EXPLORING THE RELATIONSHIP BETWEEN STRATEGIC THINKING AND

ABSORPTIVE CAPACITY: A PROPOSED TYPOLOGY

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Absorptive capacity plays an important role in the organizational adaptation process. Prior research on absorptive capacity focuses on its role in organizational outcomes such as financial performance, innovation, new product development, etc. Recently, scholars have called for research on factors that influence absorptive capacity. Because absorptive capacity plays a vital role in achieving organizational outcomes, it behooves us to improve our understanding of absorptive capacity and its antecedents to serve both researchers and practitioners. In this investigation, strategic thinking is posited to be a key antecedent of absorptive capacity. Capability theory suggests that strategic thinking is a metaphysical (higher order) capability that influences an organization's absorptive capacity. Combining this argument with Miles and Snow's typology of organizational adaptation process, it is posited that the relationship between strategic thinking and absorptive capacity can be clustered into different "groups." Prospectors, defenders, and analyzers, characterized in Miles and Snow's typology of firms are viewed as distinctive groups that exhibit different relationships between strategic thinking and absorptive capacity. Results from an empirical examination suggest that strategic thinking is positively related to absorptive capacity. The results also suggest that the relationship between these two constructs is different between these groups and that the strategic thinking of prospectors has a weaker relationship with absorptive capacity than other type of firms.

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CHAPTER 1

INTRODUCTION

Introduction

How organizations remain competitive in a dynamic environment is one of the most

investigated questions by researchers in the field of strategic management (Overmeer, 1986). To

remain competitive, organizations must constantly adapt to the changing environment and adjust

their strategy and structure so that these remain aligned with environmental mandates (Lawless

& Finch, 1989; Levinthal, 1991). Organizational adaptation is characterized as continuous

change within the organization in response to changing environmental conditions (Tushman &

Romanelli, 1985). These changes can be in (but are not limited to) organizational structure,

decision making, and the overall vision of the organization (Burke, 2002). Organizational

adaptation that leads to an efficient alignment among strategy, structure, and environment has

been found to be significantly related to superior performance (Jennings & Seaman, 1994;

Pettigrew, Woodman, & Cameron, 2001). The phenomenon of organizational adaptation, in

response to environmental change, is not new. March (1981, p. 563) asserted more than 30 years

ago that, "organizations are continually changing, routinely, easily, and responsively." This

continuous change has been characterized by research as an ongoing adaptation and adjustment

process, which helps achieve sustained organizational performance (Tushman & Romanelli,

1985; Orlikowski, 1996). At its core, the process of organizational adaptation subsumes an

organizational learning process that enables firms to create new knowledge and utilize it to

remain competitive (Weick and Quinn, 1999).

The role of knowledge is axiomatic in organizational processes that create and maintain

firm performance (Volberda, Foss, & Lyles, 2010). Likewise, the process of organizational

adaptation assumes an underlying knowledge creation process whereby new routines, processes, and activities allow the organization to remain viable and survive in a changing environment (Jansen, Van Den Bosch, & Volberda, 2005). Organizations that lead their competitors in knowledge creation tend to exhibit superior performance (Kogut & Zander, 1992; Zollo & Winter, 2002). However, relevant knowledge is not always readily available from the external environment, which often prompts organizations to develop the knowledge internally (Nonaka, 1994). One capability that has been identified by scholars as a central component in generating new knowledge (from the external or the internal environment) is absorptive capacity (Volberda et al., 2010).

Absorptive Capacity

Absorptive capacity has been noted as one of the capabilities that enable the creation of new stocks of knowledge that, among other things, enhances organizational responsiveness to environmental changes (Liao, Welsch, & Stoica, 2003). Cohen & Levinthal (1990) first conceptualized the absorptive capacity construct as an organization's ability to recognize, assimilate, and exploit new knowledge to achieve commercial ends. Since its initial conceptualization, absorptive capacity has emerged as an important theoretical tool in the investigation of underlying processes associated with organizational adaptation. The ability of the absorptive capacity construct to explain the process of new knowledge generation, modification, and application for commercial ends makes it an important research tool in strategic management and organizational adaptation research (Jansen et al., 2005).

The ability to create and exploit new knowledge enables organizations to improve their efficiency and refine their internal value-creating processes (Levinthal & March, 1993). The new knowledge provides insight into resource and capability combinations that can alter

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organizational activities and create value in alternative ways (Jansen et al., 2005). Thus, organizations with high absorptive capacity are cognizant of environmental changes and do a better job at reconfiguring their operational capabilities to enhance performance (Daspit, D'Souza, & Dicke 2016, Zahra & George, 2002).

Researchers have explored how absorptive capacity influences organizational performance (Daspit et al., 2016; Kotabe, Jinang, & Murray, 2017; Liu, Ke, Wei, & Hua, 2013; Tsai, 2001). Empirical investigations on the relationship between absorptive capacity and organizational outcomes have focused on the role of absorptive capacity in new product development (Stock, Greis, & Fischer, 2001), innovation performance (Bertrand & Mol, 2013; Chen, Lin, & Chang, 2009; Fosfuri & Tribo, 2008; Tsai, 2001), organizational learning (Chen et al., 2009; Lane & Lubatkin, 1998; Lyles & Salk, 1996), innovation (Maes & Sels, 2014), and inter-organizational knowledge transfer (Chen, 2004; Gupta & Govindarajan, 2000).

Researchers have also explored the process of new knowledge generation through absorptive capacity, and its relationship with the organizational performance (Daspit & D'Souza, 2013). Absorptive capacity has been conceptualized as having four distinct but complementary processes that lead to new knowledge generation and exploitation: acquisition, assimilation, transformation, and exploitation (Zahra & George, 2002). Recently, Daspit & D'Souza (2013, 2016) empirically confirmed that these four processes operate sequentially to influence firm performance.

Despite the richness of the theoretical and empirical investigations, the concept of absorptive capacity is yet to be explored to its full potential (Lane, Koka, & Pathak, 2006; Van Den Bosch, Van Wijk, & Volberda, 2003; Volberda et al., 2010). One area that has eluded researchers is the antecedents of absorptive capacity (Volberda et al., 2010, Van Wijk, Jansen, &

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Lyles, 2008). Recently, Rezaei-Zadeh & Darwish (2016) noted that research on the antecedents of absorptive capacity is still fragmented, and does not provide a clear picture of their role in the knowledge creation process. They also noted that future research should identify and prescribe the most important antecedents.

Antecedents of Absorptive Capacity

Antecedents of absorptive capacity have been researched at the managerial, organizational, and interorganizational levels (Rezaei-Zadeh & Darwish, 2016; Volberda et al., 2010). A detailed discussion of the antecedents of absorptive capacity is provided in Chapter 2. The following discussion focuses on managerial-level antecedents as they provide the conceptual background for this study.

In their recent review of the antecedents of absorptive capacity, Rezaei-Zadeh and Darwish (2016) demonstrated that managerial antecedents not only influence absorptive capacity directly but they also influence other organizational, interorganizational, and individual level antecedents of absorptive capacity. Therefore, managerial antecedents have both direct and indirect influence on absorptive capacity, making them critical in absorptive capacity investigations. Moreover, the role of managers in developing absorptive capacity is widely accepted in the literature (Kor & Mesko, 2013; Van den Bosch, Volberda, & Boer, 1999; Volberda et al., 2010). A bibliometric analysis by Volberda et al. (2010) showed that managerial antecedents are most prevalent and are considered the most important in studies on absorptive capacity. Four managerial antecedents discussed in the absorptive capacity literature are managerial cognition, managerial dominant logic, managerial capabilities, and strategic thinking (Collis, 1994; Rezaei-Zadeh & Darwish, 2016; Volberda et al., 2010).

Managerial cognition

Managerial cognition represents a belief system that is shaped by the interaction of managers with their organizational environment at the personal and the professional level (Adner & Helfat, 2003). This belief system creates unique schemas and mental models that the manager uses to make decisions (Prahalad & Bettis, 1986). Based on his/her cognition, a manager identifies relevant external knowledge and introduces it to the organization (Rezaei-Zadeh & Patel, 2012). Cognition also helps the manager in influencing the distribution and recognition of the new knowledge across the organization (Jones, 2006).

Dominant Logic

Managerial cognition has also been conceptualized as one of the key inputs in shaping the dominant logic of the organization. Managers perceive and interpret the world based on their cognitive lens. Over time, these perceptions and interpretations develop into the dominant logic that represents the management's "view of the world, where the firm stands in the business environment, and what it ought to be doing" (Kor & Mesko, 2013, p. 235). Critical business decisions such as resource allocation, capability development, or technology acquisition are guided by the dominant logic of the organization (Prahalad & Bettis, 1986). Dominant logic is reflected in the overall value creation process of the organization. It is embedded in the organization such that it not only determines the activities of organizational members but it also guides how managers think (Prahalad, 2004).

Managerial Capabilities

Managers are decision makers that evaluate a business situation and act accordingly. Managers who have the capability to generate and revise the knowledge sources of organization influence the absorptive capacity positively. Some of the managerial capabilities that enhance the knowledge base and hence the absorptive capacity include the ability to develop a

streamlined structure for communication, distribute relevant expertise across the organization, develop cross-functional interfaces, act as a gatekeeper for the new knowledge, assume boundary-spanning roles, and maintain effective job-rotation (Jansen et al., 2005; Volberda et al., 2010).

Although the above-mentioned managerial capabilities play a crucial role in developing organizational absorptive capacity, the underlying thought process of these managerial capabilities is the capability of strategic thinking. Strategic thinking serves as the 'brain' of the organization (Prahalad & Hamel, 1994, p. 6). It activates and maintains various higher and lower-order organizational processes and capabilities within the periphery of the dominant logic. Since absorptive capacity is a vital organizational capability that enables the organizational adaptation process through new knowledge generation, a relationship between absorptive capacity and strategic thinking seems evident. As Bonn (2005) suggests, strategic thinking "may provide the key to better understand organizational change phenomena and ultimately, organizational performance and survival" (p. 337).

Strategic thinking, a managerial capability, activates and maintains various organizational processes and capabilities to support organizational adaptation (Collis, 1994). Therefore, it serves as a necessary antecedent to absorptive capacity. The role of both absorptive capacity and strategic thinking is evident in the organizational adaptation process, which suggests a possible relationship between absorptive capacity and strategic thinking. However, the present literature does not identify strategic thinking as an antecedent of absorptive capacity. Therefore, this study attempts to bridge this gap in the literature by investigating the relationship between strategic thinking and absorptive capacity. A brief discussion on the construct of strategic thinking is provided in the next section.

Strategic Thinking

Strategic thinking has been characterized by Collis (1994) as a metaphysical (higher-order) capability in the hierarchical framework of organizational capabilities, which allows the organization to alter the configurations of existing capabilities or develop new capabilities. Strategic thinking requires the ability of systems thinking (a holistic view of the organization), the ability of reframing (identification, differentiation, and use of multiple perspectives), and the ability of reflection (use of one's own and other's perspectives to reflect on organizational actions). Strategic thinking enables managers to identify the interconnections and interdependencies within the organization and between the organization and its environment. This higher-level understanding allows managers to establish relationships among events that seem otherwise fragmented (Robinson, Stern, & Stern, 1997). By enabling a holistic view of the interdependencies between organization and environment, managers become more cognizant of changes in the environment – a necessary precursor to devising internal changes needed to align the organization with its environment. In addition, organizational adaptation being a dynamic process needs to be moderated by managerial insight that provides sense and directions for organizational change (Gioia & Chittipeddi, 1991).

Strategic thinking as a managerial capability is considered instrumental in enabling managers to focus on the bigger picture of the organization-environment relationship and modify and deploy internal capabilities to implement changes (Barr, Stimpert, & Huff, 1992). Liedtka (1998) supported this view and suggested that strategic thinking makes the organization more adaptable to change. In essence, strategic thinking is a necessary antecedent to initiate and establish a pathway for organizational adaptation.

The discussion of the antecedents of absorptive capacity reveals that managerial cognition, over time, shapes the dominant logic of the organization and the dominant logic guides the strategic thinking of managers. Both managerial cognition and dominant logic have been discussed as antecedents of the absorptive capacity (Jansen et al., 2005; Kor & Meskko, 2013; Rezaei-Zadeh & Darwish, 2016; Volberda et al., 2010). However, the evidence for the relationship between strategic thinking and absorptive capacity is absent in the literature. The absence of such research makes it worthwhile to investigate the relationship between absorptive capacity and strategic thinking.

Furthermore, the present study investigates the construct of absorptive capacity in the context of organizational adaptation. Organizational adaptation has been characterized as an ongoing phenomenon that requires continuous changes at the process level. Strategic thinking has been viewed as enabling managers to assess changes in the external environment, and allowing them to sanction the use of organizational resources and capabilities to implement changes (Collis, 1994). Thus, strategic thinking can be considered an enabler of organizational adaptation (Bonn, 2005; Liedtka, 1998). A construct that enables the organizational adaptation process should be appropriately positioned as an an antecedent of absorptive capacity. Given the role of absorptive capacity in organizational adaptation, and the ability of strategic thinking to enable organizational adaptation, strategic thinking is posited to be an appropriate antecedent to absorptive capacity in the context of this study.

Since strategic thinking has been characterized as a metaphysical (higher-order) capability in the hierarchical framework of organizational capabilities, it can also be argued that strategic thinking influences absorptive capacity (Winter, 2003). Further details of the conceptualization of strategic thinking as organizational capability are provided in Chapter 2.

Given the context of the present study and conceptual support derived from the capability framework, this study posits that strategic thinking should be viewed as an antecedent of absorptive capacity in a framework that attempts to explain the organizational adaptation process.

Research Gap

While absorptive capacity and strategic thinking have been shown to contribute to organizational adaptation, no research has looked at these two concepts in conjunction. The link between strategic thinking and absorptive capacity has been tangentially addressed in the literature. Tseng, Chang Pai, and Hung (2011) suggested that inside-out strategic thinking supports the knowledge-based perspective of the organization, which emphasizes the creation and utilization of knowledge for organization performance. Heracleous (1998) positioned strategic thinking as analogous to double-loop learning, where new and innovative solutions are developed. In addition, scholarship at the organizational level suggests that learning occurs as a stepwise process in which the organization collects new information through scanning, interprets the information, and finally makes decisions based on the knowledge (Daft & Weick, 1984). Similarly, Liedtka (1998) suggested that strategic thinking allows managers to realign organization processes to achieve competitive advantage.

Research on absorptive capacity also suggests that there might be a relationship between absorptive capacity and strategic thinking at the organizational level. However, there is no empirical evidence of such a relationship. For example, at the group/team level, Jansen at al., (2005) found that cross-functional interfaces that bring insight from different departments positively affect absorptive capacity. Further, Boal and Hooijberg (2001) suggests that strategic leadership is required to create and maintain the absorptive capacity of the organization. Fosfuri

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and Tribo (2008) found that knowledge-search experience is positively related to absorptive capacity, perhaps implying that strategic thinking may also be related to it.

<center>Research Questions</center>

Although the literature suggests that absorptive capacity and strategic thinking might be linked to each other, the direct relationship has not been explored. Current research on the antecedents of absorptive capacity does not provide adequate insights to extend our understanding of the organizational adaptation process. Since both absorptive capacity and strategic thinking are central to the organizational adaptation process, insights into the relationship between strategic thinking and absorptive capacity will help fill this research gap. Accordingly, an investigation of the relationship between absorptive capacity and strategic thinking is warranted. Thus, the first main research question (RQ) posed in this study is,

RQ-1: *What is the relationship between absorptive capacity and strategic thinking?*

Since absorptive capacity and strategic thinking have both been shown to be organizational capabilities, this study seeks to extend the understanding of how these capabilities operate in unison to enable organizational adaptation. Researchers characterize organizational capabilities as high-level routines that are idiosyncratic to the organization. The idiosyncratic nature of capabilities and their joint contribution to organization-specific goals (Winter, 2003) suggest that strategic thinking and absorptive capacity are uniquely developed by an organization to be complementary to achieve its performance goals. The uniqueness and idiosyncratic nature of strategic thinking and absorptive capacity, however, cannot be generalized across organizations. If these capabilities are organization specific and are developed within the organization in isolation, attempts to obtain generalizable findings about these capabilities is severely limited. Theoretically, the existence of such capabilities will be purely random without

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any identifiable trends that can be captured and analyzed through empirical investigation. In summary, such investigations may not provide useful information about the role of capabilities in organizational outcomes that can be generalized to deliver prescriptions that can be utilized by managers across firms or institutional fields.

The idiosyncratic nature of organizational capabilities has also been questioned because organizations show patterns in their product/market domain and other organizational outcomes (Eisenhardt & Martin, 2000). Patterns in organizational outcomes suggest that the commonality exists in capabilities that lead to similar outcomes. For example, most innovative organizations are believed to possess new knowledge creation capabilities (Katz & Tushman, 1981). Having commonalities does not mean that the capabilities are the same across organizations, but it implies that key attributes and outcomes of these capabilities are the same (Eisenhardt & Martin, 2000). Based on this argument, it can be suggested that organizations can be grouped based on similar capabilities.

Organizations that possess similar capabilities take a similar route for organizational adaptation, which leads to similar organizational outcomes. By extending this logic to the relationship between strategic thinking and absorptive capacity, this study suggests that homogeneous patterns of the relationships between strategic thinking and absorptive capacity can be identified across organizations. For example, organizations that are highly innovative may exhibit similar relationships between absorptive capacity and strategic thinking, and they will reflect a similar pattern of organizational adaptation. Similarly, organizations that focus on efficiency and cost-reduction may exhibit a homogeneous relationship between absorptive capacity and strategic thinking that leads to desired outcomes. The identification of such homogeneous groups will not only enhance our understanding of organizational capabilities and

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their relationship with organizational outcomes but will also be valuable for practitioners. Practitioners can use the group-specific relationship to identify whether their organizations' strategic thinking and absorptive capacity match their strategic orientation. Existing capability literature does not provide any classification or typology of the relationship between strategic thinking and absorptive capacity, which makes this study the first to explore the heterogeneity in organizations at capability level. The lack of such groups in the literature raises the second question of the study:

> RQ2: *Are there groups of organizations that are internally homogeneous, but externally heterogeneous in terms of the relationship between absorptive capacity and strategic thinking?*

Theoretical Perspective

Given the dynamism in contemporary business environments, organizations are forced to adapt to the changes in the external environment. The capability-based perspective offers a dynamic view of the organization, and explains the modification and deployment of organizational resources that enable organizational adaptation (Teece, Pisano, & Shuen, 1997). In other words, organizational capabilities are instrumental in organizational adaptation and can be considered as building blocks for organizational adaptation. The two constructs of interest in this study play a critical role in organizational adaptation. For example, scholars have found that strategic thinking is instrumental in enabling managers to focus on the bigger picture (e.g., the organization-environment relationship), and to modify and deploy internal capabilities that support adaptation (Barr et al., 1992). Likewise, absorptive capacity has been identified as one of the capabilities that enable the creation of new stocks of knowledge that, among other things, enhances organizational responsiveness to environmental changes (Liao et al., 2003). Since both absorptive capacity and strategic thinking are central to organizational adaptation, theories that

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explain organizational adaptation provide the most relevant perspective to the study the relationship between absorptive capacity and strategic thinking. Two prevailing theories that address the phenomenon of organizational adaptation are the theory of environmental determinism and the theory of strategic choice (Astley & Van de Ven, 1983; Hrebiniak & Joyce, 1985; Levinthal & Marino, 2015).

The Theory of Environmental Determinism

This theory advocates the natural selection approach to adaptation in which organizations have little or no control over environmental factors (Hannan & Freeman, 1977). Proponents of environmental determinism argue that organizations have limited latitude to change their internal structures against external forces. Therefore, organizations with appropriate variation are selected in, while others are selected out (Hannan & Freeman, 1977; Aldrich, 1999).

