

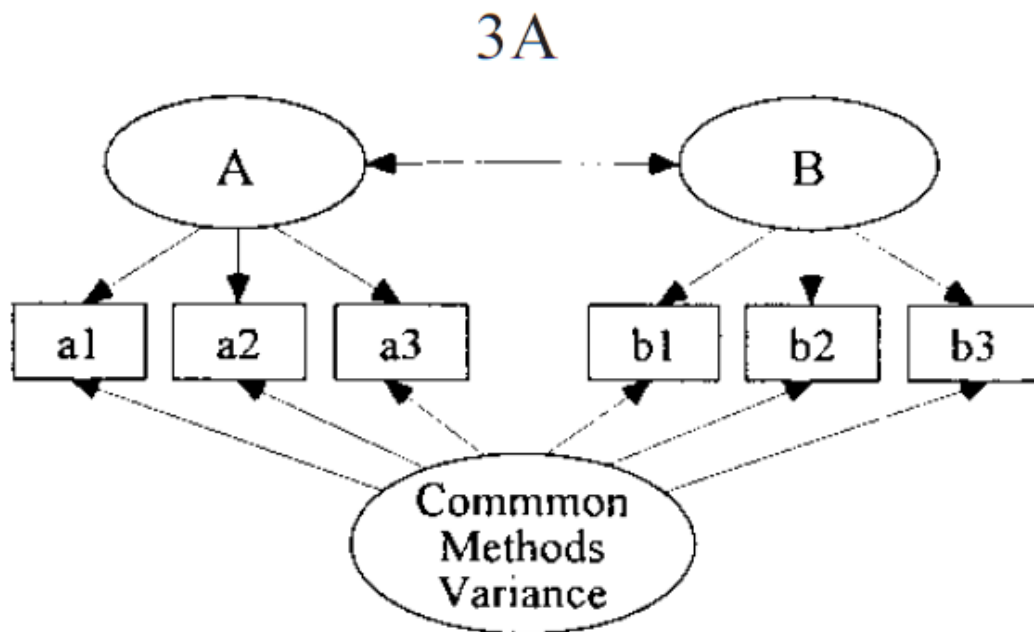


#### **4.9 Method Effect**

Proactive efforts were made to ensure that our data collection method reduced the likelihood of the data being comprised by common method effect in three ways. First, we separated predictor and criterion values at separate times and places during the administration of the survey. Secondly, we assured that all responses were anonymous with only optional (at the respondents' choice) ability to contact or identify the respondent. Third, we attempted to keep the length of the survey to a minimum in an effort to ensure respondents were energetic and alert throughout the survey.

Figure 9 shows the “single-method-factor” statistical remedy we used to assess and control for method bias (Figure is taken from Podsakoff et al. 2003 p. 896). This approach has two key advantages: 1) it does not require that the researcher identify the exact source of the method bias, and 2) it does not require a valid measure of the biasing factor. One disadvantage of this approach is only being able to control for a single source of method bias at a time. Podsakoff et al. (2003) recommends this statistical remedy for models such as ours where 1) predictor and criterion variables were not able to be gathered from separate sources; 2) predictor and criterion variables were not able to be gathered in different contexts; 3) the source of the method bias could not be identified; and 4) the method bias could not be validly measured. In summary, our approach to method bias has heeded Podsakoff et al.'s (2003 p. 900) conclusion that: “Although the strength of method biases may vary across research contexts, a careful examination of the literature suggests that common method variance is often a problem and researchers need to do whatever they can to control for it. As we have discussed, this requires carefully assessing the research setting to identify the potential sources of bias and implementing both procedural and statistical methods of control.”

**Figure 9.** The “single-method-factor” statistical remedy we used to assess and control for method bias (Figure is taken from Podsakoff et al. 2003 p. 896).



Podsakoff et al.’s (2003) one factor test was used to assess the extent to which common method effect impacted our data. We created a full measurement model with all factors set to load on their respective factors and all factors allowed to freely covary. In addition, a single additional factor was created that was identified by all items. This factor – the method effect – was not allowed to covary with other factors. This factor in essence, then, became representative of some “other” factor associated with the items. In this case that “other” factor is common method effect.

A comparison of the Satorra-Bentler  $\chi^2$  values for a model with a method factor (Model A Satorra-Bentler  $\chi^2 = 403.32$  df = 183) and a model without a method factor

(Model B Satorra-Bentler  $\chi^2 = 538.62$   $df = 207$ ) showed the change in  $\chi^2$  of 135.30  $df = 24$  is significant ( $p < .01$ ). Using the SBDIFF.exe program developed by Crawford and Henry (2003) we calculated a scaled Satorra-Bentler Scaled Difference = 282.2401  $df = 24$ , which was significant, giving us further support that method effect was present. Byrne (2006) suggests that we also consider CFI results in evaluating our measurement model. An analysis of the results of the our one factor test indicated that fit indices improved when using a method effect factor. CFI improved from 0.902 (robust) to 0.935 (robust) with a method factor while RMSEA improved from .089 to .077. A change of .01 or more in the CFI has been suggested (Cheung and Rensvold 2002) as an indication that common method bias is present. Therefore, our data suggested that measurement effect was present. Most likely, there was an element of social bias in our study where respondents found that answering some questions in certain ways to be more desirable than answering completely honestly (though this cannot be confirmed *post hoc* in this study). Our method factor has an average variance extracted of 0.09.

To further consider method bias we also considered the factor loading for each item between the method factor and the construct factor loading. These loading are shown in TABLE 4.13 below.

**Table 4.13. Factor and Method loadings for all items.**

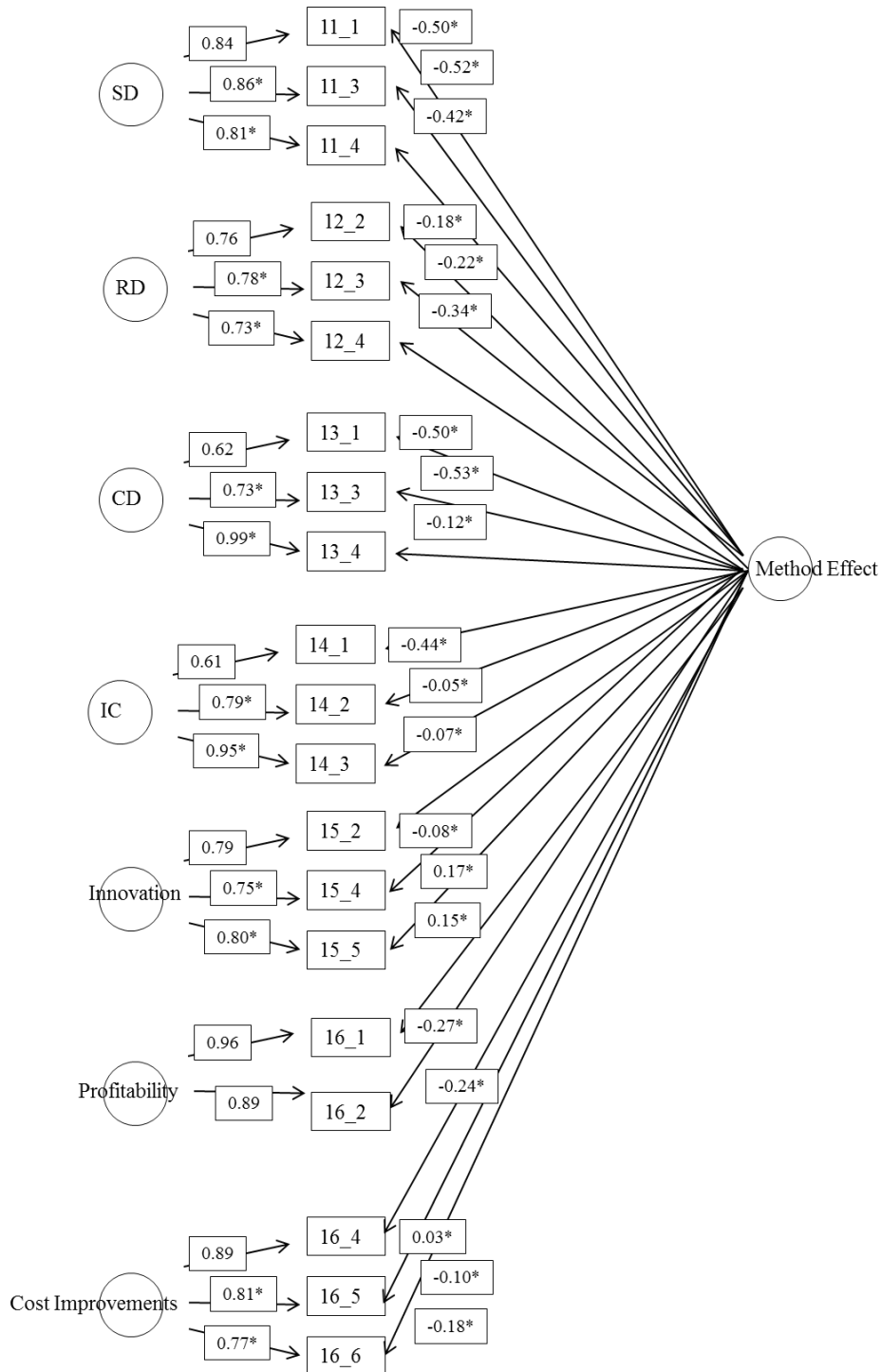
Construct	Items	Factor Loading	Factor AVE	Method Loading	Method AVE
Structural Dimension	11_1	0.84	0.84	0.51	0.24
	11_3	0.86		0.52	
	11_4	0.81		0.42	
Relational Dimension	12_2	0.76	0.76	0.19	0.07
	12_3	0.78		0.23	
	12_4	0.73		0.35	
Cognitive Dimension	13_1	0.62	0.78	0.51	0.19
	13_3	0.73		0.53	
	13_4	0.99		0.13	
Intellectual Capital	14_1	0.61	0.78	0.44	0.07
	14_2	0.79		0.05	
	14_3	0.95		0.07	
Innovation	15_2	0.79	0.78	0.08	0.02
	15_4	0.75		0.17	
	15_5	0.80		0.15	
Profitability	16_1	0.96	0.93	0.27	0.07
	16_2	0.89		0.24	
Cost Improvements	16_4	0.89	0.82	0.02	0.01
	16_5	0.81		0.11	
	16_6	0.77		0.18	

Of interest in our analysis of method effect was the fact that the method effect is quite dissimilar between separate constructs. For example, the structural and cognitive dimensions of social capital exhibited significant method effects while performance outcomes such as innovation and cost improvements showed almost no method effects. Potential implications of this finding may be that that respondents' perception to some factors show a significant and appreciable method effect that is not present with the measurement of other factors. Social desirability refers to the tendency of respondents of a survey to respond in a fashion that they believe will be viewed favorably by others which can result in the over-reporting of positive behavior or the under-reporting of negative behavior (Podsakoff et al. 2003). A review of the items used for measuring the structural and cognitive dimensions of social capital suggest that social desirability may

be the basis for the high method effect on these factors. It is worth stressing that that there is no way to definitely identify post hoc the source of this method effect.

Figure 10 shows our final measurement model including our method factor.