The Theory of Strategic Choice

The Strategic choice perspective was proposed as a counter-argument to economic constraints and environmental selection theories. Child (1972) suggested that any theory of organizational adaptation with a deterministic view is inadequate because "it fails to give due attention to to the agency of choice by whoever have the power to direct the organization" (p. 2). Accordingly, strategic choice perspective suggests that given the environment within which organizations are competing, managers can choose the desired strategy (Child, 1972).

Other Theories Emanating from Strategic Choice Theory

Subsequently, several theories and perspectives are proposed that use strategic choice perspective as an underlying assumption to explain the organization's ability to remain viable and competitive. For example, organizational structure theorists suggest that structural properties can explain the adaptation to the external environment. Lawrence and Dyer (1983) argued that

organizations with organic structures adapt to changing environment better than organizations with mechanistic structures. Decentralization and a low degree of formality in an organic structure enable information sharing, which improves organizational adaptability (Mintzberg, 1978). Likewise, the resource-based view suggests that organizations that possess unique and firm-specific resources have better strategic options than their competitors (Barney, 1986). Wernerfelt (1984) suggested that the resource perspective supports and addresses key issues related to the mode of adaptations such as diversification, merger and acquisition, and first-movers. In similar fashion, the knowledge-based perspective conceptualizes the organization as a knowledge managing entity that exploits existing knowledge and explores new knowledge to adapt to the changing environment (March, 1991). Lastly, the capability-based perspective suggests that organizations develop unique routines that result in distinctive competencies and provide abilities to adapt to the rapidly changing environment (Prahalad & Hamel, 1994; Teece et al., 1997).

Choice of Theoretical Perspective to be Used in This Study.

This study is primarily concerned with understanding the relationship between absorptive capacity and strategic thinking. More specifically, this investigation focuses on how strategic thinking influences organizational absorptive capacity and how these two processes enable organizational adaptation. The resource-based view and the knowledge-based view provide limited contextual relevance because they do not adequately address the changes in the external environment (Teece et al., 1997). The capability-based perspective is an extension of the resource-based view and the knowledge-based view that mitigates these limitations (Teece et al., 1997, Winter, 2003). Capability-based perspective conceptualizes organizational resources as mobile that can be dynamically transformed into capabilities to address the changes in the

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external environment. Capability-based perspective offers a dynamic view of the organizations that resolves the limitation of a static view of the perspectives above. Additionally, the capability-based perspective further expands and enriches the knowledge-based perspective given that knowledge created within the organization is idiosyncratic and is apposite a dynamic environment (Eisenhaedt & Martin, 2000; Teece, 2007; Teece et al., 1997). The capability-based theory of the firm provides a dynamic representation of the adaptation process in which organizations renew their resources, routines, and capabilities to enhance organizational performance. In addition, strategic thinking and absorptive capacity have been shown to be organizational capabilities. Hence, the capability-based theory of the firm was deemed as an appropriate lens to explicate the relationship between the two constructs of interest.

Contribution

The purpose and contribution of the current study are central to strategic management research. How firms survive, adapt, and generate economic rents in the rapidly changing environment is the core of strategic management scholarship. Researchers like Volberda et al. (2010) have positioned absorptive capacity at the epicenter of the organizational adaptation process. However, despite two and half decades of research on absorptive capacity, its nomological network is not fully developed. In particular, the research on antecedents of absorptive capacity is still conceptual in nature, fragmented, and inconclusive (Rezaei-Zadeh & Darwish, 2016).

This study contributes to the knowledge base of absorptive capacity by examining it through the organizational adaptation lens and by identifying its relationship with what has been theorized as a key antecedent - strategic thinking (Collis, 1994). Additionally, this study proposes and tests the existence of a hypothesized typology of relationships between strategic

thinking and absorptive capacity. Practitioners could use such a typology to identify whether their organizations' strategic thinking and absorptive capacity match their desired strategic orientation and performance goals.

Organization of Content

This dissertation is organized into five chapters. The first chapter introduces the concept of absorptive capacity, strategic thinking, the possible relationship between absorptive capacity and strategic thinking, research gaps, research questions, and relevant theoretical perspectives. The second chapter begins with a detailed discussion of the two theoretical constructs of interest, i.e., absorptive capacity and strategic thinking. Next, relevant perspectives are discussed to support the relationship between absorptive capacity and strategic thinking, which leads to the generation of specific hypotheses. The third chapter discusses operationalization of constructs, data collection method, and details of pre- and pilot-testing. The fourth chapter presents the results in details. Finally, Chapter 5 presents the discussion, research and managerial implications, and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this chapter is to provide a review of the literature on absorptive capacity and strategic thinking in the context of this study. In addition, the chapter discusses the capability-based framework and Miles and Snow's (1978) organizational adaptation process as suitable underlying theoretical frameworks to establish relationships between absorptive capacity and strategic thinking and to offer hypotheses suitable for empirical testing.

The chapter starts with an in-depth discussion on the conceptual development of absorptive capacity followed by the discussion of four dimensions of absorptive capacity. Next, a review of the antecedents of absorptive capacity is presented followed by the discussion of the second construct of this study, i.e., the construct of strategic thinking. This chapter therefore presents a detailed literature review of strategic thinking.

Next, the two research questions posed in Chapter 1 are addressed. The first research question, about the relationship between absorptive capacity and strategic thinking, is investigated by using a capability-based perspective. Derived from the hierarchical representation of organizational capabilities found in the literature (Collis, 1994; Winter, 2003), strategic thinking and absorptive capacity are positioned as metaphysical and dynamic capabilities respectively. The relationship between hierarchically-ordered organizational capabilities found in the literature is used to establish the relationship between strategic thinking and absorptive capacity. Theoretical developments are offered to posit that the strategic thinking influences the absorptive capacity of the organization. The second research question addresses the possibility that the relationship between strategic thinking and absorptive capacity could be

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categorized into identifiable groups. Miles and Snow's (1978) conceptualization of organizational adaptation processes is used to explore this research question. Specifically, it is theorized that the relationship between strategic thinking and absorptive capacity can be classified into different groups based on Miles and Snow (1978) typology.

Based on a review of the literature and the ensuing theoretical support for the existence of a relationship between the two constructs, a hypothesis is offered to empirically test the overarching relationship between absorptive capacity and strategic thinking. Additionally, the differences in the relationships between absorptive capacity and strategic thinking across "Miles and Snow" organizational archetypes are hypothesized and tested. In summary, this chapter furnishes the theoretical framework to support the investigation of hypothesized relationships between strategic thinking and absorptive capacity. It will also explore the possibility of a typology of relationships between strategic thinking and absorptive capacity.

Scope of the Study

The purpose of this study is to investigate the relationship between absorptive capacity and strategic thinking. The capability-based perspective is employed to anchor the theoretical development. Absorptive capacity is viewed as a dynamic capability with four dimensions, i.e., acquisition, assimilation, transformation, and exploitation (Zahra & George, 2002). Extant research has established that absorptive capacity is one of the key dynamic capabilities of an organization. However, research on the antecedents of absorptive capacity is sparse and lacks extensive empirical investigations. This study attempts to address this research gap by proposing and empirically confirming that strategic thinking is an antecedent of absorptive capacity. Additionally, a typology of the relationships between strategic thinking and absorptive capacity is proposed and examined based on Miles and Snow's (1978) typology.

Before developing specific hypotheses based on the relationship between strategic thinking and absorptive capacity, a detailed review of the literature on the two constructs is undertaken. Next, relevant theoretical perspectives are used to establish hypothesized relationships between strategic thinking and absorptive capacity.

Absorptive Capacity

In Chapter 1, it was noted that strategic management scholars characterize absorptive capacity as an organizational capability. Hence, it would be appropriate to use a capability-theory lens to investigate the absorptive capacity phenomenon. Collis (1994), Winter (2003), Teece (2007), and others have suggested that there are three types of organizational capabilities – metaphysical, dynamic, and ordinary capabilities. These researchers have also suggested that one could visualize a set of sequential (hierarchical) causal relationships among these three capabilities. Subsequently, scholars have demonstrated that absorptive capacity should be viewed as a dynamic capability. Absorptive capacity enable organizations to sense, seize, and reconfigure their ordinary capabilities. In other words, absorptive capacity allow organizations to make changes in ordinary capabilities and exploit the resultant changes to achieve a desired competitive position in the marketplace (Zahra & George, 2002).

In line with the conventional operationalization, absorptive capacity has been conceptualized as consisting of four processes - acquisition, assimilation, transformation, and exploitation of new knowledge[1] (Cohen & Levinthal, 1990; Zahra & George, 2002). Absorptive capacity allows organizations to identify and acquire new information from the external environment, assimilate the new information with the existing knowledge of the organization,

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[1] The transformation and exploitation processes that have been operationalized by absorptive capacity scholars reflect what dynamic capability scholars have summatively characterized as reconfiguration.

transform the combination of new information and existing knowledge and create new knowledge, and exploit the new knowledge for commercial ends.

The following section presents a review of the conceptual development of absorptive capacity and its four dimensions.

Conceptual Development and Definition of Absorptive Capacity

The absorptive capacity constructs evolved mostly through organizational learning research (Fiol & Lyles, 1985; Levitt & March 1988). Macroeconomic scholars first used the concept of absorptive capacity to explain a nation's capacity to utilize domestic and foreign assets (Adler, 1965). Later, the concept was applied to the inter-organizational context where it was viewed as the organizational capability employed to assimilate technological changes emanating from outside the organization. For example, Tilton (1971) used this conceptualization to study technology diffusion.

Cohen and Levinthal (1989, 1990) were the first to introduce the absorptive capacity construct into the management literature. They referred to it as "the organization's ability to identify, assimilate, and exploit knowledge from the environment" (1989, p. 569). The most cited definition of absorptive capacity, however, appeared in Cohen and Levinthal's (1990) seminal article where it is defined as the firm's "ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (p. 128).

Anchoring their arguments in behavioral science research, Cohen and Levinthal (1990), suggested that "the ability to evaluate and utilize outside knowledge is largely a function of the level of prior related knowledge" (p. 128). That is, organizations that have accumulated a pool of related prior knowledge can identify the relevant information and acknowledge the value of new

information. Conversely, in the absence of prior knowledge, organizations may not be able to recognize the value of the new information and therefore may ignore valuable new information.

Once the value of new knowledge is recognized, it should be acquired judiciously and be used for commercial ends. Cohen and Levinthal (1990) note that an organization's ability to acquire and value new information does not guarantee its exploitation, and organizations should have mechanisms in place to transform and exploit the knowledge for profit generation. Consistent with their definition, Cohen and Levinthal (1990) conceptualized absorptive capacity as a three-dimensional construct: knowledge recognition, assimilation, and exploitation. They argued that the new knowledge generation is a linear process that occurs through the three dimensions of absorptive capacity. Organizations recognize the value of new knowledge, assimilate it, and then exploit it for the commercial ends.

Following Cohen and Levinthal's (1990) introduction of the concept, other researchers have studied the construct using different lenses. Mowery and Oxley (1995) defined absorptive capacity as broad skills that can be used to decode tacit components of transferred technology and to apply this knowledge for organization's internal operations. They operationalized the construct of absorptive capacity based on the human capital in organization. They used four dimensions: skill level of personnel, trained R&D personnel as a percentage of the population, trained engineering graduate, and R&D spending. Kim (1998) defined absorptive capacity as the organizations' learning capability and problem-solving skills. Learning capability enables organizations to assimilate external knowledge, whereas problem-solving skills allow the organization to create new knowledge. Kim (1998) operationalized the absorptive capacity based on two dimensions: prior knowledge base and intensity of efforts.

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To improve the theoretical base of the absorptive capacity construct, Zahra and George (2002) provided a more nuanced representation of the multi-dimensional nature of the absorptive capacity construct. They conceptualized absorptive capacity as a four-dimensional construct and defined it as "a set of organizational routines and processes by which organizations acquire, assimilate, transform, and exploit knowledge to produce dynamic organizational capability" (p. 186). Zahra and George (2002) were the first to formally position absorptive capacity within the capability framework. They argued that absorptive capacity is a path dependent dynamic capability that is embedded in organizational routines.

Zahra and George (2002) presented absorptive capacity as a combination of four capabilities of acquisition, assimilation, transformation, and exploitation. They argued that these four capabilities, although responsible for different outcomes, are complimentary in nature and, in combination, enable organizations to reconfigure other resources and competencies to achieve competitive advantage. The four-dimensional conceptualization of absorptive capacity by Zahra and George (2002) is very similar to what Cohen and Leventhal (1990) have proposed. Acquisition dimension represents the "identification of new knowledge" dimension identified by Cohen and Levinthal (1990), whereas assimilation and exploitation are conceptualized as previously defined. The inclusion of the transformation dimension was justified based on Kim's (1998) suggestion that knowledge modification is required to develop the problem-solving capability.

Subsequently, researchers have suggested more complex and intricate relationships among absorptive capacity components and have presented various process models. Recently, Lewin, Massini, and Peeters (2011) proposed a routine-based model and decomposed the construct of absorptive capacity into internal and external capabilities. In their conceptualization,

both internal and external capabilities have separate meta-routines and routines. Meta-routines of internal capabilities are represented by an organization's internal variation, selection, and replication (Nelson & Winter, 1982). Whereas, meta-routines of external capabilities are comprised of exploration and assimilation of new external knowledge, learning from external knowledge, and transferring the knowledge back to the organization.

The intellectual debate around the dimensions of absorptive capacity has significantly contributed towards the development of the construct. However, the use of a four-dimensional model of the absorptive capacity construct, first proposed by Zahra and George (2002), dominates the strategy and management research. Recent empirical investigations of absorptive capacity (e.g. Daspit & D'Souza, 2013; Daspit et al., 2016; Wales, Parida, & Patel, 2013; Zhang, Zales, Lyles, & Guo, 2015) have used four-dimensions to operationalize the construct. Following the dominant conceptualization, absorptive capacity is defined as

> A set of organizational routines and processes by which organizations acquire, assimilate, transform, and exploit knowledge to enable organizational adaptation.

Likewise, in this study, the absorptive capacity construct is conceptualized as a four-dimensional construct, with the four underlying dimensions being acquisition, assimilation, transformation, and exploitation. A detailed discussion of each dimension is presented in the next section.

Dimensions of Absorptive Capacity

Acquisition

The acquisition dimension represents the identification and collection of externally generated knowledge that is critical for an organization's operations. Organizations with acquisition capability engage in information scanning activities and are motivated to develop external relationships (e.g. customer-relations, alliances, partnerships, etc.). Such activities support rich information inflows that allow organizations to obtain knowledge from varied

sources. Acquisition capability also enhances the organization's intensity and speed of information accumulation through which knowledge stocks are built (Kim, 1997). It also enhances "active listening" (Liao et al., 2003, p, 67) that enables an organization to communicate and acquire knowledge from a variety of sources (Fosfuri & Tribo, 2008). Once the information is perceived as valuable, it is distributed within the organization to create new knowledge.

Assimilation

Assimilation represents an organization's ability to absorb and interpret newly acquired knowledge (Zahra & George, 2002). Scholarly research on organizational learning suggests that acquiring new information does not ensure successful knowledge application (McGrath, 2001). External information can differ significantly from the existing knowledge of the organization. Therefore, organizations must assimilate the new information resulting in integration with the existing knowledge. The is, assimilation enables organizations to understand the new information, determine whether new information fits with existing knowledge, and make alterations in existing knowledge to assimilate the new information (Lefkowitz & lesser, 1988).

Assimilation not only helps organizations to identify valuable information, but it also enables organizations to leverage the knowledge that has been generated through information scanning. As Cohen and Levinthal (1990) note, an organization's capability to acquire and value new information does not guarantee its exploitation. Therefore, organizations should have a mechanism in place that can transform and exploit the knowledge for profit generation.

Transformation

Transformation is considered an organizational capability that combines existing knowledge with the newly assimilated knowledge to arrive at a new schema, or set of knowledge (McGrath & MacMillan, 2000). When new information is significantly different from the

existing schemas, existing cognitive structures are transformed to fit the new information

(Todorova and Durisin (2007). These changes in cognitive structures lead to the generation of

new knowledge. Transformation enables the organization to recognize opportunities and provide

new insights for their competitive landscape. In addition, this capability enables the organization

to retain knowledge over time (Garud & Nayyar, 1994; Lane et al., 2006).

Exploitation

Exploitation represents the incorporation of new knowledge into an organization's

existing operations (Zahra & George, 2002). The newly generated knowledge is used to change

or refine the organization's existing value-creating capabilities (March, 1991). The result of

exploitation is new products, services, processes, or new organizational forms (Spender, 1996).

Since organizations acquire new information continually, an established exploitation routine

keeps the knowledge "alive" due to its persistent application (Marsh & Stock, 2006). The

capability to apply knowledge also helps in knowledge retention, because new knowledge may

remain dormant for several years before it is put to commercial use (Rothaermel and Deeds,

2004). Persistent exploitation of new knowledge has been found to provide the basis for

sustainable competitive advantage (Fosfuri & Tribo, 2008).

Antecedents of Absorptive Capacity

Absorptive capacity has been shown to be positively associated with organizational

outcomes such as innovation, new product development, and performance (Volberda et al.,

2010). Therefore, organizations invest in developing their absorptive capacity as well as factors

that influence this development process. To assess the adequate level of organizational

investment needed to develop absorptive capacity, an insight into relevant antecedents is vital

(Rezaei-Zadeh & Darwish, 2016). Despite extensive research on the antecedents of absorptive

capacity, the knowledge pool is not very coherent (Volberda et al., 2010). However, Volberda et al. (2010) note that the literature on the antecedents of absorptive capacity can be categorized into three major groups: inter-organizational antecedents, intra-organizational antecedents, and managerial antecedents.

Inter-Organizational Antecedents

Prior related knowledge is an antecedents of absorptive capacity that is well-researched in the literature. The premise is that the prior related knowledge facilitates the absorption, assimilation, and generation of new knowledge from the external environment (Cohen & Levinthal, 1990; Puranam, Singh, & Chaudhuri, 2009). At the interorganizational level, Lane and Lubatkin (1998) found that similarity in compensation practices, structures, and problem sets positively affects the absorptive capacity. *Network position* is also theorized as a determinant of absorptive capacity. Attributes of network position such as connectedness and social embeddedness have also been shown to be as antecedents of absorptive capacity. For example, Jansen et al., (2005) found that connectedness within the network positively affects the absorptive capacity. Similarly, socialization tactics positively influence the transformation and exploitation components of the absorptive capacity.

Intra-Organizational Antecedents

Organizational structure and its attributes have been posited to be the antecedents of absorptive capacity. For example, Kogut and Zander (1992) note that organizational structure helps build the knowledge base of the organization. In addition, the organizational structure determines the process of knowledge generation and knowledge utilization. For example, Van den Bosch et al., (1999) suggest that a *matrix* structure significantly influences absorptive capacity because it enhances the scope and flexibility of knowledge absorption by the

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organization, whereas, a *divisional* or *functional* structure has a moderate to negative influence on absorptive capacity due to the low scope and flexibility of knowledge absorption. Attributes of organizational structure, such as *formalization*, *routinization*, and *channels of communication*, have also been identified as antecedents of absorptive capacity (Jansen et al., 2005; Volberda et al., 2010). Jansen et al., (2005) found that formalization positively influences the transformation and exploitation components of absorptive capacity, while routinization negatively affects the acquisition, assimilation, transformation, and exploitation components of absorptive capacity. Similarly, attributes of an informal organizational structure such as *cross-functional interfaces*, *inter-departmental participation*, and *job rotation* have been shown to influence acquisition and assimilation components of absorptive capacity (Jansen et al., 2005).