**Figure 10. Final Measurement Model with Method Factor.** For viewing simplicity, correlations are not shown. Error covariances, too, are retained but not shown.





Based on the improved CFI and RMSEA fit indices, the Crawford and Henry (2003) analysis and the significant (though relatively small) loadings on the method factor, we included a measurement effect factor in all subsequent analysis. Unless specifically noted, all subsequent analysis of our data in this dissertation includes the method factor. The implications of method effect are discussed in greater length in Chapter 5 of this dissertation.

In an effort to further assess the reliability and validity of our measures, we used Fornell and Larcker's (1981) analysis of convergent and discriminant validity.

The AVE (average variance extracted) for each factor was calculated and is shown in the diagonal of the Table 4.14. The AVE for each construct was above 0.50 which is the generally suggested cut-off for factors showing convergent validity. The lower half of the matrix shows the estimated correlations between our constructs. As a whole, the AVE analysis supported that there was discriminant validity in regards to our latent constructs as the square root of AVE for all constructs was greater than the correlation between factors except for the correlation between the factors innovation and intellectual capital. For this relationship the square root AVEs for each factor is well above the .70 threshold (0.80 for innovation and 0.78 for intellectual capital) and the estimated correlation between the factors innovation and intellectual capital is .83. Based on this high AVE, Ping (2005) suggests that there is more extracted variance than variance shared between the factors thus suggesting the discriminant validity of the target LV.

**Table 4.14 AVE and Covariance Matrix**

	SD	RD	CD	IC	IN	PR	CI
SD	0.70						
RD	0.46	0.57					
CD	0.25	0.74	0.63				
IC	0.18	0.47	0.31	0.63			
IN	0.23	0.40	0.12	0.83	0.61		
PR	0.38	0.12	0.09	0.37	0.48	0.86	
CI	0.09	0.25	0.25	0.42	0.49	0.73	0.68
Sqrt. AVE	0.84	0.76	0.80	0.80	0.78	0.93	0.82
Method AVE	0.24	0.07	0.19	0.07	0.02	0.07	0.01

#### **4.8 Convergent Validity**

Convergent Validity assesses the extent to which items load on the factors intended. Each factor represents a conceptual idea that cannot be directly measured. Ideally, each item in our survey measures one and only one conceptual idea. To assess convergent validity, we evaluated the loadings from our full measurement model in which all items load onto to their specified construct and all constructs were allowed to freely correlate with all other constructs. The summary of factor loadings was shown previously in Table 4.13. These high item-factor loadings, coupled with the high factor Cronbach alphas displayed previously in Table 4.6, suggest the items do indeed converge solely on the intended factor.

#### 4.10 Direct Effects.

In this dissertation we investigated the relationship between social capital and our three distinct measures of firm performance by using a single SEM model that included all three of the performance factors. Table 4.15 summarizes the direct effects tested in this dissertation and the CFI, RMSEA and RMSEA 90% confidence intervals for each of the three models. Figure 11 summarizes our findings of support for our hypotheses. All paths were significant and all but two of our hypotheses were supported.

**Table 4.15. Direct Effects in Final Model.**

Direct Effect	Std. Loading	Unstd. Loading	Std. Error	Hypothesis	Supported?
H1: SD → IC	-0.12	-0.14**	0.128	H1	NO
H2: SD → CD	0.39	0.48***	0.115	H2	YES
H3: SD → RD	0.27	0.22***	0.046	H3	YES
H4: CD → RD	0.68	0.46***	0.041	H4	YES
H5: CD → IC	-0.03	-0.02	0.144	H5	NO
H6: RD → IC	0.55	0.75***	0.259	H6	YES
H7a: IC → IN	0.82	0.72***	0.096	H7a	YES
H7b: IC → PR	0.44	0.46**	0.291	H7b	YES
H7c: IC → CI	1	0.53*	0.343	H7c	YES

Satorra-Bentler Chi-Square = 382.12 df = 138

Robust CFI = 0.91

RMSEA = .096

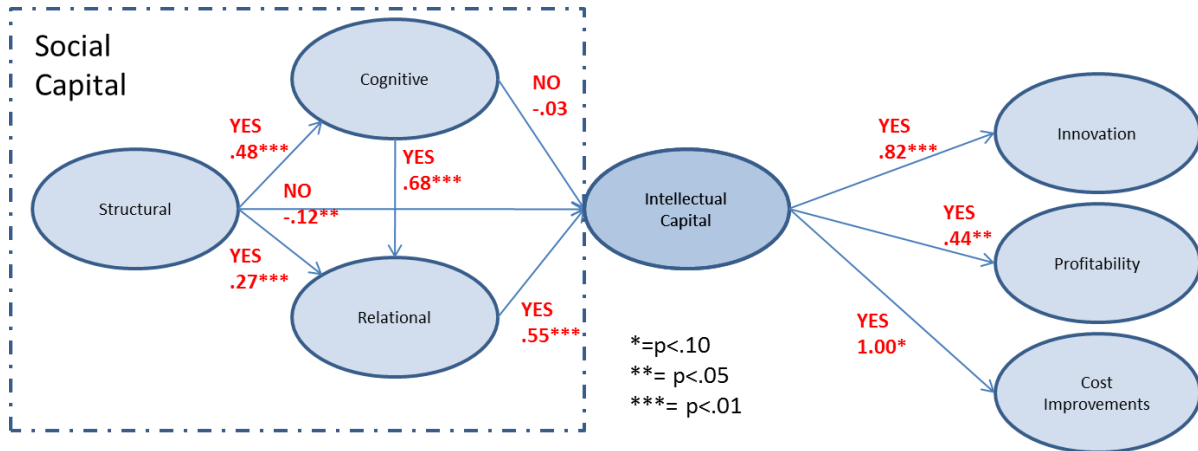
90% RMSEA C.I. (.086, .105)

\*=p<.10

\*\*= p<.05

\*\*\*= p<.01

**Figure 11. Summary of support for our hypotheses with standardized loadings shown.**



All but two of our proposed hypotheses were supported. For hypotheses H1 (H1: SD → IC) the path loading was significant but the path was negative instead of positive (as was anticipated). For hypothesis 5 the path loading was found to be insignificant.

Our unexpected finding of a significant negative path relationship for Hypotheses H1 warranted additional analysis. We suspected that net suppression may be the reason for our unexpected results. First, we confirmed that all the inter-factor correlations (shown previously in Table 4.14) were positive. Secondly, in net suppression the IV that demonstrates higher correlation with the other IV than with the DV will exhibit a small and negative path loading with the DV. We confirmed the inter-factor correlations for Hypothesis 1 meets these criteria. In net suppression, the factor with the smaller regression coefficient will exhibit a sign that is opposite of what is expected. The regression coefficients between the structural dimension (-0.12) and intellectual capital is smaller than the regression coefficient between the relational dimension (+0.55) and intellectual capital.

In net suppression, the factor with the smaller regression coefficient will exhibit a sign that is opposite of what is expected and this is exactly what we see in our model. Thus, our contradictory findings appear to be a case of net suppression.

The term “inconsistent mediation” has also been used at times to describe models where one mediated effect has a different sign than other mediated or direct effects in a model. MacKinnon, Fairchild, and Fritz (2007) suggest that inconsistent mediation results from two or more indirect paths canceling each other out, or occurs when there are different signs between indirect and direct path. David Kenny (<http://davidakenny.net/cm/mediate.htm>) suggests that in inconsistent mediation the mediator acts as a suppressor variable (i.e. net suppression).

Ensuring that we understand the implications of net suppression in our model is of great importance. Our results mean that simply increasing the structural dimension without increasing relational capital may have a negative effect on the intellectual capital. We consider the implications and interpretative meaning of our net suppression finding in greater depth and detail in the conclusions and discussion section of Chapter 5 of this dissertation.

#### **4.11 Indirect Effects:**

A latent factor may be considered a mediator if the latent factor carries the influence of a given independent latent factor (IV) to a given dependent latent factor (DV). Mediation occurs when (1) the IV significantly affects the mediator, (2) the IV significantly affects the DV in the absence of the mediator, (3) the mediator has a significant unique effect on the DV, and (4) the effect of the IV on the DV shrinks upon the addition of the mediator to the model (Kenney 2009). These criteria can be used to informally judge whether or not mediation is occurring. Sobel’s Test is a commonly reported statistical measure for evaluating indirect effects.

In our model we have a total of 4 indirect mediation effects (for example: Structural Dimension → Cognitive Dimension → Relational Dimension or, as summarized in the following table, SD → CD → RD).

We need to note that in this dissertation, as with all cross-sectional studies, we cannot establish causation conclusively. Statistically, Sobel’s test can be used to identify both confounds and mediation. Theoretically, we believe mediation is the more likely statistical phenomenon we are experiencing, but it warrants our stressing that the distinction between mediation and confounding are statistically indistinguishable.

The Sobel test equation is  $z\text{-value} = a*b/\text{SQRT}(b^2*s_a^2 + a^2*s_b^2)$  where  $a$  = raw (unstandardized) regression coefficient for the association between IV and mediator,  $s_a$  = standard error of  $a$ ,  $b$  = raw coefficient for the association between the mediator and the DV (when the IV is also a predictor of the DV), and  $s_b$  = standard error of  $b$ .

**Table 4.16. Indirect Effects.**

Indirect Path	a	b	Indirect Effect	st. err. A	st. err. B	SE	Test. St.	p-value	Hypoth.	Support?
SD → CD → RD	0.47	0.46	0.216	0.041	0.046	0.033	6.304	0.000	H9	YES
SD → RD → IC	0.22	0.75	0.165	0.144	0.259	0.122	1.351	0.177	H10	NO
SD → CD → IC	0.47	-0.03	-0.014	0.041	0.144	0.068	-0.208	0.835	H11	NO
CD → RD → IC	0.46	0.75	0.345	0.144	0.259	0.157	2.102	0.036	H12	YES

Table 4.16 illustrates the significant indirect effects present in our structural model. An indirect effect suggests that the influence of an independent variable on the dependent variable is mediated by an intervening variable. Thus, for the CD → RD → IC indirect path in Table 4.16, we can say that in our model some of the “total effect” of the cognitive dimension on intellectual capital is mediated through the relational dimension. A similar relationship is seen for the SD → CD → RD indirect path where some of the “total effect” of the structural dimension on the relational dimension is mediated through the cognitive dimension.

#### **4.12 Moderation.**

We use Marsh et al.'s (2004) approach in EQS to analyze our two moderating factors: environmental turbulence and motivation. For the moderating factor environmental turbulence we first considered linear moderation and then test environmental turbulence for a curvilinear moderation effect.

For moderation analysis, each of the three performance factors was considered as individual dependent variable for each of the two moderating variables. In order to avoid issues of multicollinearity, all items were first mean-centered. We used SPSS to determine the mean value of each of our variables and then we subtracted the mean score from each data-point. Interaction terms were created by taking the product of the mean-centered indicators. We multiplied the mean-centered variables of one construct – e.g., intellectual capital – by the other indicator – e.g., performance. The product of these mean centered variables in turn becomes a new moderator variable which can be modeled in EQS as a latent variable with a direct effect on the dependent variable – performance. Specifically, we took the highest loading item for intellectual capital and multiplied it by the highest loading item of performance. For each pair of indicators (from highest to lowest) this process was repeated. If the path coefficient is significant for this moderator variable then there is evidence that the relationship between intellectual capital and performance is indeed moderated by the factor (either motivation or firm performance). We first considered traditional linear moderation. Table 4.17 details the main indicators and their interaction terms.