Managerial Antecedents

Managers influence the development of absorptive capacity by identifying the value of external knowledge in the context of the organization. Managers are 'cognizers' (Calori, Johnson, & Sarnin, 1994, p. 437) who develop mental maps to perceive the external environment. Therefore, *managerial cognition* helps focus the process of acquiring and assimilating the new knowledge from the external environment (Zahra & George, 2002; Volberda et al., 2010). In addition, it enables managers to employ the new knowledge in business processes (Augier & Teece, 2009). Over time, managers develop a *dominant logic* that guides the overall value creation process, including the development of various organization-specific capabilities such as absorptive capacity (Eggers & Kaplan, 2009; Volberda et al., 2010; Rezaei-Zadeh & Darwish, 2016). Researchers have also found that the *leadership style* of managers has a differential impact on absorptive capacity (Flatten, Adams, & Brettel, 2015). For example, transformational leadership has been found to promote exploratory learning, while transactional

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leadership has been found to influence exploitative learning in the organization (Sun & Anderson, 2012). Finally, *dynamic managerial capabilities* have been shown to influence absorptive capacity (Adner & Helfat, 2003). Such capabilities enable managers to build and refine the knowledge base of the organization. Some of the dynamic managerial capabilities discussed are boundary-spanning roles, distribution of expertise, cross-functional interfaces, participation in decision-making, and job rotation (Jansen et al., 2005; Volberda et al., 2010).

All three types of antecedents (inter-organizational, intra-organizational, and managerial) play important role in influencing the absorptive capacity. However, as discussed in Chapter 1, managerial antecedents not only influence absorptive capacity directly but they also influence other organizational, interorganizational, and individual level antecedents of absorptive capacity. Therefore, managerial antecedents have both direct and indirect influence on absorptive capacity, making them critical in absorptive capacity investigations. Similarly, as discussed in Chapter 1, among the managerial antecedents, strategic thinking is the most important antecedent of absorptive capacity because it serves as the 'brain' of the organization (Prahalad & Hamel, 1994, p. 6). It activates and maintains various higher and lower-order organizational processes and capabilities within the periphery of the dominant logic.

Strategic Thinking as a Relevant Managerial Antecedent of Absorptive Capacity for this Study

Since the present study is investigating the construct of absorptive capacity in the context of organizational adaptation, it is imperative to select an antecedent that most significantly involved in enabling the organizational adaptation process. Although all three types of antecedents (noted above) investigated are important, they do not clearly help explain the role of absorptive capacity in the organizational adaptation process. Strategic thinking, on the other hand, is considered as a capability that makes managers more cognizant of the environment and

allows them to deploy appropriate resources and capabilities to implement changes (Collis, 1994). Thus, strategic thinking can be considered as the capability that enables managers to maintain other organizational processes and capabilities that are central to organizational adaptation. Scholarly investigations on the role of strategic thinking in organizational activities also suggest that strategic thinking is a capability needed to initiate and establish a pathway for organizational adaptation. It is a capability that enables the organization to adapt to change (Liedtka, 1998). Given the role of absorptive capacity in organizational adaptation and the ability of strategic thinking to enable organizational adaptation, it is prudent to investigate the relationship between strategic thinking and absorptive capacity.

Yet, as discussed in Chapter 1, no prima facie evidence was found of research studies that positioned strategic thinking as an antecedent of absorptive capacity. Deeper drill-downs into the three types of antecedents investigated by scholars (presented in the paragraphs above) also did not unearth exploratory or confirmatory research, which has investigated the relationship between strategic thinking and absorptive capacity. Hence, scholarly investigations into the relationship between strategic thinking and absorptive capacity are needed to provide a better understanding of organizational adaptation process and the organizational performance.

The next section of this chapter provides a detailed literature review of strategic thinking in terms of its conceptualization, definitions, and dimensions. The section ends with the discussion of three dimensions of strategic thinking that will be used to operationalize the construct in this study.

Strategic Thinking

The complexity and dynamism in today's business environment requires organizations to develop and renew strategies that can improve their value creating processes and routines

(Johnson, Melin, & Whittington, 2003). The need for continuous improvement in an organization's strategic planning has also increased the need for strategic thinking at the managerial level (Wilson, 1994). The thought process that goes into strategic planning lays the foundation for the organization's future competitive positioning. Individuals, who direct an institution, whether it is a public or private, are expected to possess thinking capabilities in addition to other professional skills and qualities. Thus, what and how top management thinks is ultimately reflected in an organization's competitive position in the market (Altier, 1991). For example, in year 1976 Ken Olsen, the founder of Digital Equipment Corporation, thought that there was no need for individuals to have a personal computer (Altier, 1991). In the same year, Apple Computer was founded, creating a completely new industry of personal computers. In the 1970s, US consumer durable manufacturers viewed the color television industry to be mature and did not invest heavily in R&D. As a result, US manufacturers soon lagged behind their industry rivals from Korea, Japan, and China (Altier, 1991). The most common manifestation of strategic thinking can be found in strategic decisions, and these decisions are what make an organization win or lose in the marketplace. Therefore, strategic thinking is a prerequisite for good decision-making and desirable organizational outcomes.

Researchers agree that strategic thinking helps managers achieve desired outcomes. For example, Tregoe and Zimmerman (1980) linked the clarity of strategic thinking with corporate survival. Porter (1980) emphasized the role of strategic thinking in effective strategic planning. Zabriskie and Huellmantel (1991) suggested the importance of managerial capabilities that constitute strategic thinking. Hanford (1995) linked strategic thinking with opportunity recognition and long-term goals. Liedtka (1998) argued that organizations with strategic thinking capabilities renew their processes faster than the competition and achieve greater efficiency.

Graetz (2002) suggested that strategic thinking enables organizations to "seek innovation and imagine new and very different futures that may lead a company to redefine its core strategies and even its industry" (p. 457). Abraham (2005) posits that strategic thinking helps managers to compete in different ways and provide unique customer value. It is evident that research on strategic thinking supports its role in organizational change through several different processes. In summary, the stream of research provides strong evidence that supports the role of strategic thinking in organizational adaptation processes.

Conceptual Development and Definition of Strategic Thinking

The concept of strategic thinking has evolved in the literature as a refinement of scholarly understanding of the term 'strategy' (Goldman, Scott, and Follman, 2015). The concept of strategy is thought to have originated during the medieval warfare in the 5th century where generals strategized to win by competitively positioning themselves. The concept was applied to enterprises in the post-industrialization era where the organizational strategy became a means to compete and secure a competitive position in the market (Chandler, 1962). The quest to delve deeper into the overall process and framework of strategy evolved into the concept of "strategic planning" (Porter, 1998; Mintzberg, 1978; Mintzberg, 1994). More recently, changes in the competitive landscape driven by globalization and emerging technologies has shifted the focus towards *strategic thinking* "as a root from which strategy develops" (Goldman et al., 2015 p. 156). Although the literature reflects consensus on the role of strategic thinking in strategy development and business performance, its conceptualization, definition, and empirical verification is sparse and fragmented.

There is some debate on the conceptualization and definition of strategic thinking. The construct has been conceptualized and defined in several ways. The initial conceptualization of

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strategic thinking was broad, and the construct lacked definitional consenus. For example, Nasi (1991) explained strategic thinking as an overarching phenomenon that encompasses leadership, control, strategic planning, and strategic analysis. He suggested that anything that is labeled as 'strategic' should be categorized under strategic thinking. Mintzberg (1994) argued that such broad conceptualizations do not provide theoretical relevance and cannot be translated into actual business practices. He specifically differentiated between strategic planning and strategic thinking and posited that strategic thinking precedes strategic planning.

Struebing (1996) supported Mintzberg's position when he noted that organizations should focus on strategic thinking instead of strategic planning. He defined strategic thinking as "a dynamic process that continually reviews missions, strategies, and operations relative to customers' needs and market forces" (p. 22). In a similar vein, Heracleous (1998) conceptualized strategic thinking as a process of discovering new and unique strategies. Liedtka (1998) defined strategic thinking as "a particular way of thinking, with specific attributes." Graetz (2000, p. 457) suggested that strategic thinking is about "seeking innovation and imagining new and very different futures that may lead a company to redefine its core strategies and its industry." Bonn (2005) defined strategic thinking as "a way of solving strategic problems that combine a rational and convergent approach with creative and divergent thought process" (p. 337). Recently, Moon (2013) expanded on Bonn's (2005) definition and defined strategic thinking as "a way of solving strategic problems that combines a rational and convergent approach with a creative and divergent thought process to find alternative ways of competing and providing customer value" (p. 1699). The positions taken by these researchers and the trend in scholarly thinking on this issue is synthesized in the later section and a definition of the construct is offered.

Dimensions of Strategic Thinking

Several researchers have called for investigation on the dimensionality of strategic thinking construct (Liedtka, 1998; Graetz, 2002; Bonn, 2005). Early research on the construct (Rowe, Mason, and Dickel,1986) characterized the strategic thinking in terms of vision, creativity, flexibility, and entrepreneurship. Later, Thompson and Strickland (1996) suggested that strategic thinking is conceptual, visionary, and analytical. Heracleous (1998) suggested that strategic thinking is creative, synthetic, and divergent. Graetz (2002) claimed that innovative thinking is also an integral characteristic of strategic thinking. Casey and Goldman (2010) suggested that four major activities that occur during strategic thinking are scanning, questioning, conceptualizing, and testing.

Liedtka (1998) proposed a model of strategic thinking that includes five elements: a systems perspective, intent focused, thinking in time, hypothesis driven, and intelligently opportunistic. She argued that strategic thinking reflects an understanding of the system as a whole, which is comprised of not only the organization but also the external environment. Strategic thinking occurs when managers apply mental models to visualize the entire value creation process and the interconnectedness of its various parts. The intent-driven element focuses on the energy and attention that is required to achieve goals. Intelligent opportunism reflects the managerial capability of identifying alternative strategies that are appropriate for the dynamic environment. Thinking in time implies that strategic thinking allows managers to develop future strategies based on the past. Hypothesis-driven suggests that strategic thinking is a scientific process that allows managers to be both creative and analytical. These five elements make a strategic thinker a future-oriented individual who has the ability to connect various parts

of a system through creative thinking with intent to leverage emerging opportunities (Liedtka, 1998).

Bonn (2005) presented a model of strategic thinking with three elements: systems thinking, creativity, and vision. Systems thinking reflects a holistic understanding of the enterprise, an ability to identify interdependencies among problems and issues at different levels, and the ability to be more analytical when examining several components of the system. A strategic thinker views the organization as an integrated whole rather than an agglomeration of uncoupled components (Kaufman, 1991). For example, rather than focusing on fragmented day-to-day operational problems, strategic thinkers look for overall patterns that can provide a bigger picture of underlying issues. As Senge (1990) notes, "we must look beyond personalities and events. We must look into the underlying structures which shape individual actions and create the conditions where types of events become likely" (p. 43).

Creativity is about synthesizing novel solutions that are relevant to the organization. Creativity is essential for strategic thinking because it enables managers to think beyond existing conceptions and beliefs to connect events and issues that seem fragmented (Robinson et al., 1997). Strategic thinking involves challenging existing mental models through creativity. Senge (1990, p. 8) argued that mental models are "deeply ingrained assumptions" that shape an individual's view of the world. Although tacit in nature, such mental models restrict thought processes to known and familiar paths. Creative thinking challenges existing perceptions and beliefs and enables managers to reflect on their own behavioral patterns. It allows managers to be imaginative and think outside the box to explore alternative solutions.

Vision-oriented thinking provides a clear and articulated guide to provide customer value in a goal-directed fashion (Strange & Mumford, 2005). It focuses on the organizational purpose

that is the driving force of overall strategic thinking (Bonn, 2001). Vision-oriented thinking helps

managers in developing a common belief system, which is essential in maintaining the focus of

organizational activities towards a common goal (Collins, Porras, Duck, Pascale, & Athos,

1998). It also plays a pivotal role in a dynamic environment where uncertainty and incomplete

information affect the decision-making. In uncertain environments, vision-oriented thinking

provides clarity about values, priorities, and preferences (Weick, 1995).

Pisapia, Reyes-Guerra, and Coukos-Semmel (2005) described a model of strategic

thinking based on three capabilities: systems thinking, reflection, and reframing. Systems

thinking was defined by them as the "ability to see systems holistically by understanding the

properties, forces, patterns, and interrelationships that shape behaviors of the systems which

provides options for actions" (p. 48). Reframing was defined as "leader's ability to switch

attention between multiple perspectives, frames, mental models, and paradigms to generate new

insights and options for actions" (p. 52). Reflection was defined as the "ability to weave logical

and rational thinking, through the use of perceptions, experience, and information to make

judgments on what has happened, and the creation of intuitive principles that guide future

actions" (p. 56). However, they suggested that strategic thinking, in a broader sense, is the

interaction between these three thinking styles and the characteristics of the external

environment.   A summary of key elements of strategic thinking as suggested in previous

literature is provided in Table 1.

Table 1

Dimensions of Strategic Thinking

S. No.	Author	Elements of Strategic Thinking
1	Andrews (1980)	Analytical, Conceptual
2	Rowe et al., (1986)	Vision, Creativity, Entrepreneurship

3	Thompson & Strickland (1996)	Analytical, Conceptual, Visionary, Synthesizing Skills, Knowledge
4	Mintzberg (1994)	Intuition, Creativity
5	Heracleous (1998)	Creative, Synthetic, Divergent
6	Liedtka (1998)	System Perspective, Intent-Focus, Thinking on Time, Hypothesis-driven, Intelligent Opportunism
7	Graetz (2002)	Creative, synthetic, Divergent, Intuitive, Innovative
8	Bonn (2005)	Vision, Creative Thinking, Systems Thinking
9	Pisapia et al. (2005)	Systems Thinking, Reflection, Reframing

Synthesis of The Literature and a Proposed Definition and Dimensionality of Strategic Thinking

Although various operationalizations of strategic thinking discussed by researchers are noteworthy, Pisapia et al.'s (2005) dimensions of systems thinking, reframing, and reflection are broad and cover other operationalizations of strategic thinking found in the literature. For example, there is reasonable consensus in the literature on how it is defined- the holistic view of the organization. Liedtka (1998) also suggested that to have a systems perspective, managers should include both internal and external knowledge, and should be cognizant of interdependencies within the system.

Reframing represents a cognitive process that allows managers to collect and analyze rich information, then interpret its meaning with the help of different mental models (Pisapia et al., 2005). Reframing is a conscious effort by managers to switch between several mental models or perspectives. The ability to switch between multiple perspectives leads to new insights and solutions. In other words, reframing might be the process that makes an individual more creative and innovative. Therefore, reframing is a much broader skillset that subsumes other kinds of thinking styles such as creative thinking, divergent thinking, intuitive thinking, or innovative thinking mentioned in some of the alternative operationalizations of strategic thinking. For

example, creative thinking, divergent thinking, and innovative thinking exhibit the use of several concepts to come up with novel and unique ideas. In other words, these thinking styles challenge existing perspectives and mental models and explore outside the box (Bonn, 2001; De Bono, 1996). However, the ability required to think outside the box with multiple perspectives is reframing. Managers should be cognizant of multiple perspectives and have the ability to evaluate and use multiple perspectives at the same time. Bolman and Deal (1991) support this notion as they suggested that managers who are adept at reframing have more choices and are more likely to develop alternative and novel ideas for the organization. Similarly, the dimension, "hypotheses-driven thinking," suggested by Liedtka (1998) is analogous to reframing. As she explains that hypothesis generation and hypothesis testing is necessarily asking the questions of "what if" and "then," which requires information from various sources. It is evident that to be able to generate and test hypotheses managers need to reframe the situation and look for alternate options.

Reflection represents a cognitive process that allows managers to carefully analyze a situation or a problem by scrutinizing existing beliefs, perceptions, and experiences, and then use knowledge to solve the problem. Reflection in a broader sense is a more analytical process that helps managers in assessing various organizational situations and problems within the boundary of organizational beliefs and vision. Some strategic thinking dimensions, as mentioned in the literature, such as vision-oriented thinking, analytical thinking, or synthesizing skills require the ability to reflect on existing perceptions and experiences. For example, vision-oriented thinking is to focus on the set of existing beliefs, values, and policies that provide a clear and articulated guide for creating value (Strange & Mumford, 2005). In order to create value through vision, managers should have the ability to reflect on existing beliefs and values to analyze them against

current situations or organizational requirements. Dewey (1993) noted that a constant scrutiny of existing beliefs and values provides more valid and insightful judgments (Dewey, 1933). Similarly, analytical thinking also requires the ability to reflect on the situation or problem in hand based on existing perceptions, experiences, and knowledge. Analytical thinking is a logical approach to asses a situation. It requires gathering and analyzing information from various resources to draw conclusions. Therefore, the ability to reflect is a prerequisite for analytical thinking because reflection enables managers to carefully assess their own and others' views to gain critical insights about a situation.

Likewise, the dimension "intent focus," suggested by Liedtka (1998), is analogous to reflection. She explains that intentions provide the guidance and focus for organizational efforts, where intentions are shaped by managers' experience and managers' understanding and knowledge based on their experience. Reflection also represents the process of carefully analyzing a situation or a problem based on existing beliefs, perceptions, and experiences. Another dimension, "thinking in timing," explained by Liedtka (1998) represents the process of reflection. Liedtka (1998) explained thinking in timing as a constant comparison of past with present and future, which is very similar to reflection that is assessing a situation or a problem based on existing beliefs and perceptions. Based on the above synthesis, a comparison of various dimensions of strategic thinking is presented in Table 2.

Table 2

A Comparison of the Dimensions of Strategic Thinking

	Systems Thinking	Reframing	Reflection
Pisapia et al. (2005)	Systems Thinking	Reframing	Reflection
Bonn (2005)	Systems Thinking	Creative Thinking	Vision
Liedtka (1998)	Systems Perspective	Intelligent Opportunism, Hypotheses Driven	Intent Focus, Thinking in Time,
Andrews (1971)		Conceptual	Analytical
Rowe et al., (1986)		Creativity, Entrepreneurship	Vision
Mintzberg (1994)		Intuition, Creativity	
Thompson & Strickland (1996)		Conceptual	Visionary, Synthesizing Skills, Analytical,
Heracleous (1998)		Creative, Divergent	Synthetic
Graetz (2002)		Creative, Intuitive, Innovative, Divergent	Synthetic

This study operationalizes strategic thinking with three dimensions: systems thinking, reframing, and reflection. However, the definitions of these three dimensions have been modified to the context of the present study. The characteristics of each of these dimensions are explored in the following paragraphs, and definitions for each dimension are offered. It may be noted that the reason to refine the definitions of these dimensions arose during the scale development process. That is, while developing the scale of strategic thinking (details are provided in Chapter 3), Q-sort exercise was implemented to identify the appropriate items for dimensions and sub-dimensions of strategic thinking. A panel of two professors and four Ph.D. students was recruited to complete the Q-sort exercise. The first round of Q-sort exercise for the strategic thinking construct did not provide satisfactory results, as several items were cross-referenced across sub-

dimensions. Based on the results, it was apparent that the definitions of dimensions found in Pisapia et al. (1990) publication were too complicated to comprehend. In addition, panelists suggested that the definitions of dimensions and sub-dimensions should be altered to simplify them and make them more practitioner oriented. Accordingly, the definitions of the strategic thinking construct and its dimensions (systems thinking, reframing, and reflection) were modified.

Systems Thinking

Von Bertalanffy (1950), the pioneer of systems theory, defined systems as "a complex of interacting elements" (p. 143). He suggested that interactions among these elements are interrelated, therefore a system "behaves as a whole" (p. 146). The notion of systems thinking is based on the idea that the whole is greater than the sum of the parts. Systems thinking reflects a holistic understanding of the enterprise. The ability of systems thinking allows managers to identify interdependencies among problems and issues at different levels. To view a system holistically, managers must be cognizant of interaction among various elements within and outside the organization. Von Bertalanffy (1950) suggested that components of a system are interdependent and interact with each other at different levels. For a system to remain stable despite these complex interactions, it needs to be in a constant state of dynamic equilibrium. In addition, managers must understand and analyze the complex interactions and interrelationships among system elements to enable dynamic equilibrium and maintain the stability of the system. As a strategic thinker, the manager must treat the organization as an integrated whole rather than managing specific requirement of each component (Kaufman, 1991). Systems thinking allows managers to understand that various elements of an organization, including individuals, are connected and influence each other's activities through a feedback process (Senge, 1990). What

managers do (decision-making) at the managerial level influences various activities in the

organization. Similarly, managerial decision-making is influenced by how changes are occurring

in the external environment. By synthesizing the previous literature on systems and systems

thinking (Fontaine, 2008; Kaufman, 1991; Senge, 1990; Von Bertalanffy, 1950), this study

defines systems thinking as:

> The ability to view a system (an organization) holistically by recognizing the
> interdependencies within and across the system.

Reframing

Framing a situation involves collecting and organizing information and developing

knowledge about a situation. Over time, managers develop specific frames or perspectives to

assess different situations. These frames or perspectives are deeply ingrained mental models that

can limit the thinking process of mangers (Senge, 1990). Limited perspectives toward an issue

can obscure useful information. On the other hand, multiple frames, approaches, or perspectives

furnish rich information that helps to gain a complete understanding of the situation (Pisapia et

al., 2005). To reframe a situation, managers should be able to identify various perspectives and

be cognizant of the differences between these perspectives. Managers should understand that

differentiating between several perspectives is crucial to sort through and identify the most

relevant information about a situation. Such an approach leads to solutions that are more

appropriate (Bolman & Deal, 1991). Therefore, to think strategically, especially in a dynamic

environment, managers need a divergent thought process that allow them to reframe a situation

by examining it from multiple perspectives.

Reframing is essential for strategic thinking because it enables managers to think beyond

existing conceptions and beliefs and connect events and issues that seem fragmented (Robinson

et al., 1997). This type of divergent thinking challenges existing perceptions and beliefs and

enables strategic thinkers to reflect on their own behavioral patterns. It allows strategic thinkers to be imaginative and think outside the box to explore alternative solutions. Without such divergent thinking, it is difficult to make full use of the information and experience available to managers (De Bono, 1996). Reframing not only allows strategic thinkers (managers) to imagine and develop multiple viable ideas, but also helps them to value alternative and unconventional options that may develop organically or be offered by employees from all levels in the organization. By synthesizing the past literature on reframing (Blackler, 1993; Bolman & Deal, 1991; De Bono, 1996), this study defines reframing as:

> The ability to identify and differentiate between various approaches/perspectives and to be able to use several approaches/perspectives while assessing a problem.

Reflection

Reflection is an ability to carefully use one's own existing beliefs and values, as well as the beliefs and values of others to scrutinize, reevaluate, and understand a situation. Reflection is about using a rational approach to make sense of a situation. This is often done by examining the connections between experiences and the situation at hand. As Dewey explained, "reflective thinking requires the continual evaluations of beliefs, assumptions, and hypotheses against existing data and other plausible interpretations of the data" (1933, p. 6).

In summary, reflection allows managers to integrate and synthesize opposing opinions that lead to more rational judgments. Managers that reflect rely on perceptions as well as evidence to carefully assess a situation. Combining perceptions and evidence-based knowledge enables managers rationally evaluate past actions and devise relevant future actions. Based on the synthesis, this study defines reflection as:

> The ability to use one's own perceptions, experiences, and knowledge, and that of others, to understand organizational actions.

Given the core emphasis of its three dimensions i.e., the provision of a holistic view through systems thinking, the exercise of a rational approach through reflection, and the use of divergent thought processes through reframing, strategic thinking is now defined as:

> A managerial capability that integrates a holistic view with a rational approach, and a divergent thought process.

Hypotheses

Hypothesizing the Relationship between Absorptive Capacity and Strategic Thinking

The link between strategic thinking and absorptive capacity has been addressed tangentially in the literature. For example, Heracleous (1998) suggested that strategic thinking is a double-loop learning process that enables organizations to develop new and innovative solutions. Similarly, Liedtka (1998) suggested that strategic thinking allows managers to realign organization processes to achieve competitive advantage. Likewise, Boal and Hooijberg (2001) suggested that strategic leadership is required to create and maintain the absorptive capacity of the organization. The existing literature provides support for the relationship between strategic thinking and absorptive capacity. However, the support for the relationship is only conceptual and indirect.

The capability-based theory provides preliminary evidence for the relationship between strategic thinking and absorptive capacity. The hierarchical perspective of capability-based theory represents the organizational adaptation process in which organizations renew their resources, routines, and capabilities to enhance organizational performance. Strategic thinking and absorptive capacity have been discussed as organizational capabilities that play a critical role in the organizational adaptation process. Therefore, the capability-based theory of the firm is an appropriate lens to explicate the relationship between the two constructs of interest.

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Establishing the Relationship between Absorptive Capacity and Strategic Thinking through a Capability Lens

The capability-based theory advocates that organizational capabilities allow organizations to create and alter their value creation activities, and eventually, their performance. Organizations achieve sustainable competitive advantage through sustained and successful competitive positioning in the marketplace. Selection of a competitive position through a careful analysis of products/services in a target market, resulting in a "value proposition" that the customer is willing to pay for is central to both achieving competitive advantage (the outcome) and the creation of the organization's strategy (the process) to achieve that outcome. There are several different approaches that have been suggested by scholars to explain how an organization positions itself in the marketplace. For example, an organization can position itself as a differentiator and provide high-quality, unique products to a niche market. Therefore, the value proposition of such organization would be the quality of the product with a narrow market focus (Porter, 1980).

The decision to achieve a competitive position is driven by factors that are both internal and external to the organization. When viewed through the RBV lens (Resource Based View) or the capability lens, the decision on how to position the organization draws heavily on the resources and capabilities that are available to the organization. For example, cost control capabilities are required to achieve a low-price position, while an organization that needs good customer service in its position aspires for good customer-relationship management capabilities (Hooley, Greenley, Fahy, Cadogan, 2001).

In an effort to understand a firm's repertoire of capabilities, researchers have identified several types of organizational capabilities that are hierarchically linked (Collis, 1994; Winter 2003). Collis (1994) proposed a three-level categorization of organizational capabilities:

functional level value-creating capabilities, dynamic capabilities that serve to reconfigure the

value-adding capabilities, and metaphysical capabilities that guide the deployment and

reconfiguration of value creation process in the organization. Similar to Collis (1994), Winter

(2003) proposed the hierarchical relationship between organizational capabilities. He proposed

that ordinary (value-creating) capabilities utilize organization resources to generate output.

Dynamic capabilities make changes in ordinary capabilities based on changing market needs.

Meta-physical capabilities reside at the highest level and influence dynamic capabilities.

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┌─────────────────────────┐
│    Strategic Thinking    │
│     (A Metaphysical      │
│       Capability)        │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│    Absorptive Capacity   │
│   (Dynamic Capability)   │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│   Operations and Other   │
│       Value-Adding       │
│        Capabilities      │
│   (Ordinary Capability)  │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│          Value           │
│   Proposition/Market     │
│          Focus           │
│        (Strategy)        │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│       Competitive        │
│    Positioning in the    │
│          Market          │
└─────────────────────────┘
            │
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│        Performance       │
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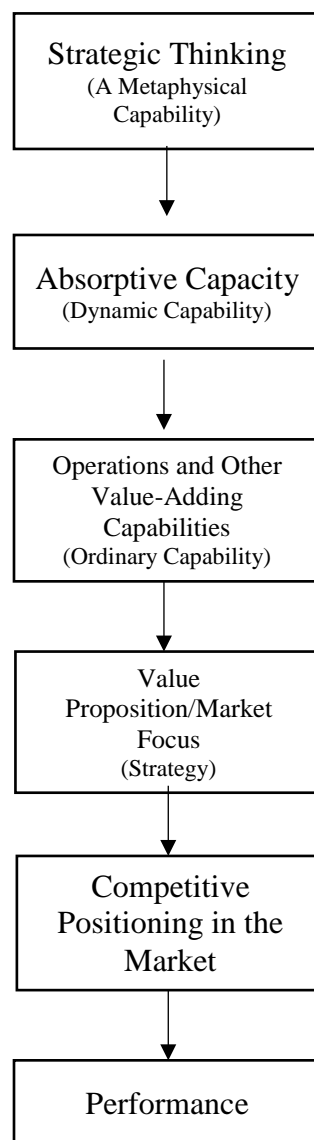
Figure 1. Positioning absorptive capacity and strategic thinking in the context of organizational
activity: a capability perspective.

A brief discussion of ordinary, dynamic, and metaphysical capabilities is provided below to explain how these capabilities influence the reconfiguration of organizational resources to achieve the desired competitive positioning and, consequently, the competitive advantage. A graphical representation of the organizational process through capability framework is represented in Figure 1.

Ordinary Capabilities

Ordinary capabilities are described as a combination of organization routines that are aligned in a specific manner to achieve commercial output (Winter, 2000). Ordinary capabilities, in that sense, help organizations deliver value to its customer, thus "representing the value-creating engine of the organization" (Daspit et al., 2016). Winter (2003) refers to ordinary capabilities as the capabilities governing "how we earn a living now." Ordinary capabilities realign organizational resources in ways that allow organizations to have the abilities to accomplish tasks (Teece, 2014). Therefore, ordinary capabilities involve the performance of administrative, operational, and governance-related functions that are necessary to accomplish tasks.

Ordinary capabilities have been shown to enable organizations to achieve their desired value proposition, market focus, and eventually their performance (Teece & Leih, 2016). For example, customer capability can be considered as an ordinary capability (Daspit et al., 2016). It allows managers to reconfigure their resources to change their output based on changing market demands (Kaplan & Norton, 2006). Ordinary or functional level capabilities provide the operational flexibility that ensures a timely and relevant response to market demand, which in turn contributes to sustaining an organization's reputation and competitive advantage (Liu et al., 2013). Amazon, the e-retailer giant, which is known for its on-time delivery, is an example of a

firm that offers superior customer service. Amazon follows a patented anticipatory shipping feature that allows it to predict customer's needs through order histories, and then stock the warehouses with relevant products in advance.

Dynamic Capabilities

In a dynamic environment, ordinary capabilities become less effective because of changing environmental conditions. This necessitates alteration to the organization's competitive position. That, in turn, necessitates changes to their ordinary capabilities to achieve the new competitive position in the marketplace. Dynamic capabilities (DC) enable the organization to make changes to its existing ordinary capabilities. Organizations, therefore, develop higher-order routines or dynamic capabilities that allow them to garner the required new information, assimilate the new information, transform it into new (codified) knowledge, and use that codified knowledge to adjust their ordinary capabilities so that they can achieve a new competitive position in the marketplace.

One such dynamic capability is absorptive capacity that enables organizations to acquire, assimilate, transform, and exploit the new information for commercial ends (Cohen & Levinthal, 1990; Zahra & George, 2002). Scholars have characterized absorptive capacity as the dynamic capability that allows the organization to shape and integrate ordinary capabilities, such that the organization's value-creating engine is constantly aligned with the dynamics of the competitive environment. Absorptive capacity enables the organization to integrate, build, and reconfigure internal and external resources to maintain leadership in continually shifting business environments. Absorptive capacity enables the organization to produce not just the best of a product type, but something that is unique and exceptional in the value provided to the buyer and the return generated for the stakeholders.

Absorptive capacity has been shown to have four dimensions, i.e., acquisition, assimilation, transformation, and exploitation, that work in conjugation create the dynamic capability. Based on these four dimensions, absorptive capacity enables organizations to acquire new information from the external environment, assimilate with the existing knowledge, transform to create new knowledge, and exploit the newly generated knowledge for commercial ends (Zahra & George, 2002). Likewise, dynamic capabilities allow organizations to sense, seize, and reconfigure ordinary capabilities to address the changing market demands (Teece et al., 1997). Therefore, from the capability-based perspective, absorptive capacity is a dynamic capability.

Metaphysical Capabilities

Most of the recent literature on organizational capabilities focused on dynamic capabilities and their role in changing the resource base (Schilke, 2014). In fast-changing and unpredictable environments, an organization's dynamic capabilities will themselves need to be updated. Therefore, organizations need capabilities at a metaphysical level to comprehend the need for such changes. One such metaphysical capability is strategic thinking, as it provides strategic insights for the value of organizational resources and capabilities (Collis, 1994). Strategic thinking is defined as the ability to think at the systems level, the ability to reframe situations, and the ability to reflect on situations.

Systems thinking enables managers to view the system as a whole. The holistic view allows managers to identify interdependencies and relationships among various components of a system, which in turn makes it easier to identify problems and issues at different levels. Reframing enables managers to challenge their existing perceptions and beliefs and helps them to think outside the box to explore alternative solutions. Reframing enhances the levels of

imagination, which help managers to develop multiple viable ideas. Reflection allows managers to make sense of a situation. Reflection helps managers in examining their perceptions against the data in hand, which leads to more viable and comprehensive judgments.

Strategic thinking via systems thinking, reframing, and reflection helps managers to develop capabilities or shift between capabilities in a dynamic environment. Barney (1986) notes that strategic thinking enables managers to recognize valuable resources and unique market positions ahead of the competition. Strategic thinking is both creative and analytical in nature. It not only allows managers to think beyond existing conceptions and beliefs but also helps managers to connect events and issues that seem fragmented (Robinson et al., 1997). Strategic thinking allows managers to analyze interconnections and interdependencies within the organization, and between the organization and its environment. This holistic perspective is required to establish an insight into the relationship between the organization and its environment. It makes managers more receptive to changes in the environment that, in turn, help managers in making informed decisions. Strategic thinking via a holistic view, reframing, and informed decision-making through reflection helps managers to redesign organization's resources and capabilities for a better alignment with the environment that enhances organizational effectiveness (Liedtka, 1998). Based on the research on strategic thinking, it can be argued that strategic thinking not only provides a clear insight into organization's product/market domain, but also provides an insight into what new or renewed capabilities will be required to achieve the desired domain.

The view through the capability lens adds credence to the argument that a relationship exists between strategic thinking and absorptive capacity. Building on the work by Collis (1994) and Winter (2003), this study proposes that strategic thinking is a critical meta-physical

capability that resides with managers in the organization and absorptive capacity is a dynamic

capability of organizations (Sun & Anderson, 2010; Todorova & Durisin, 2007; Zahra & George,

2002). Accepting that organizational capabilities exist in hierarchical order and contribute to the

organizational adaptation process, this study now posits that it is appropriate to conceptualize a

direct relationship between strategic thinking and absorptive capacity, with strategic thinking

representing a metaphysical capability and absorptive capacity representing a dynamic capability

of the organization.

As noted above, strategic thinking and absorptive capacity are instrumental in

organizational adaptation and are related to each other. However, _how_ these two capabilities

work together is not clear. One suggestion for how they may be related can be derived from the

stream of research on organizational capability, which characterizes capabilities as high-level

routines that are idiosyncratic to the organization. The idiosyncratic nature of capabilities and

their contribution to organization-specific goals suggest that strategic thinking and absorptive

capacity are also organization-specific and are uniquely developed and synchronized by a firm to

achieve "dynamic" competitive positioning in the marketplace. Supporting argument can be

found in the strategic choice perspective, which suggests that organizations attain specific

resources, technology, and structure to accomplish organizational goals (Child, 1972). If these

capabilities are organization-specific, there must be a unique relationship between them for every

organization.

Di Stefano, Peteraf, and Verona's (2014) drivetrain metaphor that was used to explain the

capability processes is an appropriate analogy to understand the relationship between strategic

thinking and absorptive capacity relationship. Dynamic capabilities can be seen as the

"freewheel" of a drivetrain (Di Stefano et al., 2014, p. 319) that is powered by the front gear, i.e.,

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strategic thinking. Thus, strategic thinking provides rules that create and deploy absorptive capacity to manage organizational adaptation. Therefore, the following hypothesis is offered:

Hypothesis 1: Strategic thinking is positively related to absorptive capacity.

The idiosyncratic nature of capabilities and their contribution to organization-specific goals suggest that strategic thinking and absorptive capacity are specifically developed by an organization to work synchronously to achieve its competitive positioning. Hence, by definition, the inter-relationship between these two constructs should be firm specific. The uniqueness of the relationship between absorptive capacity and strategic thinking, however, makes scholarly investigation of the relationship non-generalizable. That is, given our current understanding of the relationship between these two constructs, such scholarly investigations of sample firms cannot be used to develop parsimonious and generalizable research frameworks, nor can they be used to offer generalizable prescriptions to practitioners. One way to address this dilemma is to find a middle ground that compromises some level of generalizability to attain a reasonably parsimonious framework. An approach to achieve this objective is to seek out specific groups of combinations of the two constructs that are reasonably homogeneous within the group but are heterogeneous across the groups.

Using Prior Strategy Research to Explore How the Two Capabilities Work Together

Previous research has neither empirically established the relationship between strategic thinking and absorptive capacity nor categorized that relationship into groups. Identifying groups that are unique in terms of the alignment between absorptive capacity and strategic thinking will provide a parsimonious framework to study the complex relationships between different levels of capabilities. One of the approaches to group the relationships of organizations' internal processes is to develop typologies (Doty & Glick, 1994). In this study, we are interested in investigating a

typology of relationships between strategic thinking and absorptive capacity of organizations. Each group represents an ideal type, which is highly effective based on the consistency in the relationship across firms in the group. Scrutiny of the relationship between absorptive capacity and strategic thinking from a typological lens is prudent because it provides a framework to test the consistency in the relationship that is required to achieve organizational adaptation. Since strategic thinking and absorptive capacity both guide organizational adaptation and strategic decision-making, typologies provide a relevant framework to investigate the relationship between absorptive capacity and strategic thinking that is deemed to be firm specific based on current scholarly literature. Three business-level strategic typologies that have been comprehensively applied in strategic management research are Porter's generic strategies (1980), Mintzberg's typology (1988), and Miles and Snow's typology (1978).

Porter (1980) proposed that at the broadest level organizations could adopt three generic strategies to achieve competitive advantage. *Cost leadership* refers to achieving a position where products and services can be generated with minimum cost and hence can be sold at lower prices. Organizations that adopt a cost leadership strategy focus on cost minimization through scale efficiency and tight cost control in their operational processes (Segev, 1989). *Differentiation* refers to offering unique products and services that are distinct in terms of features, technology, design, image, service, and delivery. Organizations that adopt a differentiation strategy focus on developing procedures and techniques that enable them to provide unique value to the customer. *Focus* refers to identifying and targeting a specific niche market and serving it by either adopting cost leadership or differentiation. Organizations that adopt a *cost-focus* target niche market that demands specific products at lower prices.

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Organizations that adopt *differentiation-focus*, on the other hand, develop a unique image of their product or service that is desirable by a particular segment of the customers.

Mintzberg (1988) argued that Porter's typology was not exhaustive and in fact inappropriate in competitive environments. He proposed an alternative typology by subdividing Porter's differentiation strategy into differentiation by *quality*, *design*, *image*, *support*, and *undifferentiation*. Additionally, he replaced cost leadership strategy with differentiation by *price* and placed it with other differentiation strategies. Organizations that differentiate based on the *quality* provide highly reliable products at comparable prices. Organizations that differentiate based on the *design* focus on unique product features. Differentiating through *image* refers to creating a superior image of the product through promotions and advertisement. Differentiation by *support* refers to creating a cluster of supportive products and services that enhance customers' overall experience. Lastly, organizations that pursue an *undifferentiation* strategy copy other firms' strategy and do not have any unique differentiation.