Based on these analyses, our hypotheses that motivation and environmental turbulence do indeed moderate the relationship between intellectual capital and performance are supported.

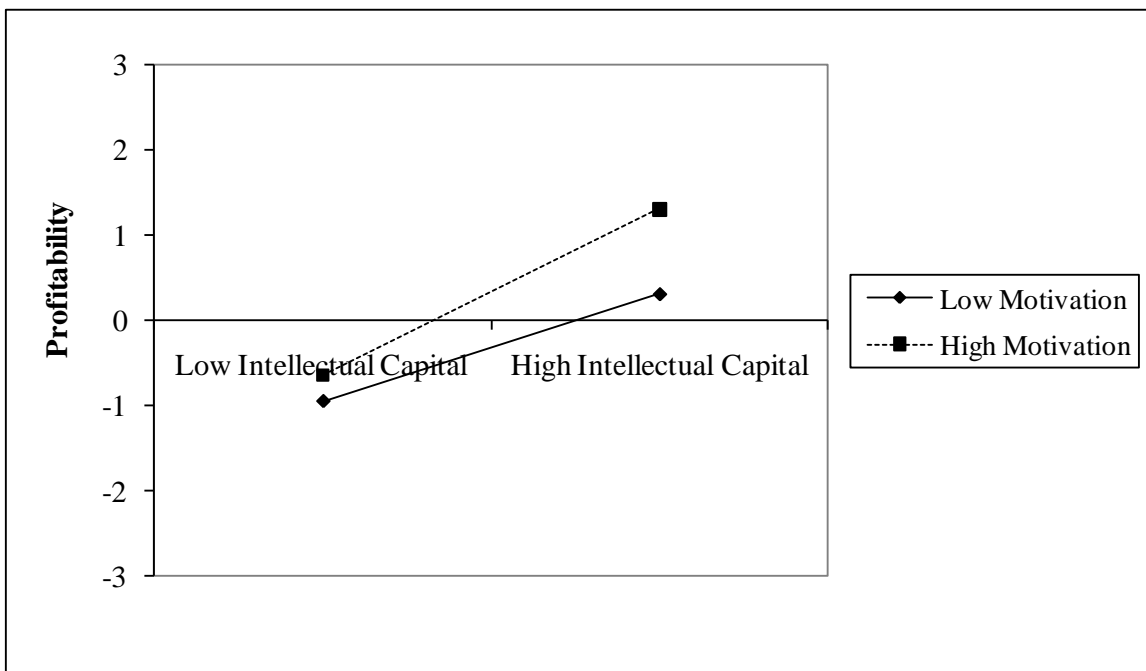
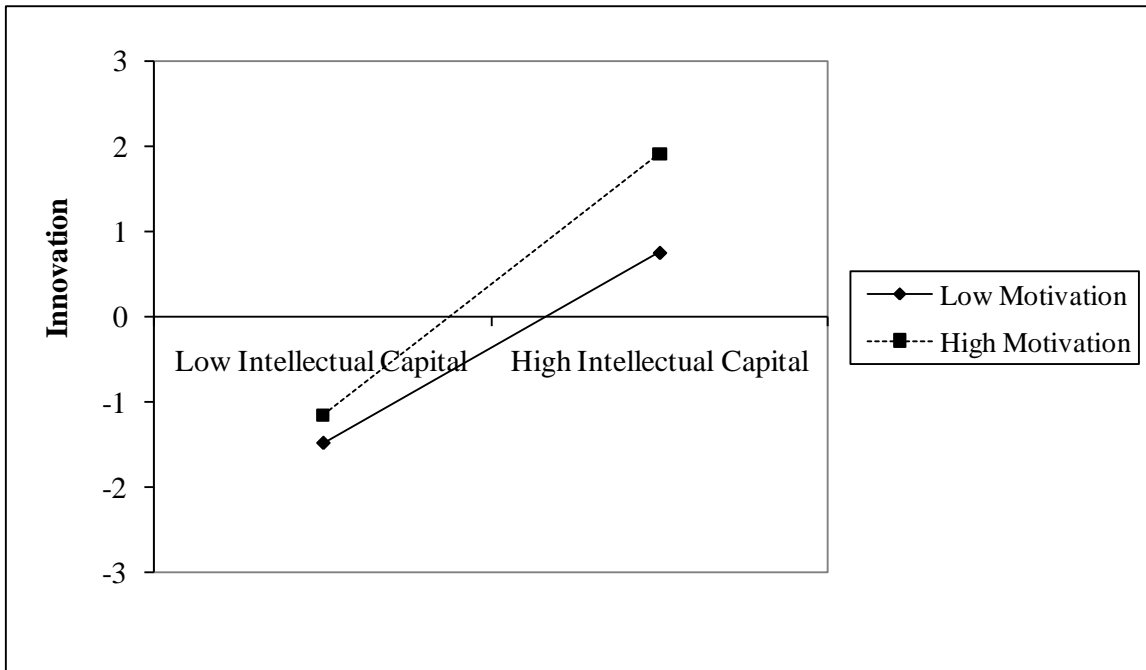
**Table 4.17. SEM Analysis for Moderation Hypotheses**

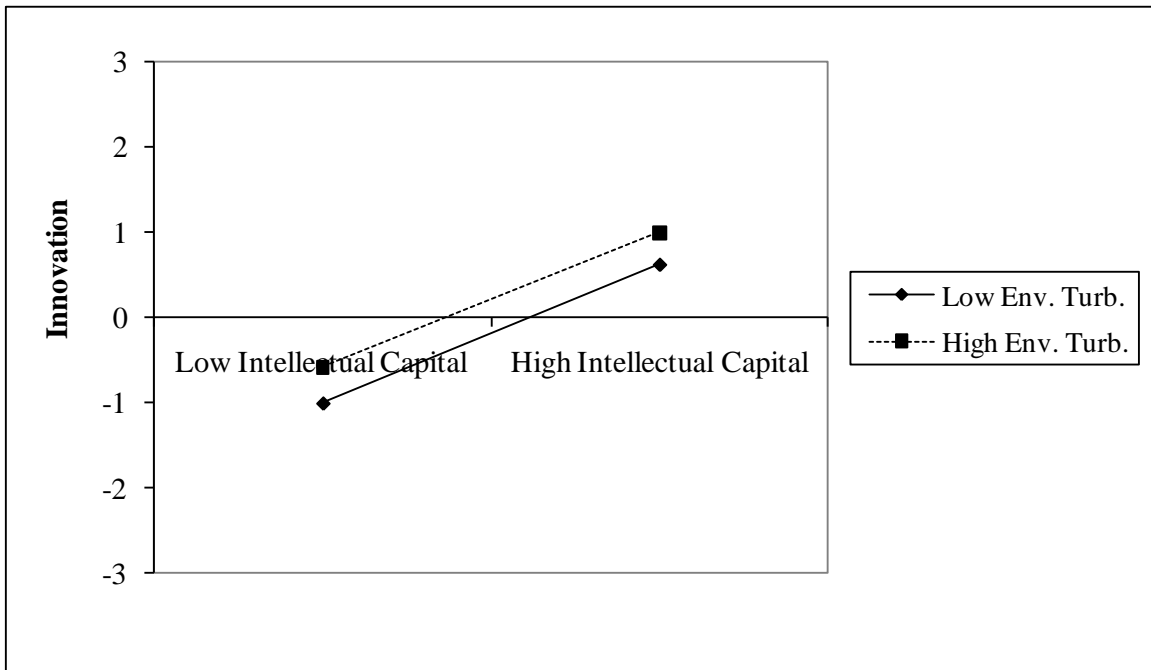
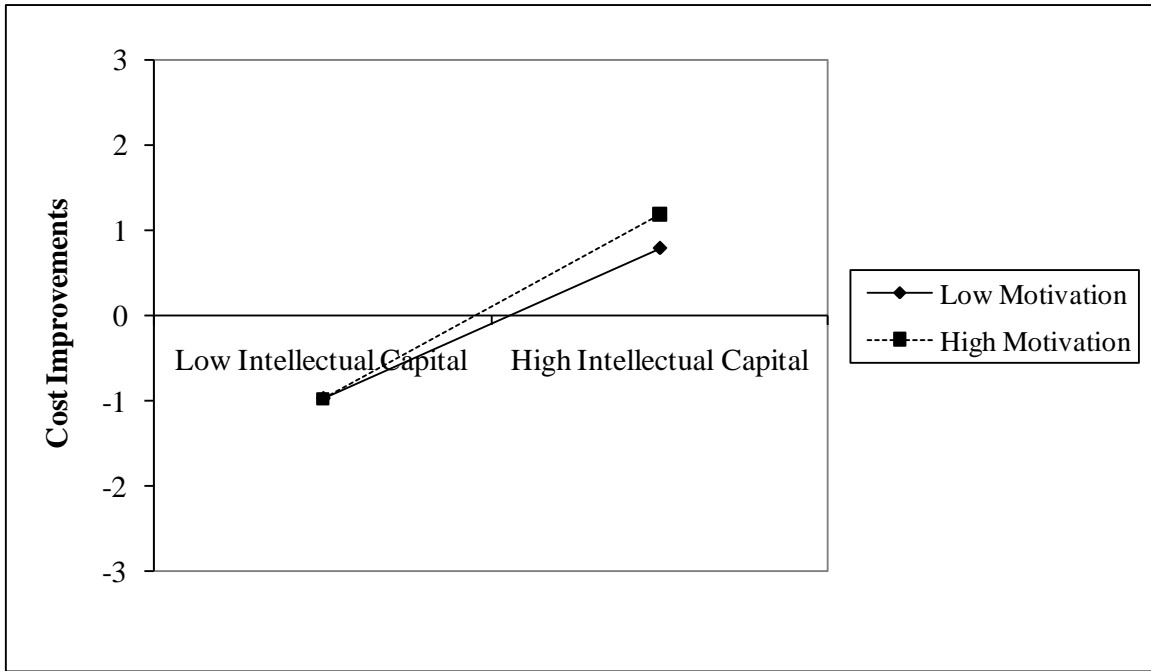
Interaction	Dependent Variable	UNSTD. Estimate	STD. Estimate	Significant at 5% level
Intellectual Capital by Motivation	IN	0.37	0.21	Yes
	PR	0.33	0.17	Yes
	CI	0.10	0.10	Yes
Intellectual Capital by Environmental Turbulence	IN	-0.11	-0.01	Yes
	PR	-0.33	-0.23	Yes
	CI	-0.19	-0.09	Yes

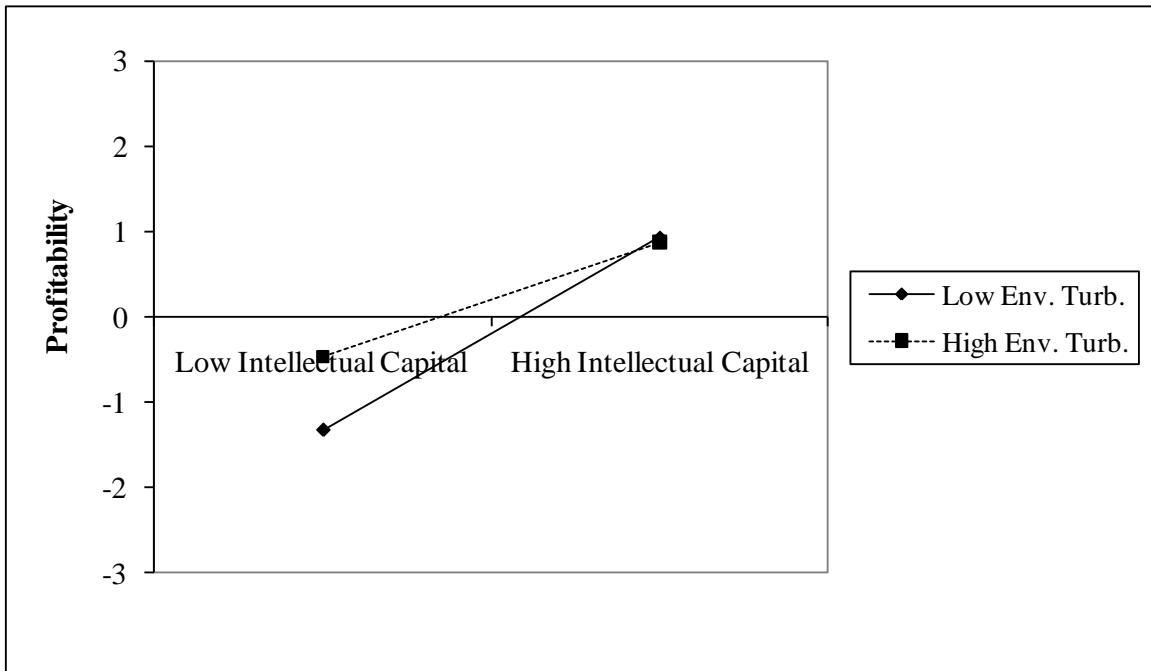
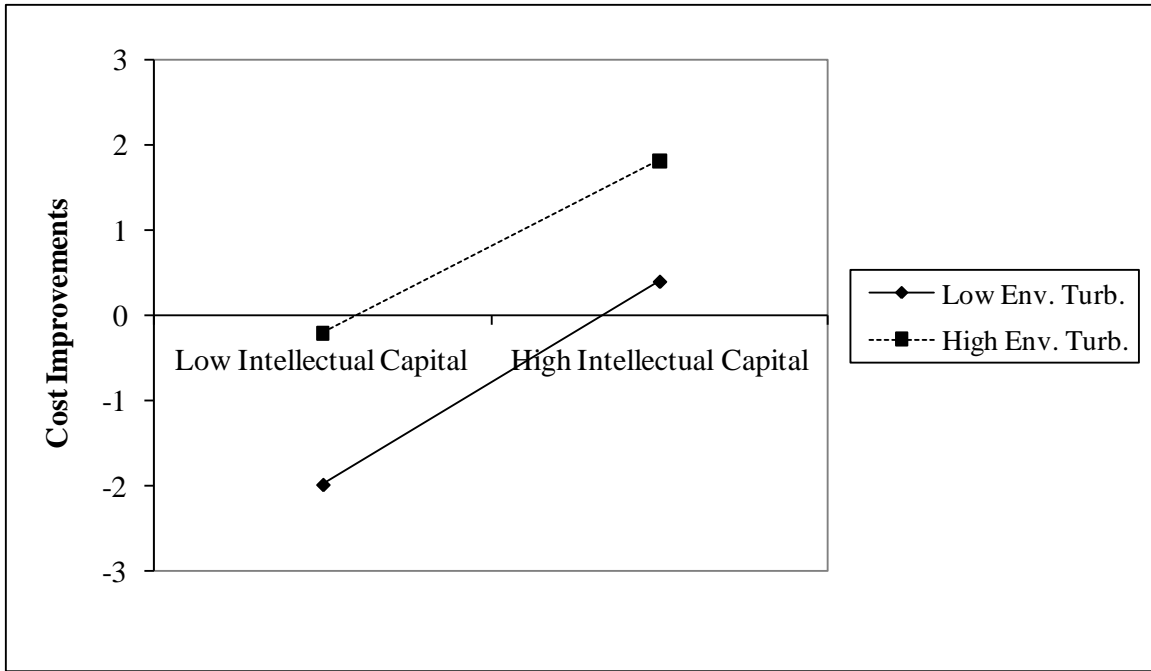
Figures 4.2 (a-f) display graphically the linear simple slopes for each of our two moderating factors (environmental turbulence and motivation) against each of our three performance outcomes, resulting in a total of six separate graphs. The implications of these moderating variables are discussed in Chapter 5.



Figures 12 (a-f). Two-way interaction simple slope diagrams for our moderating effects.







We also analyzed to see if there is a quadratic moderating effect between environmental turbulence and our performance outcomes. As developed earlier in this dissertation, previous research suggests that environmental turbulence may have a curvilinear relationship with firm performance – i.e. in circumstances of extremely low and high environmental turbulence there may be very little performance benefit derived from intellectual capital.

Combining the processes outlined in Marsh (2009) and Marsh (2006) for using structural equation models of latent interaction and quadratic effects we did not find support for a curvilinear moderating relationship between environmental turbulence and performance outcomes. We used the regression equation modeled in EQS (with mean centered variables and cross products):

$$y = F1_{(IC)} + F2_{(ET)} + (F1 \times F2) + F2^2 + (F2^2 \times F1).$$

#### **4.13 Firm size, geographical dispersion and franchise participation results**

In an effort to gauge the impact of firm size, geographical dispersion and franchise participation on social capital development we conducted a series of one-way ANOVA analyses in SPSS and considered group mean differences. While the specifics of our analyses are presented below, Table 4.18 summarizes our findings.

**Table 4.18. Summary of group differences.**

Groups Based On	Group Difference In Regards To		
	SD	RD	CD
Firm Size (number of employees)	YES	NO	NO
Firm Size (number of stores)	YES	NO	NO
Geographical Dispersion	YES	NO	NO
Franchise Participation	NO	NO	NO

The summary of our findings are as follows: firms of different size (measured both by number of employees and number of stores) and firms of different geographical dispersions demonstrated significantly different means between groups for the measures of the structural dimensions of social capital but not for the relational dimension measures or cognitive dimension measures. Our results did not show any significant difference ( $p = .05$ ) in regards to different levels of social capital between firms that operate as franchise participants versus those firms that do not.

#### **4.13.1 Firm Size and Social Capital**

We considered both of our measures of firm size (we measure firm size in two ways: 1) number of stores operated by a firm, and 2) number of employees employed by a firm) in separate tests as independent variables with each of our nine measures of social capital (three for each dimension) as dependent variables.

Levene's test showed significant lack of homogeneity of the variances between our groups of firm sizes. Because Levene's test is largely dependent on sample size, however, we sought to quantify the issue of the severity of the variance by creating ratios between the highest and lowest variances. Cohen et al. (2002) suggest that ratio analysis is superior to Levene's tests when group sizes differ dramatically and that variance ratios of less than 9 or 10 are not *too* critical. The ratios for high to low variances for all analyses fell below the threshold specified by Cohen et al. (2002) with the highest variance ratio being 3.450. All other ratios were between 1.881 and 3.450.

Accordingly, we analyzed standard ANOVA outputs in lieu of using robust methods that do not rely upon the assumption of equal variances (e.g. Games-Howell procedure, Brown-Forsythe and Welch F methods).

In one-way independent ANOVA the F-ratio is associated with two separate measures of degrees of freedom. The degrees of freedom used to assess the F-ratio are the degrees of freedom associated with the effect model (between groups)  $df_M=194$  and

the degrees of freedom associated with the residuals model (within groups)  $df_R=6$ . We express these degrees of freedom as  $F_{(194,6)}$ .

We found significant differences in levels of social capital for the structural dimension for both of our measures of firm size. For the relational and cognitive dimensions we found no significant difference between groups of firm sizes. This finding was consistent among both of our measures of firm size — “number of employees” and “number of stores.” For these six group mean differences all results were significant at a greater than  $p<0.01$ . The detailed findings are given in Table 4.19.

Our analysis showed interesting results: firms with fewer than 100 employees grouped together (i.e. there were no statistical differences between these groups but there was significant difference between these firms and between all firms with 100+ employees) and firms with more than 100 employees showed significant difference from small firms (those with 100 or fewer employees). Large firms demonstrated a higher level of structural social capital among these measures. There were, in effect, “group levels” of structural social capital depending on firm size, indicating a significant relationship between firm size and structural social capital.

Put simply: these findings indicate that small firms showed slightly but significantly less structural capital than did large firms as measured by the three items we used for the structural dimension. Small firms, however, were not significantly different than large firms on measures of the cognitive and relational dimensions.

#### **4.13.2 Geographical Dispersion and Social Capital**

In an effort to gauge the impact of geographical dispersion on social capital development we again conducted a series of one-way ANOVA analyses in SPSS. We considered our measures of geographical dispersion as our independent variable with each of our nine measures of social capital (three for each dimension) as our dependent variables. While Levene’s test again showed significant lack of homogeneity of the variances between our groups of firm sizes, the ratios for high to low variances for all

analyses fell below the threshold specified by Cohen et al. (2002) with the highest variance ratio being 3.100. All other ratios were between 1.677 and 3.100 .

Accordingly, we analyzed standard ANOVA outputs in lieu of using robust methods that do not rely upon the assumption of equal variances (e.g. Games-Howell procedure, Brown-Forsythe and Welch F methods).

As was the case for firm size, only one dimension of social capital demonstrated a significant difference in means for firms with different degrees of geographical dispersion (again at  $p > .01$ ). For the relational and cognitive dimensions there was not a significant difference between group means for geographical dispersion. The detailed findings are given in Table 4.19.

Our findings indicated that firms with the smallest geographical dispersion (distances of less than 5 miles between stores) differed significantly from stores with our two groups of stores with the greatest geographical dispersion (firms with 20 to 50 miles between stores and firms with greater than 50 miles between stores). Firms with stores between 5 and 20 miles apart did not differ significantly from firms with tighter or looser geographical dispersion.

#### **4.13.3 Franchise participation and Social Capital**

We sought to gauge the impact of firm participation as a franchise on the development of social capital via one-way ANOVA analyses in SPSS. Unlike with our earlier ANOVA analyses, Levene's test did not indicate a significant lack of homogeneity of the variances between our two groups (franchise or not-franchise). Accordingly, we analyzed standard (as opposed to robust) ANOVA outputs.

Interestingly, our sample did not show a significant difference in the two groups for any of the three dimensions of social capital.

Discussion regarding the implications of these findings is included in Chapter 5.