Miles and Snow (1978) proposed a typology of four strategic types: *prospectors*, *defenders*, *analyzers*, and *reactors*. The underlying difference between these four strategic types is the difference in their strategic orientation and the difference in organizational adaptations employed to achieve their strategic orientation. *Prospectors* maintain a broad and developing product/market domain through new product and market development. *Prospectors* deal with a wide range of environmental conditions to identify and seize new opportunities. Their organizational structure is flexible with a low degree of formalization and routinization. *Defenders* maintain a stable domain by developing one or two core products that are cost efficient. The focus is carving a niche market and serving it efficiently. There is very little or no environmental scanning for new product/market opportunities. Organizational structure is

designed to increase efficiency through cost-control, tightly knit hierarchy, and centralized decision making. *Analyzers'* strategic orientation is somewhere between defenders and prospectors. *Analyzers* maintain stability in their core product/market domain but keep looking for new product/market opportunities. However, only viable new opportunities are pursued through imitation. Organizational structure is designed to maintain the hybrid domain through a combination of matrix and functional structure. *Reactors* do not have any specific product/market domain and , therefore, are inefficient in their response to the changing environment. The absence of a defined strategy, structure, and process leads to perceptual instability and poor performance in reactor organizations.

Both Porter (1980) and Mintzberg (1988) suggest that certain market positions can be achieved by pursuing specific strategies. These strategies are the prescription for competitive positioning. Various structures, processes, technologies, and mechanisms are prescribed to achieve the desired market position. Porter's (1980) and Mintzberg's (1988) generic strategies, therefore, are market focused. These strategies also imply that organizations can choose any market position and reconfigure their structure and process accordingly.

Contrary to Porter's and Mintzberg's typology, Miles and Snow (1978) rooted their typology in the internal processes of organizations. Organizations have established patterns of internal capabilities and processes. The consistency in these patterns enables organizations to maintain their product/market domain whereas inconsistency leads to failure. Thus, the choice of product/market domain is, in fact, an outcome of how the internal processes are aligned and how these internal processes govern adaptation process. Therefore, Miles and Snow's (1978) typology, specifically the underlying organizational adaptation process, offers the prospects of a richer and more appropriate contextualization for this study.

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Using Miles and Snow's Framework to Establish a Typology of Relationship between Absorptive Capacity and Strategic Thinking

Two factors make Miles and Snow's (1978) framework appropriate to study the relationship between strategic thinking and absorptive capacity. First, the organizational adaptation process described by Miles and Snow implicitly assumes that organizations utilize both strategic thinking and absorptive capacity to maintain the product/market domain. The detailed explication of Miles and Snow's adaptation process (provided in the next section) implies that strategic thinking enables the identification and commitment of relevant organizational capabilities. Second, the relationship between strategic thinking and absorptive capacity as implied in Miles and Snow's adaptation process finds equivalence in the hierarchical relationship between strategic thinking and absorptive capacity in the capability framework. This equivalency suggests that Miles and Snow implicitly indicated the role of organizational capabilities and their characterization of organizational adaptation.

Since Miles and Snow's typology suggests that organizations exhibit adaptation in different ways, it is logical to posit that the relationship between strategic thinking and absorptive capacity could also be classified in different ways. In other words, the relationship between strategic thinking and absorptive capacity will be different across the groups of the organization identified in Miles and Snow's typology. Miles and Snow's (1978) four strategic types are prospectors, defenders, analyzers, and reactors. Prospectors, defenders, and analyzers align themselves with the external environment by deploying unique configurations of their organizational resources and capabilities. Reactors do not have a consistent or stable pattern of resource and capability deployment and, therefore, are misaligned with the external environment.

Reactors do not follow a pattern of adaptation. Therefore, they are inconsistent and unstable in their strategy. Reactors' adaptive behavior provides an inappropriate response to

environmental changes,causing them to show a poor performance. It is a "residual strategy" that arises when firms do not follow a proper adaptation process that is optimum for their strategic orientation (Miles & Snow, 1978 p. 557). Due to the lack of a proper strategy, the knowledge-generating system is random and sporadic. Since reactors do not show consistency in their adaptation behavior, their efforts to generate organizational capabilities are also erratic. Either they do not develop any organizational capabilities, or even if they do so, these capabilities are most likely to be misaligned with the external environment (Laugen, Boer, & Acur, 2006). Due to an inefficient internal control mechanism, the decision-making of reactors is poor, which leads to poor organizational performance. Clearly, reactors do not have a consistent pattern to acquire relevant information and convert it into new knowledge. Because reactors do not follow a consistent pattern in their strategies, it is likely that strategic thinking efforts to develop absorptive capacity are also random and inconsistent in reactors. Therefore, reactors are omitted from the empirical analysis of this study.

The following sections discuss the Miles and Snow (1978) organizational adaptation process and its equivalency with the capability framework. In the discussion, interpretations are made to show that Miles & Snow's (1978) adaptation process incorporates strategic thinking and absorptive capacity as internal processes that enable organizational adaptation.

Adopting a strategic choice perspective, Miles and Snow (1978) proposed that organizations deploy two types of adaptation capabilities: entrepreneurial capability and engineering capability. In addition, they highlight an overarching administrative capability that manages two adaptation capabilities. The focus of the present study is the entrepreneurial capability that represents strategic thinking and absorptive capacity. A brief review of the three adaptation capabilities is presented next. A comparison between Miles and Snow's

entrepreneurial capability with the capability framework has also been made in the following section.

Entrepreneurial Capability

Miles and Snow envisioned entrepreneurial capability to be reflected in two specific organizational processes - the process of developing strategic insight about the business' core domain and the process of making choices regarding the commitment of resources in achieving that business domain. (1978). Developing strategic insight about the organization's domain is crucial in understanding whether organizational objectives and goals are achievable or not. Strategic insight into the core domain of the organization, however, needs to be renewed when organizations face turbulent and uncertain environments. In dynamic environments, the strategic insight needs to be widened to understand the changing interrelationship between organization's objectives and the external environment. Miles and Snow implicitly characterized strategic thinking as the process that must be executed to attain strategic insight about an organization's core domain. Strategic thinking literature also supports the notion that strategic thinking may be the underlying process that leads to strategic insight (Pang & Pisapia, 2012; Yorks & Nicolaides, 2012).

Strategic thinking allows managers to identify resources and capabilities required to achieve the organizational goals. Once the resource and capability configurations are identified, they can be committed towards specific operational and other value-generating processes. Similarly, Miles & Snow (1978) viewed the resource commitment decision as an outcome of the process (capability) that first identifies relevant resources and then commit them towards an organizational goal. In this process, either existing resources are modified or new resources are generated. Absorptive capacity is the capability that enables organizations to modify and

generate relevant resources. Miles & Snow (1978) implicitly recognized that organizations must have the necessary absorptive capacity to sense and seize the new knowledge and to apply that new knowledge to transform the organization's resource commitments. Taken together, these arguments suggest that Miles & Snow's theoretical development assumed strategic thinking and absorptive capacity to be closely linked and that they must complement each other to provide the foundation of what they called the entrepreneurial capability of the organization.

The process of developing strategic insight through strategic thinking, as described by Miles and Snow (1978), is similar to what Collis (1994) characterized as a higher-order capability. According to Collis (1994), higher-order, metaphysical capabilities result in ". . . strategic insights that enable organizations to recognize the intrinsic value of other resources" (p. 145). Similar to Miles & Snow (1978), Collis assumed that these metaphysical capabilities enable managers to think strategically, thereby developing strategic insights. Likewise, the absorptive capacity, which is characterized as the process of resource commitment by Miles and Snow (1978) is described as a dynamic capability in the capability framework. Thus, Miles & Snow's (1978) organizational adaptation process and capability framework are similar. Both suggest that strategic thinking leads to resource recognition and resource commitment. Therefore, interpretation of Miles and Snow's (1978) organizational process and capabilities' hierarchical framework in terms of strategic thinking and absorptive capacity suggest that they are parallel representations. A graphical representation of the comparison between Miles & Snow's entrepreneurial capability and capability framework is presented in Figure 2.

Engineering Capability

Engineering capability is the organizational capability that employs the resources identified through the entrepreneurial capability of the organization. That is, once management uses its entrepreneurial capabilities (i.e. strategic thinking capabilities and absorptive capacity) to

zero in on the required resources and capabilities, operational processes that convert the input into output are activated. Thus, the engineering capability in Miles & Snow's (1978) adaptation process represents operations and other value generating activities that enable the firm to achieve its desired competitive position in the marketplace.

Administrative Capability

The administrative capability manages entrepreneurial and engineering capability through rationalization and articulation (Miles and Snow, 1978). Rationalization looks over current activities by maintaining steady operations. Rationalization helps organizations to maintain their current domain of product and target market. Whereas, articulation capability guides organizations to identify innovative paths for future products and markets.

Organizational Adaptation Process   Organizational Adaptation Processes

Using the Miles & Snow Lens   Using the Capability Lens
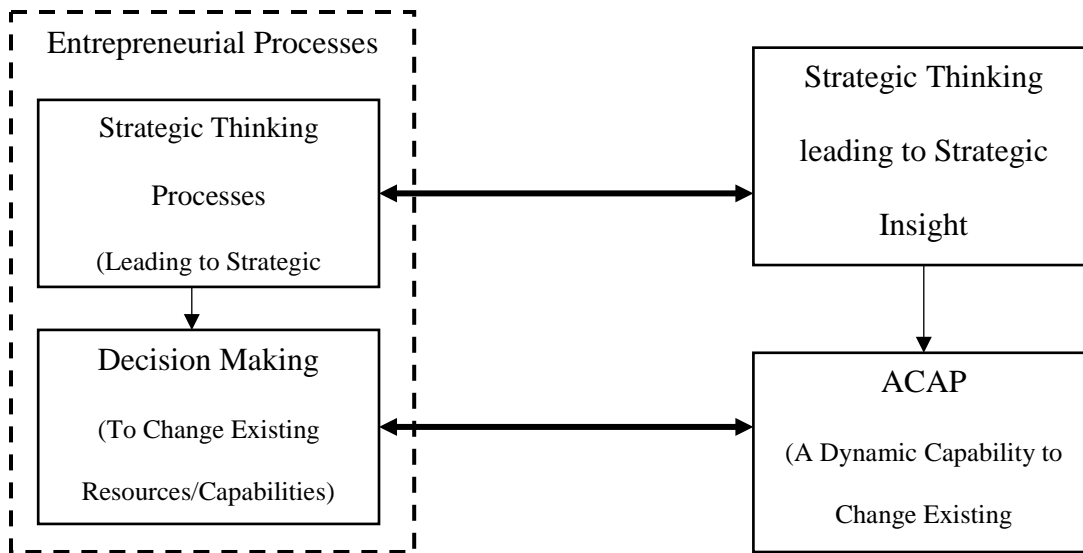
Figure 2. Positioning absorptive capacity (ACAP) and strategic thinking in the context of capability theory vs. miles & snow framework: a comparison.

As discussed in preceding sections, strategic thinking represents one of the meta-physical capabilities and absorptive capacity is a dynamic capability. The relationship between the two constructs can now be further explored with the help of Miles and Snow's (1978) typology.

It is evident that the relationship between strategic thinking and absorptive capacity is sequential. Both the capability framework and Miles & Snow's (1978) adaptive process suggest that strategic thinking and absorptive capacity are idiosyncratic to the organization and that strategic thinking precedes absorptive capacity. It is also suggested that both are uniquely aligned in the adaptation process and deliver organizational specific outcomes. These adaptation processes are complex, but the pattern can be understood if viewed through the lens of Miles and Snow's (1978) typology. All organizations go through the adaptive process. However, the patterns of adaptive behavior used by organizations differ and are dependent on the group to which they belong (Miles & Snow, 1978).

As discussed in the above section, the relationship between strategic thinking and absorptive capacity is heterogeneous at the intergroup level. Heterogeneity results from the unique pattern of relationships between strategic thinking and the four dimensions of absorptive capacity. Because of the difference in the strategic orientation of the three types of firms identified in Miles and Snow's typology, and because they undergo a different organizational adaptation process, the relationship between strategic thinking and the four dimensions of absorptive capacity will vary within each group. The following section will explore the relationship between strategic thinking and the four dimensions of absorptive capacity within each type of firm identified in Miles and Snow's typology.

Exploring the Relationship between Strategic Thinking and Absorptive Capacity Dimensions within Each Group of Firms Identified in Miles and Snow's Typology

Prospectors

Prospectors focus on entrepreneurial activities and believe in becoming the first mover in their respective strategic domain. They emphasize innovation through new product or service development and concentrate on offering novel solutions to customers' problems. They constantly look for new opportunities and exploit them in a quest for competitive economic rents (Boyne & Walker, 2010; Slater, Hult, & Olson, 2010). Since prospector organizations constantly search for novel methods for creating value, they typically perceive more dynamism and uncertainty in the environment.

Based on prospectors' strategic orientation, the strategic thinking is expected to show a unique pattern of relationships with the components of absorptive capacity. Prospectors' strategic thinking is "opportunity-focused, innovative, and self-renewing" (Ireland, Covin, and Kuratko, 2009, p. 26). Strategic thinking exemplifies the future orientation of the firm. Identifying the relationship between organization and environment makes them more cognizant of future opportunities (Fontaine, 2008). Since prospectors constantly seek new opportunities that are different from their current domain (Lumpkin & Dess, 1996; Venkatraman, 1989), their efforts will be directed to acquire information on all possible factors in the external environment. The strategic thinking of managers in prospector type organizations necessitates the requirement of high levels of information from the external environment. Hence, they tend to scan a broad range of environmental components and events to identify potential opportunities (Wang, 2008). A better grasp of the interdependencies between the organization and the environment enables managers to identify relevant information in the external environment. In addition, the focus of the strategic thinking allows managers to acknowledge the value of new information. Therefore,

it is likely that the strategic thinking efforts of prospectors would support developing and sustaining acquisition capability.

However, it is likely that, due to information overload, managers in prospector organizations may not be able to efficiently assimilate all the new information that they acquire through acquisition (Edmunds & Morris, 2000). In addition, due to the constant influx of new information, prospectors may not be able to reevaluate the existing knowledge in comparison to the new information and transform it into new knowledge. Additionally, since the strategic thinking of prospectors is to look for new opportunities and continue to develop new product-market domains, they may find it difficult to exploit all the acquired knowledge. In other words, in their quest for new opportunities, prospectors may devote less of their strategic thinking efforts to support the development and sustenance of exploitation capabilities.

Defenders

Defenders yearn for stability in their existing product-market domain and consistency and efficiency in their structure, process, and technology (Miles & Snow, 1978; Slater & Narver, 1993; Troilo, De Luca, & Atuahene-Gima, 2014). Defenders tend to focus on specific markets with their limited offerings and defend their territory vigorously. Limited focus on product-market domain makes the adaptation more predictable. Additionally, the focus on process improvements has been found to enable defenders to address predictable changes more efficiently (Wang, 2008).

Because of their strategic orientation that focuses on a limited product-market domain, the strategic thinking of defenders is expected to show a unique pattern in its relationship with the components of absorptive capacity. Defenders have been found to pay less attention to strategic options that fall beyond their domain of operation (Miles and Snow, 1978). The

emphasis is on efficiency and cost-control rather than exploration and experimentation (Desarbo, Di Benedetto, Song, & Sinha, 2005; Thomas & Ramaswamy, 1994). Defenders are aggressive in their existing markets with limited product offerings. This limited focus allows them to be more efficient in what they do (Laugen et al., 2006, Slater et al., 2010). Therefore, it is highly likely that the strategic thinking of defenders will focus on developing exploitation capabilities that allow efficient uses of existing exploitation capabilities.

Although the strategic thinking of defenders is to focus on the existing product-market domain and exploit it, the demand for new information still exists. Defenders tend to be aggressive in securing their 'turf' by keeping a close eye on competitors and any new entrants (Miles and Snow, 1978, p. 550). Since the strategic orientation of defenders is to consolidate and protect their position in their existing markets, their information acquisition capability is limited to the current product-market domain. Additionally, since defenders do not intend to develop new or unique offerings, the information scanning effort for new opportunities is also limited (Miles & Snow, 1978).

The strategic orientation of defenders demands high assimilation capabilities, and may well be more than their acquisition capability. For example, because defenders are aggressive in serving their existing markets with limited products, they require a constant reevaluation and scrutiny of their existing system. A constant reflection of the existing system, past actions, successes, and failures is important to better understand the cause-effect relationship, which in turn contributes in enhancing the efficiency of the organization. Defenders strive to assimilate the information that they collect to compete in their existing markets. Wang (2008) notes that defenders engage in adaptive learning (refinement in existing knowledge) to make incremental changes in their product-market domain. Clearly, defenders constantly assimilate the information

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from their competitors to defend their product-market domain (Miles and Snow, 1978).

Therefore, they are expected to focus a significant portion of their strategic thinking capabilities

on the development of assimilation capabilities.

Since the strategic orientation of defenders is to defend and exploit existing markets, it is

crucial to use the relevant information from the external environment to devise new competitive

strategies. Defenders constantly make sense of information from the external environment and

use it to configure their processes in order to retain their competitive position. For example,

Miles and Snow (1978) suggested that defenders keep a close track of competitors pricing and

changes in product quality and use that information to take economic actions. Therefore,

defenders are also expected to focus their strategic thinking capabilities on the development of

transformation capabilities.

Analyzers

Miles and Snow (1978) posit that analyzers will exhibit characteristics of both

Prospectors and Defenders. Analyzers simultaneously pursue new products and market

opportunities with an attempt to maintain core product-market domain that can provide overall

stability to the organization. Similar to Defenders, analyzers keep a stable customer base and set

of products for stable revenue generation. Along with maintaining a stable product-market

domain, analyzers keep looking for prospective opportunities, which reflects prospectors'

strategic orientation. However, analyzers prefer a "second-but-better strategy" (Desarbo et al.,

2005). In other words, Analyzers approach new products and market segments, but through

imitation. Their strategy is to "play it safe" and adopt a "follower" approach into new product or

market created by other firms. The key is to respond quickly and imitate successful firms (Miles

and Snow, 1978).

Strategic thinking of analyzers is ambidextrous in a sense that they envision an organization that is stable enough to generate a consistent revenue stream and at the same time are alert toward the development of new product and market domains. However, since the primary focus of analyzers is to maintain a stable product-market domain, it is likely that analyzers will focus their strategic thinking on developing capabilities that reflect an orientation very similar to defenders. The knowledge and resource development of analyzers depends on the spillover of knowledge from innovator firms (Mansfield, Schwartz, & Wagner, 1981). Analyzers therefore establish a knowledge-generating system that specifically monitors leading organizations in the industry and absorbs unique and limited information from the environment. Therefore, the focus of the strategic thinking of analyzers is likely to establish a limited but focused acquisition capability.

Since the primary strategic orientation of analyzers is to maintain stability in their existing product-market domain, they constantly analyze and scrutinize their existing system. A constant evaluation of new and existing information is required to understand the cause-effect relationships, which in turn contributes to maintaining that stability in existing systems. Analyzers constantly assimilate whatever information they have to understand their existing markets. In addition, they use the new information to assess future opportunities. Therefore, analyzers are expected to focus their strategic thinking capabilities on the development of assimilation capabilities.

Since the strategic orientation of analyzers is to exploit their existing markets and simultaneously look for new opportunities, the transformation of acquired information into new knowledge is imperative. It is important to use the relevant information from the external environment for new competitive strategies as well as to search for new opportunities. Without

new knowledge, analyzers may not be able to retain their competitive position or identify whether prospective opportunities are vital for the organization. Therefore, analyzers are expected to also focus their strategic thinking capabilities on the development of transformation capabilities.