**Table 4.19. Summary of means for items between groups with significant mean differences.**

Groups Based On	Mean		
	SC-11_1	SC-11_2	SC-11_3
<b>Firm Size (number of employees)</b>			
Less than 20	1.83A	1.77A	1.73A
Between 21 and 100	1.61A	1.66A	1.57A
Between 101 and 200	1.22B	1.30B	1.30B
Between 201 and 500	1.40B	1.47AB	1.27B
500 or more	1.28B	1.28B	1.26B
<b>Firm Size (number of stores)</b>			
1	1.78A	1.67AB	1.76A
2 to 4	1.56AB	1.56AB	1.56AB
5 to 10	1.50BC	1.50BC	1.39C
11 to 20	1.67AB	1.67AB	1.67AB
21 to 50	1.21C	1.21C	1.32C
51 to 100	1.30C	1.22C	1.35BC
More than 100	1.30C	1.28C	1.30C
<b>Geographical Dispersion</b>			
Less than 5 miles	1.29A	1.27A	1.31A
5 to 10 miles	1.55AB	1.52AB	1.56AB
11 to 19 miles	1.39A	1.38A	1.39A
Between 20 and 50 miles	1.21A	1.21A	1.22A
50 or more miles	1.88B	1.75B	1.83B
<b>Franchise Participation</b>			
Yes	1.35A	1.35A	1.35A
No	1.51A	1.47A	1.52A

Note: Means sharing a letter in their subscript are not significantly different at the .05 level according to a Tukey HSD test.



## CHAPTER FIVE

### DISCUSSIONS AND IMPLICATIONS

In this chapter we seek to address the most important aspect of this dissertation: what does all this research, data, and analysis *mean*? To answer this we first return to the three foundational goals we set at the outset of this dissertation:

1. Develop and empirically test reliable and valid metrics for social capital;
2. Develop and empirically test a model of social capital comprised of three interrelated dimensions; and
3. Develop and empirically test the relationships between social capital and performance outcomes for firms.

In this chapter we seek to elucidate the answer to these questions and to cover additional key take-a-ways from this dissertation. We break this chapter into several sections. First, we summarize our findings. Secondly, we discuss the contributions of this dissertation to researchers and practitioners. Thirdly, we discuss the unanticipated findings from our research. Next we consider the implications of our method bias and then address some of the key practitioner oriented takeaways from our research. We conclude the dissertation by considering the limitations of this dissertation and the needs we have identified for future research.

#### **5.1 Summary of Results**

A fundamental challenge for supply chain and operations management scholars is to better understand how organizations can use their interorganizational relationships to create sustainable advantage and superior performance. This dissertation provides clear empirical support that firms *are* able to use social capital developed via their supply chain to generate innovation, cost improvements and increase overall profitability. Firms are

forever in a battle to achieve sustainable competitive advantage and firms need look no further than their own supply chain for opportunities to generate this competitive advantage. As a whole, our interest in the topic of social capital and performance outcomes has stemmed from the fundamental belief that supply chain partners can and should be a part of the competitive solution for firms—this dissertation adds insight and empirical support to these assertions by providing evidence that links the dimensions of social capital with three specific measures of firm performance.

## **5.2 Contributions to Researchers**

In this dissertation we successfully established measures for the three dimensions of social capital. Measuring the three facets of social capital presented a number of conceptual and practical challenges throughout this dissertation – each facet of social capital is *very* closely related to others and yet distinctly unique. It is perhaps this challenge of appreciating (and measuring) both the close ties and unique attributes of these social capital dimensions that has left the need for better measures and metrics unmet for such a long period of time.

Each dimension of social capital as measured in this dissertation has reliability in excess of  $\alpha > 0.86$  and demonstrates a unidimensional nature in the measurement model. The measures should serve well as a strong foundation for future researchers investigating social capital.

A primary contribution of this dissertation is in developing the foundation for a cumulative tradition in social capital measures. Early on in our research we sought to build on empirical work that has been conducted in social capital research to date. Little such research was available, and as we asserted earlier in this dissertation, a thorough review of OM journals that mirrored Roth et al.'s *Handbook of metrics for research in operations management : multi-item measurement scales and objective items* (2008) found no measures for social capital or its dimensions. Moreover, leading OM journals such as *Journal of Operations Management*, *Production and Operations Management*,

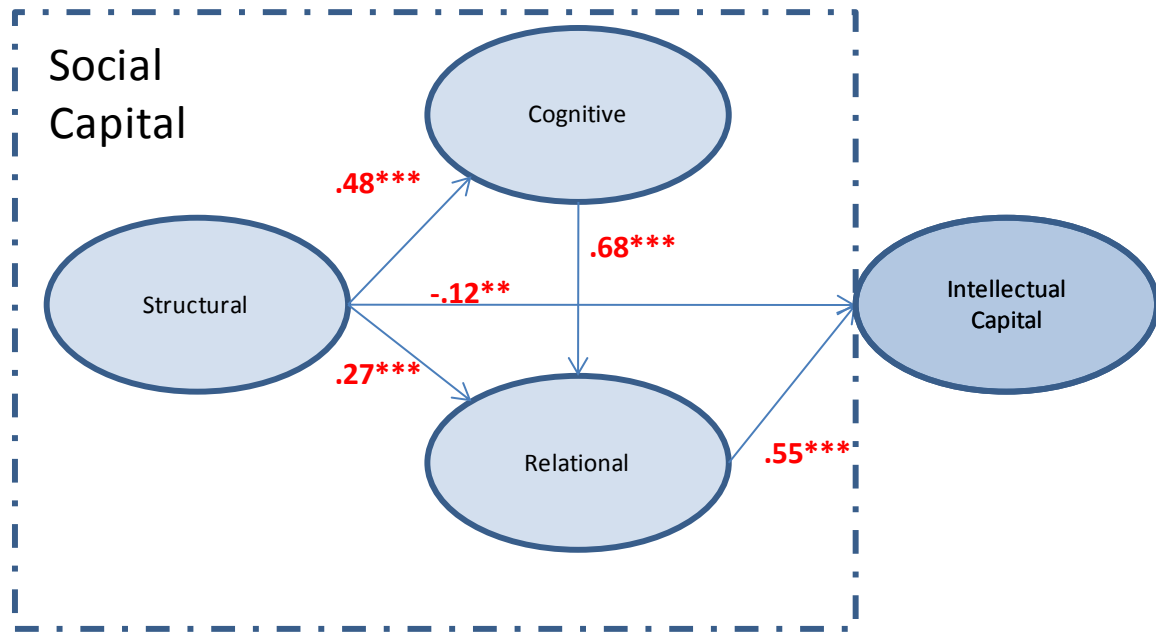
*Manufacturing and Service Operations Management, Decision Sciences, Journal of Service Research, International Journal of Production Research, Management Science, and International Journal of Operations and Production Management* were noticeably lacking empirically valid measures for social capital. We believe the measures developed and tested in this dissertation make a strong contribution towards OM scholars building a cumulative, valid and reliable tradition for OM research on social capital.

In this dissertation we have generated and tested new metrics for social capital and its three dimensions that may serve as foundations for future OM research.

In addition to providing measures for social capital, this dissertation provides novel insights into the inter-dimensional nature of the facets of social capital. As discussed previously in Chapter 2, we have found that social capital has long been conceptualized as multi-dimensional in nature, but that empirical research on this theoretical assertion was missing. Previous studies have limited the analysis of social capital to only one or two of its dimensions: relational dimension (Cousins et al., 2006; Nahapiet 2008), structural dimension (Capaldo, 2007), or a combination of the two (Autry and Griffis, 2008; Lawson et al., 2008). Very few studies have investigated all three forms of social capital (Nahapiet 2008) in a single model, with the notable exception of Krause et al. (2007).

This dissertation provides empirical support for the conceptualization of social capital as being comprised of the structural, relational and cognitive dimensions. Throughout the item development and testing process it was clear that there are distinct, measurable differences between the three facets of social capital. Moreover, the theoretical underpinnings of each facet seem to support different levels and depths of knowledge and intellectual capital. Figure 13 shows the final supported relationships among the dimensions of social capital.

**Figure 13. The Dimensions and Interactions of Social Capital.**



\*= $p < .10$

\*\*= $p < .05$

\*\*\*= $p < .01$

Forthcoming work (accepted by the *Journal of Operations Management (JOM)* but not yet in print) by Villena et al. (2011) investigates the relationship between social capital and negative performance consequences. In this study these authors, *again*, consider each of the three dimensions of social capital independently. Our work supports the importance of considering each dimension in an interactive manner. In fact, our research would suggest that considering the dimensions of social capital independently leaves open the possibility of there being significant gaps in the ability of OM researchers to draw meaningful and accurate interpretations from their findings.

This dissertation jointly examines all three dimensions of social capital—cognitive (e.g., shared culture and goals), relational (e.g., trust, friendship, respect, and reciprocity), and structural (e.g., social ties), thereby addressing the different ways these dimensions influence performance outcomes.

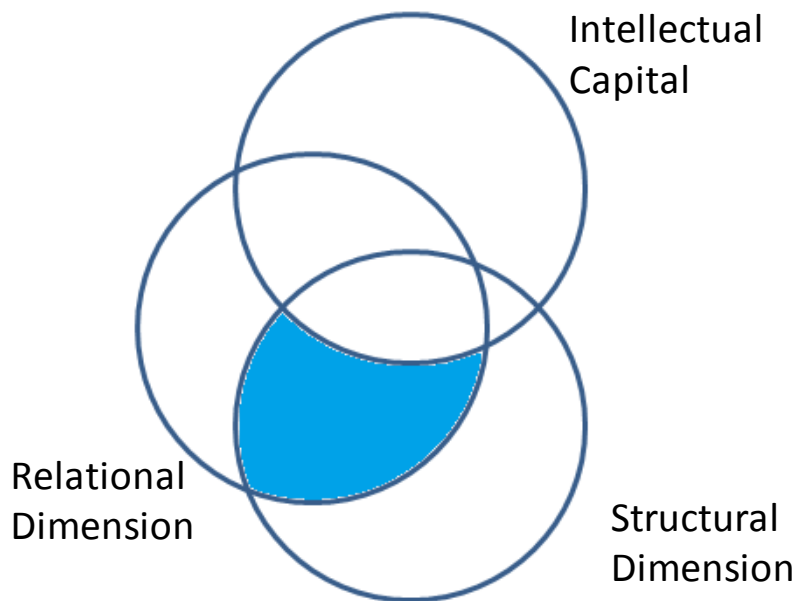
Our multi-dimensional conceptual model of social capital is well supported in this dissertation and each of the three dimensions of social capital demonstrates uni-dimensionality. All the direct relationships hypothesized between the dimensions, except one, were significant. The relationship between the structural dimension and intellectual capital showed a significant but negative path loading and it warrants our giving some reflection to this unexpected finding. First, conceptually, we believed prior to collecting and analyzing our data that knowing the right person (the structural dimension) would be a prerequisite for generating intellectual capital with them. This may still hold true, but with Hypothesis 1 not being supported with a positive path loading, support is found for the conceptualization that it is only *in conjunction with* the cognitive and relational dimensions that true intellectual capital can be created. From a practical and theoretical standpoint, this suggests that knowing the right people may not immediately or independently generate intellectual capital. Rather, developing a network of contacts may very well be just a first step in establishing social capital in a firm.

Our results suggest that, structural capital, although slightly positively correlated with intellectual capital (0.18), functions in the multiple regression equation primarily as a suppressor of variance for relational capital that is irrelevant to intellectual capital—i.e., removing the irrelevant variance between structural and relational capital consequently increases the loading for relational capital.

Stating this finding differently we can say that for conditions where relational capital is held constant at some set value, increasing structural capital may have a negative impact on the level of intellectual capital.

The Venn diagram in Figure 5.2 helps us illustrate this point. The structural dimension, although slightly positively correlated with intellectual capital, functions primarily as a suppressor of variance in relational capital that is irrelevant (i.e. that is not common to both intellectual capital and relational capital—the shaded area in the Venn diagram).

**Figure 14. Net Suppression Venn Diagram**



Our finding of net suppression between the dimensions of social capital has considerable significance for researchers and practitioners. The suggestion that increasing one dimension of social capital without developing the other dimensions may have an unexpected outcome on intellectual capital and firm performance further strengthens the significance of studying the three dimensions in a holistic manner instead of considering each independently.

In addition, our finding of an insignificant *direct* relationship (unsupported Hypothesis 5) between the cognitive dimensions and intellectual capital but a significant *indirect* effect (see section 4.11) adds further support that the dimensions of social capital are inter-related.

### 5.3 Unanticipated Findings of Interest

Several interesting implications become apparent from our results.

First, our two unsupported hypotheses warrant some consideration. This dissertation reveals a paradox surrounding social capital that only becomes apparent when all the dimensions of social capital are considered in a single, unified, inter-active model: yes, social capital can improve firm performance, but it can also hurt firm performance. Leveraging social capital effectively requires an appreciation that all social capital is not “equal” but rather that the role of each dimension is truly dependent on the other dimensions. Increasing one aspect of social capital without developing social capital holistically leaves a firm open to negatively impacting firm performance.

First, the fact that the relationship between structural capital and intellectual capital demonstrates a significant negative relationships lends support to Burt’s (1995) assertion that “closure between two networks requires more than just structural ties, bridging also requires attributes such as facilitating trust and collaborative alignment.” Simply knowing people is a prerequisite for developing social intellectual capital but our finding suggests that it is *not in itself sufficient* to generate intellectual capital for a firm. Only by developing the relational aspects of a structural tie can intellectual capital be developed and realized.

Secondly, our finding that the cognitive dimension does not significantly relate to intellectual capital (a finding also found by Villena et al. 2011), suggests that while developing a congruence of mindsets between supply chain partners is an impactful part of the social capital process it, too, *is not in itself sufficient*. Rather, the cognitive dimension seems to serve as a facilitator of deeper and richer knowledge creation. The resources providing shared representations, interpretations, and systems of meaning among parties, therefore, can only be expected to yield significant performance improvements when coupled interactively with the relational dimension of social capital.

Both of these findings bolster our assertion that *considering the dimensions of social capital independently leaves open a very real chance that OM researchers may fail to draw meaningful, complete and accurate interpretations from their findings.*

We then considered conceptually why the specific SD→IC and CD→IC pathways were not significant in the positive manner we hypothesized. A potential explanation is that establishing a network of ties throughout a supply chain is a resource intensive endeavor. Creating a network takes time, energy and people away from internal firm opportunities and focuses them outside the firm. Networks are built over time and developing a network throughout a supply chain could take significant dedication of resources. The cognitive dimension, too, when viewed as a shared vision among supply partners that embodies collective goals and aspirations (Tsai and Ghoshal, 1998), can be considered a “facilitator” of social capital. The cognitive dimension can be conceptualized as a modern-era Rosetta stone that helps two disparate supply partners truly “speak the same language.”

The firm, however, can only capitalize on these “facilitators” if it sufficiently develops the relational dimension of social capital. Additional research on social capital may want to consider a relational dimension-centric model of social capital. Villena et al. (2011) suggest that relational social capital is more critical to firm performance than cognitive or structural social capital and state that “a high level of relational social capital is indispensable (p.11)” when pursuing strategic performance goals.

An additional unanticipated finding of this dissertation concerns firm size and social capital. While some OM researchers suggest that small firms have less slack resources than large firms (Daniel et al. 2004, George 2005) thus increasing the importance of social capital and the role it is likely to play in sustaining small businesses competitive advantage, others suggest otherwise. Villena et al. (2011), for example, state in their paper on social capital that “small firms were excluded because in general they tend to rely on individual managers’ social capital to gain access to new resources and because they tend to lack resources to invest in building social capital with supply chain partners (p.6).” Our findings that there *are* differences in levels of social capital among



firms of different sizes heighten the tension around these opposing viewpoints of the expected relationship between firm social capital and firm size. Perhaps a key takeaway from our findings in response to this tension is that we found no difference in the relational or cognitive dimensions of social capital. Small firms demonstrated less structural capital than large firms perhaps suggesting that small firms struggle to obtain access to supply chain contacts. Our findings that small firms have less structural capital than large firms but similar levels of cognitive and relational capital suggest that small firms may be “over-achieving” when it comes to developing their relationships. The results of this study suggest that small firms are capable of developing the relational and cognitive dimensions more efficiently than larger firms.

The implications from our moderating variable analysis also warrant our mentioning. Our findings suggest that firm motivation positively moderates the relationship between intellectual capital and performance. This supports the idea that firms must be committed over a sustained period of time to realize the benefits of social capital in terms of improved firm performance.

Our findings also suggest that environmental turbulence does negatively moderate the relationship between intellectual capital and performance. Thus the higher the level of risk and uncertainty faced by a firm the more challenging it is to translate intellectual capital into firm performance.

#### **5.4 Method Bias Implications**

Most OM researchers now agree that common method variance — variance that is attributable to the measurement method rather than to the constructs the measures represent (Podsakoff et al. 2003) — is a potential problem in OM research (as well as all behavioral/social research). Most recent articles in leading OM journals (such as *Journal of Operations Management*, for example) address the issue of common method variance in the data analysis section with the key assertion being that ignoring method bias is a potentially major flaw. In this dissertation we used best practice methodology following

Podsakoff et al.'s (2003) guidelines to address common method variance both *a priori* (primarily in survey design) in our research as well as by using statistical remedies to control for common method bias *post hoc*.

In our model, method factor loadings have an average variance extracted of 9.6% of the variance whereas the measurement items on our factors have an average variance extracted of 65.7% of the variance. For comparison, an article forthcoming at *Journal of Operations Management* (Villena et al. 2011) found that 17% of their total variance was accounted for by a method factor but concluded that method bias was not a factor in part because this variance was “significantly less than the amount of method variance (25%) suggested by Williams et al. (1989 p. 9).”

In section 4.9 of this dissertation we suggested that social desirability may be a cause for our significant method effect and noted that there is no way to definitely identify *post hoc* the source of this method effect. However, in future social capital research that draws from the items developed in this dissertation we would suggest that researchers consult Podsakoff et al. (2003) and include an *a priori* measure of social desirability. By directly measuring the method effect researchers can isolate it from specific factors and, thus, improve the fit of the overall model.

## **5.5 Managerial Implications**

The findings of this dissertation are significant to managers. In many ways retailing can be considered far less complex than manufacturing. Yet even the reduced complexity of retailing can at times be overwhelming for firms. According to NACS data, a typical c-store has more than 3,000 SKUs in-stock at any given time—with each SKU bringing the challenges of managing costs, retails, pre-salesmen, distribution and marketing with it. The challenge of managing the supply chain for improved performance can often seem to be impossibility. By correctly maintaining relationships with the *right* people at the *right* vendors in the *right* way, firms can eke a sustainable competitive advantage even in today's challenging business environment.

Our findings of inconsistent mediation (section 4.10), for example, suggest that simply increasing the number of people a firm knows without actually developing a meaningful relationship may actually be detrimental to the firm's knowledge base and overall firm performance. Hence, it is important to develop meaningful relationships that can generate new knowledge and lead to improved firm performance.

Based on insight from this dissertation, we offer four key takeaways for practitioners.

### **5.5.1 Structural Capital – it all starts with knowing the right supply chain partners.**

Our analysis of the net suppressive relationship between the structural and relational dimension indicates that simply knowing the right people is not enough of a sustainable competitive advantage for firms in today's challenging business environment. However, structural capital is the starting point for developing a firm's supply chain into a sustainable competitive advantage. According to NACS data, the convenience store industry averages over 200% employee turnover per year. The challenge for each firm, though, is *despite* the difficulty of staying abreast of the ever changing rosters of vendors, is to know who at key vendors *is* stable and *can* get things done. Having key contacts at major suppliers – people one can call to help jointly plan – stands to help a firm and the supplier. Knowing who to call is not the end of the battle by any means; however, it *is* a crucial first step. Our results also suggest that the smaller a firm is, the more challenging it can be to effectively develop structural capital.

### **5.5.2 Relational Capital – get to *really know* your supply chain partners.**

Practitioners need to appreciate the performance benefits that building relationships with key contacts at suppliers can provide. This dissertation shows that while it is important to remain in contact with the right people at the right suppliers, simply knowing the right people *is not* enough to derive true value from the supply chain.

By working to develop a sense of trust and respect, a firm stands to get more out of their supplier than just a product to put on the shelf. Complex forms of firm performance improvement – innovation, for one prime example – require a sense of trust and respect with supply partners – not just an email address or business card for supply chain partners. This dissertation supports that firms seeking competitive advantage via their supply chain partners will be well served to develop *meaningful* relationships with a developed sense of trust and respect. These meaningful relationships can be developed only through the interactions associated with specific person-to-person relationships. Developing this relationship based trust and friendship can take time and a concerted effort on the part of the firm and its management team.

### **5.5.3 Cognitive capital: Understand your supply chain partners goals and objectives.**

Our research suggests that it is important for practitioners to find and understand how their goals align with the supplier's goals. While not always apparent at first glance, working together to find the win-win situation with suppliers can be *the* key to creating value from the supply chain. In fact our results suggest that *the single most important* part of a relationship with a supplier is agreeing on what is in the best interest of the relationship (i.e. the path loading between the cognitive and the relational dimension has the highest among the dimensions of social capital).

### **5.5.4 Intellectual Capital: Knowledge is the cornerstone to improvement.**

Mounting evidence supports that the firms with the best performance also have the best understanding of how to operate their business effectively. The term intellectual capital is consistent with the view of knowledge as developed in OM literature (Kogut and Zander 1992, Levinthal and March 1993, Liebeskind 1996, Spender and Grant 1996, Conner and Prahalad 1996, Nonaka 1994, and Teece et al. 1997) where internal firm knowledge is a source (often viewed as *the* source) of competitive advantage to a firm. The notion inherent in all of these conceptualizations of knowledge is awareness that

knowledge can be created through meaningful combination and exchange through social interactions and that knowledge and intellectual capital can be a source of sustainable competitive advantage.

When a firm is working with one supply chain partner to establish better firm performance (for example, reduced costs or improved merchandising) the challenge for the firm is to learn to capitalize on existing knowledge available to the firm from its supply partners and to begin moving towards solving firm challenges by creating new knowledge in conjunction with the supply partners. Supply partners can be an invaluable source of knowledge about all aspects of business—the challenge is for the firm to be able to develop intellectual capital and integrate it into the company.