Finally, since the primary focus of analyzers is to defend and exploit existing markets (similar to defenders), it is highly likely that the strategic thinking of analyzers will focus on developing exploitation capabilities that allow more efficient uses of existing exploitation capabilities.

To summarize, the unique pattern of the relationship between strategic thinking and dimensions of absorptive capacity for each type of firm identified in Miles and Snow's typology is presented in Table 3.

Table 3

Expected Emphasis of Strategic Thinking on Absorptive Capacity Dimensions by Three Types of Organizations Identified In Miles and Snow Typology

	Acquisition	Assimilation	Transformation	Exploitation
Prospector	Strong	Medium	Weak	Weak
Defender	Weak	Medium	Medium	Strong
Analyzer	Medium	Medium	Medium	Strong

Hypothesizing the Differences among Firm Types in Terms of the Relationship between Strategic Thinking and Dimensions of Absorptive Capacity

Based on the summary presented in Table 3, this study explores the differences in the relationship between strategic thinking and dimensions of absorptive capacity across the type of firms identified in the typology. It is evident from the summary that defenders and analyzers are similar in terms of the relationship between strategic thinking and the four components of

absorptive capacity. Miles and Snow (1978) also suggested that most of the revenue of analyzers comes from a steady set of product-market domain. Therefore, analyzers keep a tight control on their operations and their efficiency, which is a defender characteristic. Therefore, the following hypotheses are developed to test the differences between prospectors and other type of firms (i.e., defenders and analyzers).

Prospectors focus on entrepreneurial activities and constantly look for new opportunities and exploit them in a quest for competitive economic rents (Boyne & Walker, 2010; Slater et al., 2010). Since prospector organizations constantly search for novel methods for creating value, they tend to scan a broad range of environmental components and events to identify potential opportunities. However due to over-emphasis on acquiring new and broad information, as explained in the previous section, prospectors tend to devote less of their strategic thinking in building assimilation, transformation, and exploitation capability.

Contrary to prospectors, defenders and analyzers exploit their existing product-market domain to generate a steady stream of economic rents. Both defenders and analyzers establish an efficient knowledge generation mechanism that contributes in enhancing the efficiency of the organization. Defenders constantly assimilate the information from their competitors and new entrants to defend their product-market domain. Whereas analyzers, along with assimilating the information from their competitors, collect and assimilate information from prospectors and innovators to identify new opportunities. Similarly, defenders and analyzers focus their strategic thinking on developing transformation capability because they continuously use the new information to develop competitive strategies. Finally, since the primary focus of both defenders and analyzers is to exploit their existing product-market domain, they focus their strategic thinking capabilities on the development of exploitation capabilities.

The arguments presented above suggest that the relationship between strategic thinking and four dimensions of absorptive capacity (i.e., acquisition, assimilation, transformation, and exploitation) for prospectors will differ from other type of firms. Therefore, I hypothesize that,

Hypothesis 2a: *The relationship between strategic thinking and the acquisition dimension of absorptive capacity is stronger for prospectors than other types of firms.*

Hypothesis 2b: *The relationship between strategic thinking and the assimilation dimension of absorptive capacity is weaker for prospectors than other types of firms.*

Hypothesis 2c: *The relationship between strategic thinking and the transformation dimension of absorptive capacity is weaker for prospectors than other types of firms.*

Hypothesis 2d: *The relationship between strategic thinking and the exploitation dimension of absorptive capacity is weaker for prospectors than other types of firms.*

Research Question 2 states, "are there any specific groups present that are homogeneous within but are heterogeneous from each other in terms of the relationship between absorptive capacity and strategic thinking?" Exploration of the relationships between strategic thinking and dimensions of absorptive capacity, in the previous section, suggests that at least two such identifiable patterns exist that can be differentiated based on their unique alignment of strategic thinking and absorptive capacity. Therfore, I hypothesize that the relationship between strategic thinking and absorptive capacity also exists in two different patterns.

Hypothesis 3: *The relationship between strategic thinking and absorptive capacity for prospectors is different from other types of firms.*

A pictorial representation of all hypotheses is presented in Figure 3.
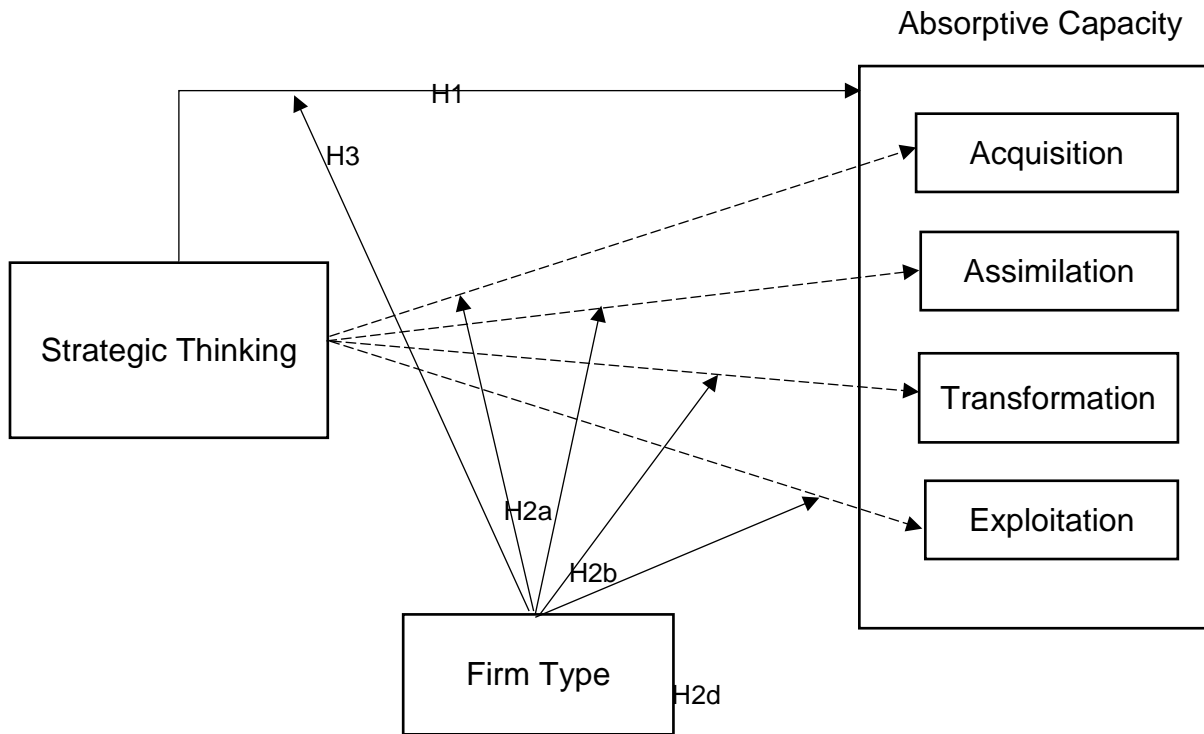
Figure 3. Pictorial representation of hypotheses.

Summary

In summary, Chapter 2 provides a detailed review of absorptive capacity and strategic

thinking, which are the constructs for investigation in this study. Understanding the relationship

between absorptive capacity and strategic thinking is the primary investigation of this study. The

literature review of absorptive capacity offered a detailed discussion of its conceptual

development over time, a discussion of the antecedents of absorptive capacity, and finally a

discussion of four components of the absorptive capacity. The literature review of strategic

thinking offered its relevant definitions in the literature. In addition, a review of relevant

dimensions of strategic thinking along with a synthesis of common dimensions that are discussed

in the literature is presented.

Following the literature review of the two constructs, a synthesis of the capability-based

perspective and Miles and Snow's (1978) adaptation process, as relevant theoretical perspectives

to test the relationship between absorptive capacity and strategic thinking, is presented. The extant literature review suggested that absorptive capacity and strategic thinking are central to the organizational adaptation process. The capability-based perspective and Miles and Snow's (1978) adaptation process represent value-generating processes that organizations undergo to align with the changing environment.

Derived from the hierarchical framework of capabilities, the synthesis of capability-based perspective suggested that absorptive capacity and strategic thinking are idiosyncratic to organizations where strategic thinking represents metaphysical capabilities and absorptive capacity represents dynamic capabilities. Similarly, entrepreneurial capability as described by Miles and Snow (1978) represents the process of strategic thinking that leads to the process of resource commitment, i.e., the absorption of new knowledge and application of the new knowledge in transforming the organization's resource commitment. Based on the capability-based theory and Miles and Snow's (1978) organizational adaptation process, it is hypothesized (H1) that strategic thinking and absorptive capacity are significantly related to each other.

Next, the relationship between strategic thinking and individual dimensions of absorptive capacity is explored to find out the differences across three strategic types. The relationship between strategic thinking and acquisition, assimilation, transformation, and exploitation for prospectors is hypothesized to be different from other firms (H2). Next, based on Miles and Snow's (1978) typology, the relationship between absorptive capacity and strategic thinking is examined across three types of organizations. The relationship between absorptive capacity and strategic thinking of prospectors and other type of organizations is hypothesized as heterogeneous (H3). The next chapter presents the methodology to examine the hypotheses presented above.

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CHAPTER 3

METHODS

Introduction

This study focuses on the relationship between strategic thinking and absorptive capacity in an organizational context. A quantitative study was designed to fulfill the objectives of the study. In Chapter 2, specific hypotheses were developed to address two research questions that relate to 1) the relationship between strategic thinking and absorptive capacity and 2) the heterogeneity in the relationship between strategic thinking and absorptive capacity across three organizational types identified in Miles and Snow's typology.

Chapter 3 provides a detailed explanation of the research design, data collection methodology, sampling technique, and statistical techniques used to implement and test the hypotheses developed in Chapter 2. The chapter unfolds as follows: first, the constructs and measures are discussed. Specifically, the operationalization of construct dimensions and sub-dimensions is presented. Next, details of the pilot study are presented, which include pre-pilot testing (instrument refinement using a panel of experts and student samples), sampling frame for the pilot study, and sample used for the pilot study. Then, details of the main study including the first-phase data collection are presented. In the main study section, constructs' reliability and validity are discussed to show that the data was appropriate to conduct hypotheses testing.

Data Collection Method

A survey-based design was selected due to the perceptual phenomena studied in this research (Malhotra & Grover, 1998). Given the latent nature of constructs, managerial perceptions are more likely to yield rich data specific to the constructs in comparison to the secondary data (Bagozzi, 1979; Boyd, Dess, & Rasheed, 1993). Survey research allows

researchers to attain a large sample size. This is important for the power of the test, and it enables

the collection of detailed information specific to the constructs of interest. Electronic mail and

online survey administering techniques facilitate reaching out to potential respondents,

dissemination of research instrument, and data collection.

<div align="center">Constructs and Measures</div>

The two main research questions of this study are:

1. What is the relationship between strategic thinking and absorptive capacity of a firm?

2. Can a typology of relationships between strategic thinking and absorptive capacity be identified?

The two constructs-of-interest in the study are absorptive capacity and strategic thinking.

Absorptive capacity is a multidimensional construct that has been shown to have four underlying

dimensions. Descriptions of the four dimensions of absorptive capacity are provided in Chapter

2. Strategic thinking construct is also a multidimensional construct that has three underlying

dimensions. Descriptions of the three dimensions of strategic thinking are also provided in

Chapter 2. Since robust scales were not available for the strategic thinking construct, scale

development was undertaken and the process will be described later in this chapter.

In Chapter 2, Miles and Snow's (1978) strategic archetypes were used to propose a

typology of relationships between strategic thinking and absorptive capacity. The four strategic

archetypes were measured using an objective scale developed by Conant, Mokwa, &

Varadarajan (1990) and modified by Desarbo et al. (2005).

This study is configured to investigate the relationship between two organizational

capabilities (strategic thinking and absorptive capacity). Hence, control variables found in the

capability literature are used to parse-out effects that may interfere with the investigation

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(Kerlinger & Lee, 2000). A discussion on the selection of control variables and their operationalization is also offered in this chapter.

Overall, this chapter provides a detailed discussion on how the primary constructs of interest and the control variables have been operationalized. The discussion also furnishes an explanation of data collection items that were adapted and modified from prior operationalization found in the literature to fit the context of this study. All items were measured on a 5-point Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5) unless otherwise noted.

Absorptive Capacity

In this study, **t**he absorptive capacity construct was measured using a scale that was adapted from one that was initially developed by Jansen et al. (2005) and later modified by Daspit and D'Souza (2013). Jansen et al.'s (2005) study was the first to operationalize the absorptive capacity construct using four dimensions (acquisition, assimilation, transformation, and exploitation). All dimensions used in that study were found to have reasonable convergent and discriminant validity by the authors. Daspit and D'Souza (2013) adapted and validated their scale with acceptable internal and discriminant validities.

For the present study, 21 items representing four dimensions of absorptive capacity were adapted from Daspit and D'Souza (2013). Modifications to scale items were introduced to further strengthen the scale in the context of the current study. Six items for the acquisition dimension were adapted from Daspit and D'Souza (2013) and modified to refine the scale. For example, the original item "our firm has frequent interactions with other firms to acquire new knowledge" was modified to "our organization frequently interacts with other organizations to acquire new information." For the assimilation dimensions, three items were adapted from Daspit and D'Souza (2013) and modified to refine the scale. Additionally, three new items were

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generated during the pretesting stage of instrument development. For example, the original item "we are quick to recognize shifts in our market (e.g. competition, regulation, demography)" was modified to "we quickly analyze shifts in the market." An example of newly created item for assimilation dimension is "We quickly interpret the changing competitive dynamics of the market." Details on the pre-testing process that resulted in these changes are provided later in this chapter. For the transformation dimension, six items were adapted from Daspit and D'Souza (2013) and also modified to refine the scale. For example, the original item "our employees record and store newly acquired knowledge for future references" was modified to "our employees effectively use acquired information to generate new business ideas." Similarly, for the exploitation dimension, six items were adapted from Daspit and D'Souza (2013) and modified to refine the scale. For example, the original item "our firm has difficulty introducing new products and services" was modified to "we have well-established protocols to launch new products/services."

Strategic Thinking

Strategic thinking has been conceptualized as a three-dimensional construct (the three dimensions being systems thinking, reframing, and reflection). The rationale for adopting a three-dimensional view of the construct was provided in Chapter 2. However, the operationalization of three dimensions (systems thinking, reframing, and reflection) is different from that found in Pisapia et al. (2005) and Pang & Pisapia (2012), as the current study defines strategic thinking as a managerial capability. Pisapia et al. (2005) developed the original questionnaire in the context of strategic leadership, and it was based on three cognitive processes, i.e., systems thinking, reframing, and reflection. The original scale was comprised of 39 items, which were based on the ability of managers to utilize cognitive processes. The authors

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renamed and called it the "strategic thinking questionnaire" in subsequent publications (e.g. Pang & Pisapia, 2012). In both the original and the modified version of Pisapia's (2005) questionnaire, all items were clubbed under three broad dimensions (systems thinking, reframing, and reflection). Moreover, some items in the modified scale were represented under different dimensions from the original version. While the theoretical development of the construct and its subdimensions by Pisapia and coworkers was robust, inconsistencies in the scale's development process compelled this researcher to develop a strategic thinking scale that was consistent and appropriate for the context of the current study.

The development of scale items for strategic thinking was undertaken through a rigorous pretesting of items, which included a panel of experts to review the items (Professors and Ph.D. students who had experience in scale development), and two samples of undergraduate students. The scale was further validated through a pilot test that surveyed managers of firms that operate in the information technology industry. Details of the pilot test and pretesting are provided in the "pilot test" section of this chapter. The details for the operationalization of the three dimensions of strategic thinking are provided next.

Systems Thinking

Bertalanffy (1950) suggested that a system (in our case, the organization) is comprised of various interacting elements. Therefore, a key element of systems thinking is the ability to recognize and understand the interdependencies among various elements within the organization, and interdependencies with elements outside the organization (Beckhard and Pritchard, 1992). Understanding these interdependencies allows managers to anticipate changes in one component of the system based on another component of the system (Capra, 2002). In addition, managers can utilize these relationships to plan anticipatory changes in the organization (Galbraith, 2001).

Systems thinking, then, is defined as the ability to view a system (an organization) holistically by recognizing the interdependencies within and across the systems. Based on this definition of systems thinking, six items were adapted from Pisapia et al., (2005). However, all items were modified and worded differently to simplify the item, to present it in practitioner parlance, and to represent systems thinking as an organizational capability. For example, the original scale item "consider how one thing seems to lead to the next in a nonlinear way" was modified to "we recognize that actions of a department can influence the action of another department within our organization." Similarly, the scale item "Consider how different parts of organization influence the way things are done" was modified to "we recognize the importance of integrating activities within our organization." Likewise, the original scale item "consider how changes occur through the influence of environmental factors" was modified to "we recognize that change in external environments can drive change in our organization." Similarly, the scale item "Try to sense changes in your organization's environment that will require changes internally" was modified to "we recognize that change in market trends requires adjustments to our business activities."

Reframing

Reframing was defined, in Chapter 2, as the ability to identify and differentiate between various approaches/perspectives and to be able to use several approaches/perspectives while assessing a situation. Consistent with the core ideas embedded in its definition, the "reframing" dimension of strategic thinking was operationalized based on its three dimensions: 1) ability to identify various approaches/perspectives, 2) ability to differentiate among various approaches /perspectives, and 3) ability to use several approaches/perspectives while assessing a situation.

To reframe a situation, the first requirement is that managers must be knowledgeable about at least two approaches/perspectives to view a complex situation. Using a single frame or perspective can be detrimental to decision making because it becomes difficult to argue that it is the most suitable lens to view crucial information about the situation. Ideally, managers should be able to identify several approaches/perspectives that can be used to assess a complex situation, because different perspectives provide divergent information, knowledge, and interpretations of a situation. Three new items were created for the sub-dimension that reflects "the ability to identify various approaches/perspectives." New items were created because no items were traceable in prior scale developments (e.g., Moon, 2013; Pang & Pisapia, 2012; Pisapia et al., 2005). A sample item for this dimension is, "we recognize that there are multiple approaches to describe a situation."

The ability to differentiate between various approaches/perspectives is another crucial capability necessary to reframe a complex situation (Morgan, 1986). Varied perspectives provide a wider lens to assess a problem or situation. To reframe a situation, the contribution of additional approaches or perspectives is only valuable when they provide new and different meanings to a situation/problem. Therefore, managers should be cognizant of the differences between various perspectives so that they can appropriately choose and efficiently apply these approaches/perspectives to describe or assess the situation. The ability to differentiate between various approaches/perspectives increases the breadth of insight available to managers (Pisapia et al., 2005). For "the ability to differentiate between various approaches/perspectives" sub-dimension, three items were adapted from Pisapia et al. (2005), but were modified to better reflect the sub-dimension. For example, the original scale item "ask yourself and others to map out different strategies needed to map out the resolution of a problem" was modified to

"discussion with others helps us differentiate among different approaches used to resolve a business problem."

The third sub-dimension is the "ability to use several approaches/perspectives while assessing a situation." This ability is central to reframing because multiple approaches/perspectives provide a more coherent understanding of a situation. For example, using several approaches/perspectives to diagnose a situation helps managers develop unique ideas and offer alternate solutions. As Bolman and Deal (1991, p. 4) suggest, the use of multiple approaches enables managers to avoid "self-entrapment." Over time, managers develop specific approaches/perspectives to assess each type of complex situation. Each perspective results from deeply ingrained mental models that can limit the thought process of managers (Senge, 1990). Using a limited number of perspectives to address a complex situation can limit the ability to leverage useful information. On the other hand, the use of multiple approaches/perspectives furnishes rich information that helps to better understand a situation. (Pisapia et al., 2005). Additionally, the use of multiple approaches has been found to lead to better outcomes (Bolman & Deal, 1991).