## **5.6 Limitations**

There are several major limitations of this dissertation. Perhaps the most apparent limitation is that our data is cross-sectional in nature and thus offers no longitudinal flavor for how social capital develops and changes over time. A longitudinal study may help clarify how the dimensions of social capital develop and evolve over time.

A second limitation of this dissertation deals with the small number of franchisees who responded to our survey. A larger sample of franchises may have offered more insights into the social capital implications of franchise participation.

A third limitation of this dissertation is the narrow scope of the convenience store industry. The generalizability of our findings is obviously limited by our narrow sample. However, we believe this is largely offset by having a clear focus on a well-defined, important industry. Also, contingency issues (such as environmental turbulence) may not have been as prevalent in our results due to our focusing on one specific industry.

## 5.7 Further Research

This dissertation spawns a number of exciting areas for future research in social capital. Understanding how the dimensions of social capital interact with each other has long been identified as an important avenue of investigation for OM researchers, and this dissertation takes an important first step in this direction. We measure and conceptualize the dimensions of social capital at very high level and future studies might develop more specific measurement scales that stand to measure the more intricate “sub-constructs” that comprise each of the three dimensions. Modeling the three dimensions as second order factors comprised of their component parts would add clarity to social capital. For example, in measuring the cognitive dimension in future studies researchers may want to investigate the specific mechanisms that lead to a congruence of mindsets between supply chain partners: concepts of shared norms, systems of meanings and values. Drilling down into the sub-constructs of each dimension — while maintaining the inter-related nature of the three dimensions of social capital social capital — would be of great interest.

Additionally, a longitudinal study would allow for the establishment of true causal relationships among social capital constructs. This dissertation shows clear empirical support for the complexity and inter-related nature of the social capital constructs. A cross-sectional slice of data cannot bring clarity to all of the issues relevant in the formation and development of dimensions of social capital. One realistic research approach might be to conduct a longitudinal case study. Also, meta-analysis of existing research may illuminate some dynamic interactions. Put succinctly, an emphasis should be placed on developing future research that clarifies how social capital develops over time or strengthens our understanding of how the dimensions interact dynamically. Continued research on how the dimensions of social capital are developed from infancy to maturity would be a great contribution to the SCM and OM knowledge base.

There is an opportunity to better refine our understanding of the relationship between firm size and social capital. Understanding when and how social capital develops differently in firms of different sizes will play a great role in how managers at small firms utilize their supply chain partners. Future research could focus on clarifying how and when individual managers' social capital in a small firm begins to transition into true "firm" capital.

Finally, and perhaps of greatest interest to OM researchers and practitioners alike, further research into the relationship between the cognitive dimension and intellectual capital would be of great value. Given our finding that the cognitive dimension does not have a significant direct impact on intellectual capital, we encourage other researchers to validate the finding through replication in other contexts—especially in very complex industries such as automobile manufacturing.

## CHAPTER SIX

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## CHAPTER SEVEN

### APPENDIX

**Table 1. Operational Conceptualizations of Social Capital**

Author & Journal	Operationilization of Social Capital
Shaw et al. (2006) AMJ	assets embedded in relationships
Ahuja 2000 SMJ	the firm's prior relationships with other firms and provides it with information and status benefits
Dyer and Nobeoka 2000 SMJ	strong ties produce the trust (social capital) necessary to facilitate the transfer of tacit knowledge.
Rowley et al. 2000 SMJ	structural measures: structural hole and Coleman's (1988) closure forms of social capital illustrates that different types of structural embeddedness can be beneficial
Koka and Prescott (2002) SMJ	information benefits available to a firm due to its strategic alliances
Moran (2005) SMJ	the structural embeddedness (i.e., configuration) of a manager's network of work relations and the relational embeddedness (i.e., quality) of those relations
Acquaah (2008) SMJ	Social capital embodied in the development of managerial social networks and ties with external entities affects an organization's competitive advantage and performance, a macro-level construct
Min et al. 2008 JBL	A set of social resources embedded in the relationships in a supply chain network, including not only relationships per se but also interactions among different actors and the processes derived from those relationships within a supply chain.

**Table 2. Survey Measures of the Relational Dimension in Social Capital**

**Research**

Author & Journal	Relational Dimension Construct	Measures
Lawson et al. JOM 2008	Supplier closeness	<p>SC 1: In this relationship, the parties work together to solve problems</p> <p>SC 2: Our key suppliers are flexible in response to requests we make</p> <p>SC 3: Our key suppliers make an effort to help us during emergencies</p> <p>SC 4: When an agreement is made we can always rely on our key suppliers to fulfill all the requirements</p>
Lawson et al. JOM 2008	Relational capital	<p>RC 1: The relationship with key suppliers is characterized by close, personal interaction at multiple levels</p> <p>RC 2: The relationship with key suppliers is characterized by mutual respect at multiple levels</p> <p>RC 3: The relationship with key suppliers is characterized by mutual trust at multiple levels</p>
Lawson et al. JOM 2008	Managerial communication	<p>MC 1: There is high corporate level communication on important issues with key suppliers</p> <p>MC 2: We have very frequent face-to-face planning with key suppliers</p>
Lawson et al. JOM 2008	Technical exchange	<p>TE 1: Our engineers and sales staff have a close relationship with our suppliers' staff</p> <p>TE 2: In the development process, direct communication is bilateral rather than unilateral</p> <p>TE 3: Frequent contact between our key suppliers' and our engineers is important</p> <p>TE 4: Communication with our key suppliers often begins to occur earlier in the development process</p> <p>TE 5: Informal communications often reduce lead time in the development process</p>

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		TE 6: Through informal discussion, communication is bilateral rather than unilateral
Krause et al. JOM 2007	Buyer Dependence	<p>If we decided to stop purchasing from this supplier they could easily replace our volume with purchases from other suppliers</p> <p>There are many competitive suppliers for this component</p> <p>Our production system can easily be adapted to use components from a new supplier</p> <p>Dealing with a new supplier would only require a limited redesign and redevelopment effort on our part</p>
Krause et al. JOM 2007	Supplier Dependence	<p>If we decided to stop purchasing from this supplier they could easily replace our volume with sales to some other buyer</p> <p>It would be relatively easy for this supplier to find another buyer for these components</p> <p>Finding new buyers for these components would not have a negative impact on the price this supplier can charge</p> <p>If the relationship with our company was terminated it would not hurt this supplier's operations</p>
Cousins et al. JOM 2006	Informal socialization processes:	<p>SC1—How effective has communication guidelines been in improving the understanding you and your supplier have of each other's businesses?</p> <p>SC2—How effective has awareness of supplier issues been in improving the understanding you and your supplier have of each other's businesses?</p> <p>SC3—How effective has on-site visits been in improving the understanding you and your supplier have of each other's businesses?</p>
Cousins et al. JOM 2006	Formal socialization processes:	<p>SS1—How effective has joint workshops been in improving the understanding you and your supplier have of each other's businesses?</p> <p>SS2—How effective have cross-functional teams been in</p>

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		developing the relationship? SS3—How effective has a matrix-style reporting structure been in developing the relationship?
Cousins et al. JOM 2006	Relational capital:	RC1—There is close, personal interaction between the supply partners at multiple levels. RC2—The relationship is characterized by mutual respect between the supply partners at multiple levels. RC3—The relationship is characterized by mutual trust between the supply partners at multiple levels.
MCFadyen and Cannella (2004) AMJ	Relational dimension	number of relations the number of interactions with other authors strength of relations sum of that scientist's coauthors
Fischer and Pollock (2004) AMJ	network embeddedness	Investor participation in past deals managed by the lead investment bank for a given IPO
Hoegl et al. DS (2003)	Team's strength of networking resources	From the start of the project: the team had relationships with team-external colleagues that helped the progress of the project, the team had useful contacts outside our organization, the team had enough contacts that could help out if problems arose.
Hoegl et al. DS (2003)	Team's perceived importance of networking for project success	To successfully complete the project it was important to: acquire team-external knowledge coordinate team-external work contribution seek feedback outside the team.
Hoegl et al. DS (2003)	Team's level of networking preference	The team members were generally motivated to collaborate with experts from different disciplines and functions The team members were interested in working with people from other organizations.

Hoegl et al. DS (2003)	Team's perception of the strength of the organizational knowledge-sharing climate	<p>Project-relevant information was made accessible by the organization.</p> <p>Colleagues from outside the team were willing to share their knowledge, information, and experiences.</p> <p>It was easy to draw on existing knowledge inside the organization.</p>
Hoegl et al. DS (2003)	Individuals' extent of network building	<p>Through this team project I have gotten to know people from other functional areas and divisions.</p> <p>I have acquired interesting contacts outside our organization through this project.</p> <p>This cross-functional project has increased the number of my personal contacts within our greater organization (including other companies within our group of companies).</p> <p>The project has allowed me to acquire more contacts than a line position would have.</p>
Subramaniam and Youndt 2005 AMJ	Social Capital	<p>Our employees are skilled at collaborating with each other to diagnose and solve problems.</p> <p>Our employees share information and learn from one another.</p> <p>Our employees interact and exchange ideas with people from different areas of the company.</p> <p>Our employees partner with customers, suppliers, alliance partners, etc., to develop solutions.</p> <p>Our employees apply knowledge from one area of the company to problems and opportunities that arise in another.</p>
Uzzi, and Lancaster 2003 MS	Relational Types (Field research)	Embedded ties vs. Arm's-length ties
Kale et al. 2000 SMJ	Relational capital	<ol style="list-style-type: none"> <li>1. There is close, personal interaction between the partners at multiple levels</li> <li>2. The alliance is characterized by mutual respect between the partners at multiple levels</li> <li>3. The alliance is characterized by mutual trust between the</li> </ol>



		<p>partners at multiple Levels</p> <p>4. The alliance is characterized by personal friendship between the partners at multiple levels</p> <p>5. The alliance is characterized by high reciprocity among the partners</p>
Baum et al. 2000 SMJ	Modelling: Alliance network at founding.	<p>the number of alliances a firm had at the time of its founding with each of several types of partner:</p> <ol style="list-style-type: none"> <li>1) nonrival</li> <li>2) potential rival BFs,</li> <li>3) pharmaceutical cos.,</li> <li>4) chemical cos.,</li> <li>5) universities,</li> <li>6)research institutes,</li> <li>7) government labs,</li> <li>8) industry association</li> <li>9) marketing cos.<sup>14</sup></li> </ol>
Wu Journal of Management Studies 45:1 January 2008	Network Ties	<ol style="list-style-type: none"> <li>1. Our company has a group of close business partners.</li> <li>2. Our company has close relationships with many financial institutions.</li> <li>3. Our company has established good working relationships with relevant government offices.</li> </ol>
Wu Journal of Management Studies 45:1 January 2008	Trust	<ol style="list-style-type: none"> <li>1. We never worry that our business partners will take advantage of us.</li> <li>2. Our business partners never act opportunistically.</li> </ol>
Wu Journal of Management Studies 45:1 January 2008	Repeat Transactions	<ol style="list-style-type: none"> <li>1. Our business partners usually repeat their transactions with us.</li> <li>2. Our company does more business with active business partners than with nonactive business partners.</li> <li>3. We do more business with our long-term business partners.</li> </ol>
Chen and Wang R&D	External social	External collaborative partners can enhance a new venture's