For the sub-dimension, "the ability to use several approaches/perspectives while assessing a situation," one item was adapted from Pisapia et al. (2005), wherea two items were newly created. The original scale item from Pisapia et al. (2005), "evaluate a situation using many different viewpoints," was modified to "we use multiple approaches to evaluate a business problem." The other two newly developed items also assessed managers' level of using multiple approaches. For example, one of the items was, "we use multiple approaches to describe a business problem."

Reflection

Reflection was defined, in Chapter 2, as the ability to use one's own perceptions, experiences, and knowledge, and that of others, to understand organizational actions. Thus, by integrating prior developments, it is posited that the "reflection" dimension of strategic thinking has two sub-dimensions: 1) The ability to use one's own perceptions, experiences, and knowledge to understand organizational situations and 2) the ability to use the perceptions, experiences, and knowledge of others to scrutinize and evaluate organizational situations. The following paragraphs discuss the operationalization of these two sub-dimensions.

Using one's own perceptions and knowledge is important because the information that supports the existing perceptions and knowledge could be incomplete. Therefore, a constant reevaluation of existing beliefs and assumptions in the context of new information is crucial to completely understand a situation (Dewey, 1933). In addition, using the perspectives and knowledge of another individual is equally important for reflection. The other's perspective and knowledge could provide support or oppose it. In either case, using or applying the other's perspective and knowledge broadens the available intellectual base, thereby providing a more insightful assessment of the situation. Rodgers (2002) advocated the use of the experiences of others when she notes that "an experience, then, is not an experience unless it involves interaction between self and another person, the material world, the natural world, an idea, or whatever constitute the environment at hand" (p. 846).

Three items were adapted from Pisapia et al. (2005) for the sub-dimension "using one's own perspectives, experiences, and knowledge." The three items adapted were modified to better represent capability-centric and practitioner-oriented characterization in an organizational context. For example, the original scale item "try to decide how you could have handled a

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situation better when thinking about what you've done and decisions you have made" was modified to "we reflect on how we could have handled past organizational actions differently."

For the other sub-dimension, i.e., "using others' perspectives, experiences, and knowledge," one item was adapted from Pisapia et al. (2005), and modified to better reflect the sub-dimension in the study context. The original scale item "seek a mentor or colleague to discuss what you are doing when in a situation that requires your action" was modified to "we seek help from individuals within our department to reflect on the effectiveness of past organizational actions." The other two items were generated based on the recommendations made during the pretesting phase. An example of a new item is, "we seek help from individuals across the organization to reflect on past organizational actions."

Miles and Snow Typology

Miles and Snow's typology was measured using a multi-item objective scale adapted from Desarbo et al. (2005). Most of the initial multi-item scales were limited to the entrepreneurial dimension of Miles and Snow's adaptive cycle and ignored engineering and administrative dimensions (Zahra & Pearce, 1990). For example, Smith, Guthrie, and Chen (1986) developed an 11-item questionnaire that measured only entrepreneurial and engineering dimensions. Similarly, Segev (1989) developed a 28-item questionnaire that mostly measures the entrepreneurial dimension.

Conant et al. (1990) developed the original instrument. It consisted of an 11-item scale that incorporates all three dimensions (entrepreneurial, engineering, and administrative). Of these eleven items, four represent the entrepreneurial dimension, three items represent the engineering dimension, and four items represent the administrative dimension. Each of the 11 questions is represented by four distinct responses that characterize each archetype's "adaptive stance/activity

about the dimension" (Conant et al., 1990, p. 372). The classification of firms into one of the archetypes is based on a majority-rule decision structure. A firm is classified as either prospector, defender, analyzer, or reactor based on the highest number of responses out of 11 questions. In the event of a tie between the reactor and any other archetype, the firm is classified as the reactor. In the event of a tie between or among non-reactors, the firm is classified as analyzer because it is a hybrid strategy (Miles & Snow, 1978). The scale developed by Conant et al. (1990) has been validated in other empirical studies (e.g. Desarbo et al., 2005; Parnell & Wright, 1993). Conant et al.'s (1990) approach to classify firms is, prima facie, appropriate for this study. However, their scale items were developed in the context of Health Management Organizations, and the scale was context-specific. Desarbo et al. (2005) modified the scale items to represent generalized adaptive stances/activities, thereby making the scale generalizable and applicable across industries. Hence, this study used the 11-item scale developed by Desarbo et al. (2005).

The sample in the Desarbo et al. (2005) study was business units in manufacturing industries therefore the scale items were worded to address business units and products. The sample of the current study is firms operating in the Information Technology industry that provide both services and products. Therefore, to modify the scale items in the context of the present study, the term 'products' was replaced with 'services/products' and the term "business units' was replaced with "firms." No other scale modification was undertaken.

Control Variables

Control variables are important to parse-out unwanted effects that are not part of the investigation, but are likely to have some effects on the dependent variable, i.e., absorptive capacity (Kerlinger & Lee, 2000). Previous empirical research on absorptive capacity used several variables to minimize extraneous influences. Some commonly used control variables

found in absorptive capacity research are: firm age (Daspit & D'Souza, 2013; Daspit et al., 2016; Minbaeva, Pedersen, Bjorkman, Fey, & Park, 2003), firm size (Daspit & D'Souza, 2013; Lenox & King, 2004), subsidiary (Lund Vinding, 2006), type of firm (product or service) (Jansen et al., 2005), and perceived dynamism (Daspit et al., 2016). A control variable representing the type of firm (i.e., manufacturing or service) is not applicable in this study because the focus is on firms in the software industry where most firms provide both products and services. Additionally, controlling for perceived dynamism is not relevant because firms are classified based on Miles and Snow's typology, which implicitly differentiates firms based on perceived environmental uncertainty and dynamism. Therefore, this study controls for firm size and firm age.

Firm Size

Firm size can influence organizational capabilities. It is believed that firm size can influence resource access such as access to capital, which may constrain organizational capabilities. Also, smaller firms are considered more flexible as they can quickly adjust their capabilities in comparison to very large firms (Pavlou & El Sawy, 2011). Firm size was operationalized as the annual revenue of the firm. This variable was measured using an item, which includes six categories of annual revenue: less than 5 million, 5 million – 10 million, 10 million – 20 million, 20 million – 50 million, and more than 50 million.

Firm Age

Past research suggests that as organizations grow older, they gain experience in instituting change and develop expertise in refining their capabilities. Therefore, to account for the age of the firm a variable was used to measure firms' age by asking respondents to answer the following question: "Age of your firm (years)?"

Pilot Study

A pilot study was conducted because of the exploratory nature of this research, and the need to develop/modify existing scales. The main goal of the pilot study is to refine the survey instrument and then test the reliability and validity of the embedded scales (Trochim & Donnelly, 2008). In addition to validating the research instrument, the pilot study also helped the researcher determine the feasibility of the full study by providing preliminary information on the appropriateness of the research design and the sampling approach (Van Teijlingen, Rennie, Hundley, & Graham, 2001). The pilot study included a "pre-pilot" that employed a panel of experts and a sample of students. The details of each phase of the pilot study are discussed next.

The Pre-Pilot Study

Pre-pilot testing (which includes refinement and pre-testing of the instrument) is undoubtedly important to minimize instrument-related issues that may arise in the pilot study. Particularly in this study, a pre-pilot testing of the instrument was crucial because research on strategic thinking is limited and fragmented (Goldman et al., 2015). To ensure that the operationalization of strategic thinking is relevant to the context of the current study, and the items appropriately reflect the sub-dimensions, pre-pilot testing was deemed necessary. Additionally, operationalization of the absorptive capacity construct is relatively new, and only a handful of studies have empirically tested the reliability and validity of the absorptive capacity scale. Overall, pre-pilot testing was expected to garner insights that could be used to improve the scales, thereby offering the opportunity for richer and more pertinent data to be collected in the pilot study and the main study.

The scale development procedure in this research was undertaken with due diligence, which followed one of the most acceptable scale development guidelines provided by Hinkin

(1995, 1998). Development of reliable measures is of utmost importance because true correlation between two constructs can only be observed through accurate and reliable operationalization of the construct (Hinkin, 1995; Schoenfeldt, 1984). A latent construct (an abstract concept) cannot be observed directly, and is therefore measured with the help of "observable dimensions of behavior" (Hinkin, 1998, p. 104). The American Psychological Association suggests that a robust operationalization of a construct should be demonstrated with the help of construct validity (scale measures the supposed construct), which is achieved through content validity, criterion-related validity, and internal consistency (APA, 1995). In order to achieve appropriate construct validity, Hinkin (1998) provides a 6-step process that has been frequently used in scale development (e.g. Holt, Armenakis, Field, & Harris, 2007; Oreg, 2003; Shaffer et al., 2016; Sieger, Gruber, Fauchart, & Zellweger, 2016).

The first step is an item generation process in which items that appropriately and adequately represent the construct are generated. The deductive approach of item generation requires developing the definition of the construct and using the definition as a guide in generating items. The inductive approach requires developing items by asking experts and respondents about their understanding of the phenomenon under question and then creating items with the help of content analysis. Within item generation process, a pretesting of scale is deemed imperative to ensure the content validity of the construct. Q-sort exercise is one of the most commonly used technique to test the content validity of scale items (Nahm, Rao, Solis-Galvan, & Ragu-Nathan, 2002). The second step is questionnaire administration and data collection. The questionnaire is presented to respondents. The objective is to determine the sample size, initial item reduction, and confirm the psychometric properties of the new measure.

The third step is exploratory factor analysis, which is performed to ensure the dimensionality (number of factors) of the construct. It also helps in initial item reduction. Researchers should use both the theory and quantitative results to determine the number of factors to be retained. Also, the number of items per factor should be logically determined. A minimum of three items is required for proper convergence (Gerbing & Anderson, 1988). The fourth step is the confirmatory factor analysis (CFA) that ensures the unidimensionality and external consistency of the measurement (Gerbing & Anderson, 1988). The CFA than leads to step five, which is testing the convergent and discriminant validity of the construct. Convergent validity examines the extent to which items represent the corresponding construct and discriminant validity examines the extent to which items do not correlate with the construct that they are not supposed to measure. The sixth and the final step is to replicate the data collection and subsequent processes to ensure the generalizability of newly developed scales. A pictorial representation of these 6 steps is presented in Figure 4.

Item Development with an Expert Panel

The pre-pilot testing phase began with the identification of a panel of experts (dissertation committee members and Ph.D. students). Dissertation committee-member involvement in this phase of the study was solicited

Step-1
Item Generation

Step-2
Questionnaire
Administration

Step-3
Exploratory Factor
Analysis

Step-4
Confirmatory Factor
Analysis

Step-5
Convergent/Discriminant
Validity

Figure 4. Scale development process: Adopted from Hinkin
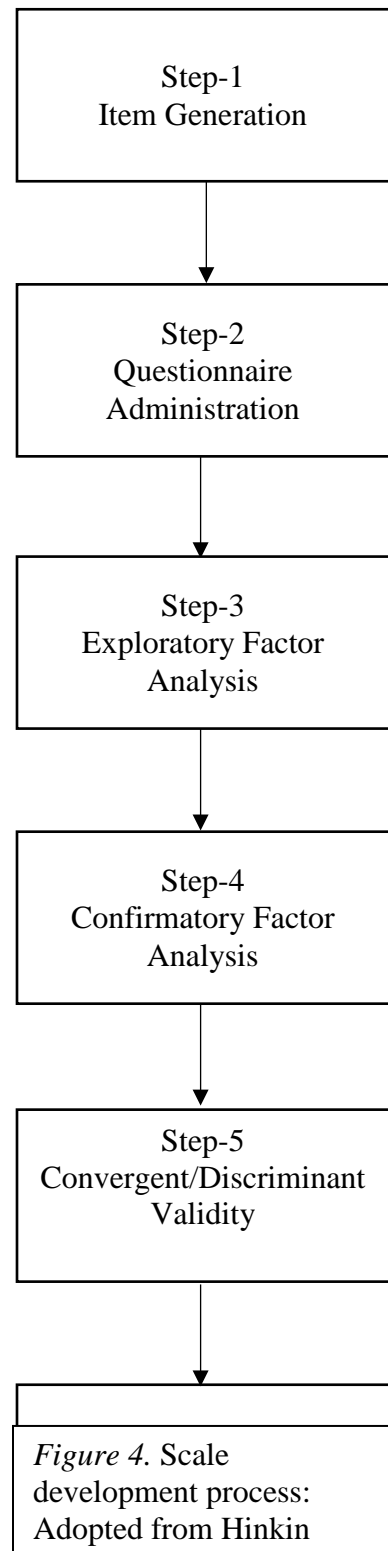
because each member was actively involved in various research projects and had extensive experience in survey instrument development. Ph.D. students were carefully selected based on major research area, time spent in Ph.D. program, and experience in survey research. Five Ph.D. students were recruited for the purpose. Panelists were asked to review sub-dimension definitions and corresponding items to check whether items represent the corresponding sub-dimensions. This process was operationalized through a Q-sort analysis. The Q-sort analysis was conducted in two steps: First, experts were asked to associate randomized items with the corresponding dimensions and second, based on the results of item-sorting, researchers either delete, re-word, or create new items. This technique has been proven to help in improving the face validity of constructs (Nahm et al., 2002).

Before conducting the first round of Q-sort analysis with the expert panel, two researchers (the dissertation committee chair and I) identified specific items for strategic thinking based on the definitions of strategic thinking at the dimensional level. The focus of the first round of pre-pilot testing was to identify dimensions and sub-dimensions for the strategic thinking construct and to confirm the face validity of the scales for the absorptive capacity construct and the Miles and Snow typology. All items for strategic thinking scales were initially taken from Pisapia et al.'s (2005) original scale. It should be noted that the 39 items in Pisapia et al.'s (2005) scale had been grouped under three broad dimensions (systems thinking, reframing, and reflection). Fifteen items represented systems thinking, eleven represented reframing, and thirteen represented reflection. However, these authors did not clearly identify items at the sub-dimensional level. To further classify the 39 items at the sub-dimensional level the two researchers worked to apply definitions of the three dimensions of strategic thinking to infer and categorize each of Pisapia et al.'s (2005) 39 items into what seemed to be the appropriate sub-

dimensions, i.e., systems thinking, reframing, or reflection. Once the items were classified by the researchers, a Q-sort exercise for strategic thinking scale was created in Qualtrics. The process used for this exercise is presented in the paragraph below.

Two professors and four Ph.D. students completed the first round of Q-sort analysis that was administered through Qualtrics. Based on the panelists' suggestions, and further scrutiny of the literature, their definitions of the sub-dimensions were first re-worded and modified to better represent the definitions (these modified definitions of the sub-dimensions were provided earlier in this chapter). Eventually, the number of items in the modified scale was reduced from 39 to 28, as some of the original items were no longer applicable, given the modified definitions at the sub-dimensional level.

The newly generated scale (based on the streamlined and practitioner-oriented new definitions of strategic thinking and its dimensions) was presented to three panelists (Ph.D. students) for the second round of Q-sort analysis. The newly incorporated changes showed significantly improved results when the Q-sort data was analyzed. One respondent (who was a strategic management major and was familiar with the related literature/definitions) could sort the items with almost 95% accuracy. However, the other two respondents (who were not strategic management majors) demonstrated about 50% success in the sort, which, while higher than their prior score, was relatively low. It is possible that the lack of understanding of the literature/definitions contributed to the poorer responses.

Another explanatory factor that could have compounded the poor sorting outcome by the two non-strategic management majors is that the verbiage used to explicate some of the miss-classified items were too theoretical in nature. To overcome this problem, since the respondents in the pilot and the main study will be the practitioners, the scale was sent to a fourth panelist for

further refinement. This panelist was selected based on the individual's extensive industry experience at the executive level prior to entering the PhD program. The intent was to use the panelist's industry experience to make the items "practitioner friendly." After making changes based on this panelist's recommendations, modified items were sent to two panelists (whose native language was English) to review the items for syntax, style, and structure.

Based on the third round of feedback from panelists, several items were modified. For example, the item "discussion with colleagues helps us differentiate one perspective/framework from another" was modified to "discussion with colleagues helps us to differentiate one approach from another." A total of three items were deleted from the scale, which reduced the total number of items from 28 to 25. After completing the process, the scale items for strategic thinking were deemed appropriate for use in the pre-pilot study.

Items used for the Miles and Snow typology scale and the scale for absorptive capacity were also reviewed by six panelists (two professors and four Ph.D. students). Panelists were asked to assess whether the items properly represented corresponding dimensions. In addition, panelists were asked to offer alternate items that could represent the "assimilation" dimension of absorptive capacity as the original scale comprised only three items. Following the request, five new items were suggested by panelists. Out of five newly suggested items, three were included in the scale. An example of a new item is "we are quick at incorporating new environmental trends in our decisions." Another example of a newly added item is "we take a long time to analyze and interpret the acquired knowledge."

For Miles and Snow's typology scale, panelists noted that the items in scale were specific to business units in manufacturing industries. Since the industry investigated in the current study is the information technology industry that provides both services and products, panelists

suggested modifying the scale items accordingly. Based on panelists' suggestion, the term 'products' was replaced by 'services/products' and the term "business units' was replaced by "firms."

A few recommendations were offered by the expert panelists to modify items in the absorptive capacity scale. For example, one of the item in the acquisition dimension had unnecessary verbiage that could deter or bias respondents. Panelists suggested removing the verbiage. Therefore, the original item, "we collect industry information through informal means (e.g. lunch with industry friends, talks with trade partners)," was modified to "our employees frequently collect industry information through informal channels." Another item in the acquisition dimension, "our employees regularly visit other firms in the industry," was modified to "Our employees frequently monitor competitors to acquire new information." based on suggestions by panelists. One item from the assimilation dimension, "new opportunities to serve our customers are quickly understood," was changed to "We quickly analyze changes in the market demand" as per panelists' recommendation. No changes were suggested for scale items related to the transformation dimension. For the exploitation dimension, out of six original items, one item, "our firm has a clear division of job duties," was dropped based on suggestions. Panelists argued that this item does not represent the exploitation dimension. A new item, "Customer needs are addressed through delivering new solutions," was added to the scale for the exploitation dimension based on panelists' suggestions.

Pre-Pilot Test of the Strategic Thinking Scale

Before using the extensively modified scale for strategic thinking in the pilot study, it was administered to undergraduate students twice (in two different courses) to check for the

factor loadings and reliability of the scale. The intent was to see if the items hang together and whether further refinements were necessary.

The first round of student testing of the strategic thinking scale was administered to undergraduate business students. A total of 27 students completed the survey, and 24 responses were usable. Correlational analyses were used to determine to what extent items were showing convergent and divergent validity. Initial analysis showed that some of the items were either poorly or negatively correlated within the sub-dimensions. Based on initial factor loadings and reliability analysis, items that were that did not seem to represent the sub-dimensions were either re-worded or deleted. Re-wording and deleting inappropriate items resulted in a modified scale comprised of 21 items.

A second round of student testing followed. It employed the new 21-item scale. This scale was administered to a different group of undergraduate business students. A total of 35 students completed the survey. The results from the new set of respondents showed improvement in terms of inter-item correlation and factor analyses. After the second round of student testing, the strategic thinking scale was deemed appropriate for use in the pilot study.

The Pilot Study

The survey respondents in the pilot study were individuals employed by firms in the software industry. Authorization had been obtained from the university's Institutional Review Board (IRB) to conduct the study (application number 17-135). The questionnaire consisted of 15 sections with a total of 74 questionnaire items about the strategic thinking, absorptive capacity, Miles and Snow typology, control variables, and other individual and firm related demographics.