Management 38, 3, 2008	networks	<p>competitive advantages</p> <p>External collaborative partners can speed a new venture's entry into the industry</p> <p>External collaborative partners can provide complementary assets that the new venture needs</p> <p>The new venture has good interactions with collaborative partners in order to exchange information</p>
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**Table 3. Survey Measures of the Structural Dimension in Social Capital Research**

Author & Journal	Structural Dimension Construct	Measures
Lawson et al. JOM 2008	Supplier integration	<p>SI 1: The participation level of key suppliers in the design stage</p> <p>SI 2: The participation level of key suppliers in the process of procurement and production</p> <p>SI 3: The establishment of a quick ordering system</p> <p>SI 4: Information exchange with key suppliers through information technology</p>
Chen and Wang R&D Management 38, 3, 2008	Internal social networks	<p>Entrepreneurial team members in the central position of the network are willing to combine and exchange resources with other team members</p> <p>Within the network interactions, entrepreneurial team members are capable to combine and exchange resources with other team members</p> <p>Entrepreneurial team members interact with each other in order to disseminate useful information within the team</p> <p>Entrepreneurial team members communicate functionally with other team members who are in</p>

		different disciplines
Krause et al. JOM 2007	Structural Capital: Supplier Development Activities	Allocation of your personnel to improve supplier's technical skill base Regular visits by your engineering personnel to supplier's facilities Dedicated supplier development team
Krause et al. JOM 2007	Info Sharing	

**Table 4. Survey Measures of the Cognitive Dimension in Social Capital Research**

Author & Journal	Cognitive Dimension Construct	Measures
Krause et al. JOM 2007	Shared Values	Both firms share the same business values The parties often agree on what is in the best interest of the relationship This supplier shares our goals for this business

**Table 5. Survey Measures of the Performance Outcomes in Social Capital Research**

Author & Journal	Performance Outcome	Measures
Lawson et al. JOM 2008	Buyer performance improvement	<p>BPI 1: In the last 2–3 years, we have been able to improve product design performance through these partnerships</p> <p>BPI 2: In the last 2–3 years, we have been able to improve process design through these partnerships</p> <p>BPI 3: In the last 2–3 years, we have been able to reduce lead time through these partnerships</p> <p>BPI 4: In the last 2–3 years, we have been able to improve product quality through these partnerships</p>
Cousins et al. JOM 2006	Supplier relationship outcomes:	<p>SP1—In the last 2–3 years, we have continued to be able to improve product design performance through these partnerships.</p> <p>SP2—In the last 2–3 years, we have continued to be able to improve process design through these partnerships.</p> <p>SP3—In the last 2–3 years, we have continued to reduce lead time through these partnerships.</p>
Krause et al. JOM 2007	Supplier improvement quality, delivery, manufacturing, flexibility	<p>Our supplier improvement effort with this supplier has helped improve our product quality.</p> <p>Our supplier improvement effort with this supplier has helped shorten the delivery times.</p> <p>Our supplier improvement effort with this supplier has helped</p>
Krause et al. JOM 2007	Supplier improvement Cost	<p>Our supplier improvement effort with this supplier has helped lower the cost of our products.</p> <p>Our supplier improvement effort with this supplier has helped reduce our product cost.</p>
Cousins et al.	Supplier	SP1—In the last 2–3 years, we have continued to be

JOM 2006	relationship outcomes:	able to improve product design performance through these partnerships. SP2—In the last 2–3 years, we have continued to be able to improve process design through these partnerships. SP3—In the last 2–3 years, we have continued to reduce lead time through these partnerships.

## A1. Final Survey Instrument

**Please indicate to what extent you agree or disagree with the following statements about your firm...**

The following questions concern who you know and who you are able to contact..	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm knows who to contact with key suppliers to get things accomplished	1	2	3	4	5
Our firm knows how to reach the right people at our key suppliers	1	2	3	4	5
Our firm works at making sure we know who to call to correct supplier problems	1	2	3	4	5
Our firm has clearly identified people to contact at our key suppliers	1	2	3	4	5

The following questions concern the kind of personal relationships you have developed with your supply partners...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our relationship with key suppliers is characterized by close, personal interaction	1	2	3	4	5
Our relationship with key suppliers is characterized by a history of respect	1	2	3	4	5
Our relationship with key suppliers is characterized by a history of trust	1	2	3	4	5
Our firm values our relationships with key suppliers	1	2	3	4	5

The following questions concern shared goals and values between you and your supply partners...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm and key suppliers share the same business values	1	2	3	4	5
Our firm and key suppliers often agree on what is in the best interest of our relationship	1	2	3	4	5
Our firm and key suppliers share our goals for this business	1	2	3	4	5
Our firm and key suppliers agree on how we should do business together	1	2	3	4	5

The following questions concern the knowledge capability of your firm ...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our firm effectively learns new opportunities	1	2	3	4	5
Our firm successfully learns how to better satisfy our customers	1	2	3	4	5
Our firm successfully learns how to be more competitive	1	2	3	4	5
Our firm discovers new ways to be a better firm	1	2	3	4	5

**Please indicate to what extent you agree or disagree with the following statements about your firm...**

<b>The following questions concern your firm's ability to reduce waste, increase efficiency and innovate...</b>	<b>Scale of Agreement</b>				
	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Our firm successfully eliminates waste in our company	1	2	3	4	5
Our firm continuously improves our efficiency	1	2	3	4	5
Our firm operates in a lean manner	1	2	3	4	5
Our firm continuously improves the service we offer customers	1	2	3	4	5
Our firm remains up-to-date on industry "best practices"	1	2	3	4	5
Our firm successfully stays ahead of the industry	1	2	3	4	5
Our firm successfully innovates	1	2	3	4	5

<b>The following questions concern your firm's profitability relative to your competition and your ability to sell products and services at a low cost ...</b>	<b>Scale of Agreement</b>				
	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Our firm's profitability is greater than the average in the industry	1	2	3	4	5
Our firm's return on investment is greater than the average in the industry	1	2	3	4	5
Our firm's profit margin is greater than the average in the industry	1	2	3	4	5
We are able to offer our products and services to our customers at better prices than our competition	1	2	3	4	5
The total costs we pay for our products is lower than that of our competitors	1	2	3	4	5
Our firm is able to offer competitively priced products	1	2	3	4	5

<b>The following questions concern your firm's attitude towards industry conditions...</b>	<b>Scale of Agreement</b>				
	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Our employees are motivated to build relationships with key suppliers	1	2	3	4	5
Our employees believe it is important to work hard at building relationships with key suppliers	1	2	3	4	5
At our firm building close relationships with key suppliers is important	1	2	3	4	5
Our industry has a high-level of risk	1	2	3	4	5
Our industry has a high-level of uncertainty	1	2	3	4	5
It is difficult to successfully plan for the long-term in our industry	1	2	3	4	5
Our industry is very turbulent	1	2	3	4	5

**Please indicate the correct answer to the following questions about you and your firm...**

A few questions about you and your firm...	Please Circle the Best Response				
What is your position in your firm (circle all that apply)	Owner or Part Owner	CEO, COO, President or CFO	Vice President	Director or Manager	Other
If you selected "Other" as your title, please list your title:  _____					
How many years have <u>you</u> personally been working in the convenience store industry?	Less than 2 years	2 to 4 years	5 to 9 years	10 to 14 years	15 or more years
How many years has your <u>firm</u> been in the convenience store industry?	Less than 2 years	2 to 4 years	5 to 9 years	10 to 14 years	15 or more years
How many employees does your firm employ?	Less than 20	Between 21 and 49	Between 50 and 99	Between 100 and 199	200 or more
How many stores does your firm operate?	1	2 to 4	5 to 9	10 to 49	50 or more
If you operate more than 1 store, what is the approximate average distance (in miles) between your stores?	Less than 5 miles	5 to 10 miles	11 to 19 miles	Between 20 and 50	50 or more miles
What gasoline do you sell (check all that apply)	Private Unbranded	Branded			
If you selected "Branded", please list the brand(s) of gasoline you offer:  _____					
Is your company affiliated with a franchise group (such as 7-11)?	Yes	No			
If your company is affiliated with a franchise group(s), please list:  _____					
For 2009, was your average monthly per store gross profit (before expenses):	Less than \$25,000	\$25,000 to \$34,999	\$35,000 to \$44,999	\$45,000 to 54,999	\$55,000 or greater
For 2009, was your average monthly per store operating profit (after expenses):	Less than \$9,999	\$10,000 to \$44,999	\$15,000 to \$19,999	\$20,000 to 24,999	\$25,000 or greater



**If your company participates as a franchisee, please indicate to what extent you agree or disagree with the following statements about your firm...**

The following questions concern your firm's relationship with your franchisor...	Scale of Agreement				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our franchisor helps coordinate our relationship with our other supply chain partners.	1	2	3	4	5
Our franchisor provides support in selecting what products to sell in our stores.	1	2	3	4	5
Our franchisor provides support in maximizing our profit margins.	1	2	3	4	5
Our franchisor provides support in analyzing our store sales in order to improve our sales.	1	2	3	4	5
Our franchisor provides merchandising support.	1	2	3	4	5
Our franchisor helps our firm secure lower prices from our vendors.	1	2	3	4	5
Our franchisor supports our firm by making our distribution network easier to manage.	1	2	3	4	5
Our franchisor supports our firm by helping us advertise and promote our business.	1	2	3	4	5

August 24, 2010  
Mr. XXXXX XXXXXXX  
Quick Stop  
5555 Sample Drive  
XXXXXXX, XX 55555-5555

Dear Mr. XXXXX XXXXXXX:

I am writing to ask for your help in completing a survey for my PhD dissertation at Clemson University in Clemson, South Carolina.

The objective of this research is to investigate the intangible attributes that create strong relationships between convenience store operators and their supply chain partners. I am seeking to link the qualities of these relationships with different aspects of firm performance.

While some of the questions may seem similar to each other, I am seeking to focus on subtle distinctions in how relationships impact firm performance. In total I ask 45 questions and the entire survey should take less than 10 minutes to complete.

All responses will be kept confidential and you do not need to identify yourself in the response. At the bottom of this cover letter is a detailed summary of the conditions in which this survey, consistent with Clemson's IRB board, will be administered.

You may complete the survey online at the following link:  
[http://clemson.qualtrics.com//SE?SID=SV\\_eX0Jt4XpIlniX4w](http://clemson.qualtrics.com//SE?SID=SV_eX0Jt4XpIlniX4w)

I would be glad to provide you with a summary of my findings if this is of interest to you. Also, *Convenience Store News* magazine plans to offer the findings as well.

I very much appreciate your participation. If you have any questions, feel free to call me at (864) 656 - 2011

Tobin Turner  
Clemson University  
Phone: (864) 656-2011  
Webpage:  
[http://business.clemson.edu/managemt/Management\\_PhD/tobin.html](http://business.clemson.edu/managemt/Management_PhD/tobin.html)