Respondents

Since the focus of this study is on firm-level capabilities, the approach was to select one key informant from each firm. Senior managers have a comprehensive understanding of organizational processes and macro-level workings of the firms. Previous studies have supported the key informant approach because such individuals provide a valid representation of organizational phenomenon (Garg, Walters, & Priem, 2003; Li & Atuahene-Gima, 2002; Zhou & Li, 2012). Therefore, the target respondents for the pilot study were senior to middle level managers of the firm. To ensure the validity of respondents, only responses from respondents that have a minimum of 5 years of experience were selected.

Sampling Frame

Since the research questions posed in this study deal with strategic thinking and absorptive capacity that play a pivotal role in the organizational adaptation process, high technology (hi-tech) industries, made up of firms that are constantly adapting, are an appropriate population for this study. Organizational adaptation by firms in these industries is spurred by both technological change and cycles of industry growth and consolidation. Previous research (e.g., Cruz-Gonzalez, Lopez-saez, Navas-Lopez, & Delgado-Verde, 2015; Thornhill, 2006) has demonstrated that, typically, the high-tech industries experience more change compared to other industries. Within the hi-tech industry, the rate of organizational adaptation in the information technology sector is typically higher than in other similar industries. Information published by the United States Department of Labor (U.S. Bureau of Labor Statistics, 2013) was used to identify specific high-growth / hi-tech segments of the information technology sector. This relevant report identifies "computer programming services": Sic code 7371, "prepackaged software": SIC code 7372, and "computer integrated system design": SIC code 7373 as the

fastest growing industries based on the past and projected output growth from 2012-2022 (U.S. Bureau of Labor Statistics, 2013). Managers of firms that fall in the above mentioned SIC codes comprised the sample frame for the pilot study.

Sampling Technique

Panel data was obtained using services provided by Qualtrics. Qualtrics is an online survey administering company (Long, Bendersky, & Morrill, 2011). Qualtrics also provides prescreened respondents appropriate to the study requirements. These respondents range from specific product users to senior managers working in different industries. Based on the study requirements, Qualtrics invites prescreened respondents in order to ensure the legitimacy of respondents (Hagtvedt, 2011). In addition to Qualtrics own screening algorithms, an additional screening question was embedded in the survey instrument. Respondents were compensated based on the survey length. Compensation to respondents varies from actual cash to 'survey cash' that can be used to buy product and services online (Dumas, Phillips, & Rothbard, 2013).

Recently, the use of Qualtrics and similar third-party services in academic research has increased. The data collection through online services allows proper randomization and the entire process takes substantially less time than conventional mail survey procedure. Third parties such as Qualtrics provide the flexibility to target a specific population that is sometimes difficult in conventional field studies. In a recent study published in *Organization Science* Dumas et al. (2013) used Qualtrics to specifically target 25 percent respondents from underrepresented minorities. Similarly, in another study published in *Academy of Management Journal* Long et al. (2011) successfully obtained respondents with specific employment criteria. Overall, Qualtrics panels have been used in studies published in premier journals (e.g., *Academy of Management Journal, Organization Science, and Journal of Marketing*).

Qualtrics' data collection process is rigorous to ensure the quality of data. A project manager is assigned to each project. The project manager first launches the survey to a small fraction of respondents, usually ten percent. The project manager and I then reviewed the data for its quality before launching the full-scale survey. In addition, the final sample is calculated based on the usable responses, thus ensuring the sample size requirements.

Data Collection

Before launching the full-scale pilot study, a soft launch was conducted to obtain fifteen responses (i.e., 10% of the total size for the pilot study). Review of the soft launch data showed some inconsistencies in the responses, specifically in the reverse coded items. Reverse coded items are used as attention checks to maintain the reliability of responses. It was found that some respondents provided contradictory responses to reverse coded items. Based on the responses, some of the reverse coded items were reworded. In addition, an additional attention check item "This is an attention check item. Please select strongly disagree as a response for this item" was added in the survey questionnaire. Because of the modifications in the survey questionnaire, IRB approval was obtained for the modified survey instrument.

Results of Pilot Study

Since the purpose of the pilot study was to refine and validate the instrument, study variables were tested for their reliability and validity.

Absorptive capacity was measured as a four-diemnsional construct (acquistion, assimilation, transformation, and exploitation). All 24 items were subjected to principal component analysis using varimax rotation. The analysis showed weaker loadings on some items, and a few cross-loadings. Following the standard proceedure of data reduction, several items were deleted to obtain four clean factors.

Table 4

Principal Component Analysis of Absorptive Capacity Dimensions for the Pilot Study

	Component			
	1	2	3	4
Acquisition				
AQ1 Our firm has frequent interactions with other firms to acquire new knowledge.	0.799			
AQ2 Our employees regularly visit other firms in the industry, to acquire new knowledge.	0.879			
AQ4 Our employees frequently meet with employees from peer firms.	0.829			
Assimilation				
ASS1 We are quick to recognize shifts in our market (e.g. competition, regulation, demography).		0.705		
ASS3 We quickly analyze and interpret changing market demands.		0.792		
ASS4 We are quick to analyze and interpret acquired market information.		0.824		
Transformation				
TR2 Our employees record and store newly acquired knowledge for future reference.			0.551	
TR3 Our firm recognizes the usefulness of new knowledge.			0.78	
TR4 Our employees readily share practical experiences.			0.743	
Exploitation				
EXP1 We know how activities within our firm should be performed.				0.853
EXP1 Customer complaints are quickly addressed in our firm.				0.834

Three items were retained for the acquisition dimension. The Chronbach's alpha for the

acquisition dimension with three items was 0.86. Three items were retained for the assimilation

dimension. The Chronbach's alpha for the assimilation dimension with three items was 0.90.

Three items were retained for the transformation dimension. The Chronbach's alpha for the

transformation dimension with three items was 0.77. Two items were retained for the

exploitation dimension. The Chronbach's alpha for the exploitation dimension with two items

was 0.79. Although the Chronbach's alpha is satisfactory, one new item was added in the main

study to satisfy the requirement of minimum three items for a first order construct. The principal

component analysis for four dimensions of absorptive capacity in the pilot study is presented in

Table 4.

Reliability, convergent validity, and discriminant validity for the dimensions of

absorptive capacity was performed by creating first-order latent constructs of acquisiton,

assimilation, transformation, and exploitation in AMOS. The results are presented in Table 5.

Table 5

Reliability, Convergent Validity, and Discriminant Validity for the Dimensions of Absorptive Capacity

	CR	AVE	MSV	ASV	1	2	3	4
1. Acquisition	0.862	0.676	0.471	0.327	0.822			
2. Assimilation	0.903	0.756	**0.780**	0.552	0.628	**0.870**		
3. Transformation	0.794	**0.563**	**0.780**	0.593	0.686	0.883	**0.750**	
4. Exploitation	0.805	0.674	0.530	0.376	0.340	0.694	0.728	0.821

Analysis shows that average variance extracted (AVE) values for the four dimensions

were above 0.50, thus providing support for convergent validity (Fornell & Larcker, 1981). The

composite reliability (CR) for acquisition was 0.862 and AVE was 0.676. The CR for

assimilation was 0.903 and AVE was 0.756. The CR for transformation was 0.794 and AVE was

0.563. The CR for exploitation was 0.805 and AVE was 0.674. The square root of the AVE for

acquisition and exploitation was greater than its correlation with the other factors in the model,

which indicates good discriminant validity (Fornell & Larcker, 1981). However, the square root

of the AVE for assimilation (0.870) is less than its correlation with transformation (0.883).

Similarly, the square root of the AVE for transformation (0.750) is less than its correlation with

assimilation (0.883). This suggests that the construct of assimilation and transformation does not

have sufficient discriminant validity. Items for these two constructs were later reviewed and modified prior to launching the main study.

Strategic thinking was measured as a three-dimensional construct (systems thinking, reframing, and reflection). Two of the three dimension were further divided into sub-dimensions. Systems thinking was measured as a unidiemsnional construct. All 6 items measuring the construct of systems thinking were subjected to principal component analysis using varimax rotation. Four items were retained for the construct computation. The Chronbach's alpha of the systems thinking construct with 4 items was 0.88.

Reframing was measured as a three-dimensional construct (ability to identify various approaches/perspectives, ability to differentiate among various approaches/perspectives, and ability to use various approaches/perspectives). All nineitems measuring the three sub-dimensions of reframing were subjected to principal component analysis using varimax rotation. Two items for each sub-dimension were retained for the construct computation. The Chronbach's alpha of the sub-dimension "ability to identify various approaches/perspectives" with two items was 0.80. The Chronbach's alpha of the sub-dimension "ability to differentiate among various approaches/perspectives" with two items was 0.77. The Chronbach's alpha of the sub-dimension "ability to use various approaches/perspectives" with two items was 0.80.

Similary, reflection was measured as a two-dimensional construct (i.e., the ability to use one's own perceptions, experiences, and knowledge to understand organizational situations and the ability to use the perceptions, experiences and knowledge of others to understand organizational situations). All six items measuring the two sub-dimensions of reflection were subjected to principal component analysis using varimax rotation. Two items for each sub-dimension were retained for the construct computation.

Table 6

Principal Component Analysis of Strategic Thinking Dimensions for the Pilot Study

	Component					
	1	2	3	4	5	6
Systems Thinking						
ST1.2 We recognize the importance of integrating organizational activities.	0.822					
ST1.3 We recognize that actions of a department can influence action of another department.	0.641					
ST2.2 We recognize that our product offerings must match customers' needs.	0.846					
ST2.3 We recognize the importance of adapting our business activities to adjust to market changes.	0.811					
Reframing						
RFG1.1 There are multiple approaches to describe a situation.		0.844				
RFG1.2 There are multiple approaches to assess a situation.		0.542				
RFG2.1 Discussion with colleagues helps us identify the best approach to assess a problem.			0.698			
RFG2.3 Discussion with critics and challengers helps us better understand our own approach to assess a			0.787			
RFG3.2 We find it easy to use multiple approaches to assess a situation.				0.803		
RFG3.3 We are comfortable using more than one approach while assessing a situation.				0.806		
Reflection						
RFN1.1 We reflect on how we could have handled past organizational situations.					0.718	
RFN1.2 We reflect on why things worked and why they did not.					0.818	
RFN2.1 We seek help from individuals outside the organization to reflect on organizational situations.						0.893
RFN2.3 We seek help from colleagues to reflect on the appropriateness of organizational decisions and						0.704

The Chronbach's alpha of the sub-dimension "ability to use one's own perceptions, experiences,

and knowledge to understand organizational situations" with two items was 0.84. The

Chronbach's alpha of the sub-dimension "ability to use the perceptions, experiences, and

knowledge of others to understand organizational situations," with two items was 0.67, which is

below the threshold of 0.7 (Nunnally, 1978). However, other researchers suggest that Cronbach's

alpha is a conservative measure and the range of 0.6 to 0.69 is moderate and should be

acceptable (Robinson, Shaver, & Wrightsman, 1991). Table 6 provides the factor analysis of

three components of strategic thinking at the sub-dimensional level. All factor loadings were

above the 0.5 level.

Reliability, convergent validity, and discriminant validity for the dimensions of strategic

thinking was performed in AMOS using a first-order latent construct for systems thinking and

second-order latent constructs for reframing and reflection. The results are presented in Table 7.

Table 7

*Reliability, Convergent Validity, and Discriminant Validity for the Dimensions of Strategic
Thinking*

	CR	AVE	MSV	ASV	1	2	3
1. Reflection	0.893	0.807	0.790	0.674	0.898		
2. Reframing	0.901	**0.754**	**0.819**	0.805	0.889	**0.868**	
3. Systems Thinking	0.954	0.912	0.819	0.689	0.747	0.905	0.955

Analysis shows that average variance extracted (AVE) values for the three dimensions

were above 0.50, providing support for convergent validity (Fornell & Larcker, 1981). The

composite reliability (CR) for reflection was 0.893 and AVE was 0.807. The CR for reframing

was 0.901 and AVE was 0.754. The CR for systems thinking was 0.954 and AVE was 0.912.

The square root of the AVE for reflection and systems thinking was greater than its correlation

with the other factors in the model, which indicates good discriminant validity (Fornell &

Larcker, 1981). However, the square root of the AVE for reframing (0.868) was smaller than its

correlation (0.889 and 0.905) with the other factors. It suggests that the construct of reframing

does not have sufficient discriminant validity. To address this issue, items for reframing construct were later reviewed and modified in the main study.

Main Study

Although adequate reliability of constructs was achieved using the survey instrument in the first industry pilot, discriminant validity for some of the dimensions of strategic thinking and absorptive capacity was not achieved. To improve the discriminant validity of the 'reframing' dimension of strategic thinking, and the 'assimilation and 'transformation' dimensions of absorptive capacity, item refinement was undertaken. Based on EFA and CFA results from the industry pilot, two researchers (dissertation committee chair and I) identified specific items that needed refinement. Additionally, a panel of experts was recruited to check the face validity of refined items. Five Ph.D. students and an Assistant Professor from another university in the eastern United States were recruited to serve on the panel of experts. Panelists were asked to review sub-dimension definitions and corresponding items to check whether items represent the corresponding sub-dimensions. This process was operationalized through a Q-sort analysis.

Overall, the verbiage of all 21 items from the strategic thinking scale was reviewed, and a new item was added to the reflection dimension. The verbiage of 11 items from the absorptive capacity scale was reviewed, in addition, 12 items of the scale were deleted, and replaced by new items. Once the items were deemed appropriate, the first round of another Q-sort analysis was conducted using two Ph.D. students on the expert panel. The results of the Q-sort analysis suggested that just four items from the absorptive capacity construct needed minor refinements. After the items had been refined, a second round of Q-sort analysis was conducted using the remaining 3 Ph.D. students on the expert panel. Only the absorptive capacity scale was tested in the second round of Q-sort analysis. Three items were refined based on the feedback from the

second round of Q-sort analysis. Finally, a third round of Q-sort analysis was conducted by

sending the refined absorptive capacity scale to an assistant professor employed at a public

university in the eastern United States. The results from the third round of Q-sort analysis were

near perfect, with only a minor modification being suggested to one item. This change was

incorporated in the scale.

Sample and Procedure

Because of extensive refinements to the scale items, and addition of new items to the

survey instrument, caution was taken during the roll-out of data collection process for the main

study. In addition, because of the large number (and high cost) of responses involved for the

main study, the data for the main study was collected in two phases. The purpose of two-phase

data collection was to ensure the reliability of the survey instrument with a smaller sample in the

first phase and continue the data collection if the smaller sample confirmed the reliability of

study constructs.

The data collection for the main study was conducted employing respondents employed

by firms in the software industry. Authorization to use the modified survey instrument was again

obtained from the university's Institutional Review Board (IRB) (application number 17-135)

prior to roll-out of the data collection process. The questionnaire consisted of 15 sections with a

total of 75 questionnaire items about the strategic thinking, absorptive capacity, Miles and Snow

typology, control variables, and other individual- and firm-related demographics. To maintain

consistency, the data collection process employed was the same as that used for the pilot. Panel

data was obtained using services provided by Qualtrics, the online survey administering

company used for data collection during the pilot study. Managers and senior employees

working in the software industry were used as respondents. To improve the quality of

information collected, only responses from individuals with a minimum of 10 years of work experience were used.

A total of 101 responses were collected in the first-phase of the data collection process. Analyses of this data suggested appropriate factor loadings and reliability of latent constructs used in this study. The data collection was then continued to complete the required sample size of 250 for the main study. Upon completion of the data cleaning process, 219 surveys were used for further analysis. An analysis of the demographics suggests that almost 58% of the respondents have 15 or more years of professional experience and almost 42% of the respondents had between 10 to 15 years of professional experience. Approximately 73% of the respondents had at least a bachelor's degree, and almost 23% of the participants possessed a graduate degree. The average age of the respondents was 45.5 years. Of the 219 participants, 135 were males, and 84 were females. Approximately 73% of the participants belonged to firms that were in operations for more than 15 years, and approximately 48% of the participants belonged to firms that were in operations for more than 20 years.

A brief analysis of the first-phase data and details of factor analysis, reliability, convergent validity, and discriminant validity analyses for full data are provided next.

Measures – First-Phase

Absorptive Capacity

All 24 items representing the four dimensions of absorptive capacity were subjected to principal component analysis using varimax rotation. Following the standard procedure of data reduction, several items were carefully deleted to get four clean factors. Three items were retained for the acquisition dimension. The Chronbach's alpha for the acquisition dimension with three items was 0.77. Three items were retained for the assimilation dimension. The Chronbach's

alpha for the assimilation dimension with three items was 0.92. Three items were retained for the transformation dimension. The Chronbach's alpha for the transformation dimension with three items was 0.83. Three items were retained for the exploitation dimension. The Chronbach's alpha for the exploitation dimension with three items was 0.68, which is moderate and acceptable (Robinson et al., 1991).

Strategic Thinking

Strategic thinking was measured as a three-dimensional construct (systems thinking, reframing, and reflection). The definitions of these three dimensions were modified, and underlying subdimensions were identified to help researchers to generate appropriate items that, in conjugation, reflect the overall latent construct. To extract the appropriate items for each dimension (systems thinking, reframing, and reflection), all 22 refined items were subjected to EFA (principal component analysis using varimax rotation). After removing items with poor loadings and items that were cross loading, a factor structure of three clean factors emerged.

For the systems thinking dimension, four out of six items were retained. These four items represented the two underlying subdimensions that were used to define systems thinking. The Chronbach's alpha of systems thinking construct with four items was 0.84.

For the reframing construct, six out of nine items were retained. These six items represented the three underlying subdimensions that were used to define reframing. The Chronbach's alpha of reframing with four items was 0.89.

For the reflection dimension, four out of seven items were retained. These four items represented the two underlying subdimensions that were used to define reflection. The Chronbach's alpha For reflection with four items was 0.86.

Measures – Full Study

Absorptive Capacity

      To confirm that dimensionality of of the construct was adequately represented in the full data set, all 24 items representing the four dimensions of absorptive capacity were subjected to a principal component analysis using varimax rotation. Following the standard procedure of data reduction, several items were deleted to get four factors. Three items were retained for the acquisition dimension. The Chronbach's alpha for the acquisition dimension with three items was 0.73. A sample item was "Our employees frequently meet with customers to acquire new information." Three items were retained for the assimilation dimension. The Chronbach's alpha for the assimilation dimension with three items was 0.93. A sample item was "we quickly analyze changes in market demand." Three items were retained for the transformation dimension. The Chronbach's alpha for the transformation dimension with three items was 0.83. A sample item was "our organization is efficient at designing new value-creation processes." Three items were retained for the exploitation dimension. The Chronbach's alpha for the exploitation dimension with three items was 0.64, which is moderate and acceptable (Robinson et al., 1991). A sample item was "customer complaints are quickly addressed." The principal component analysis for four dimensions of absorptive capacity is presented in Table 8. All factor loadings were above the 0.5 level.

Strategic Thinking

      All 22 items were subjected to principal component analysis using varimax rotation. After removing items with poor loadings and items that were cross loading a factor structure of three clean factors emerged. The principal component analysis for three dimensions of strategic thinking is presented in Table 9. All factor loadings were above the 0.5 level.

Table 8

Principal Component Analysis of Absorptive Capacity Dimensions for The Main Study

		Component			
		1	2	3	4
Acquisition	Cronbach's Alpha = 0.73				
AQ3	Our employee frequently monitor competitors to acquire new information.	0.651			
AQ4	Our employee frequently meet with customers to acquire new information.	0.813			
AQ6	Our employees frequently collect industry information through informal channels.	0.810			
Assimilation	Cronbach's Alpha = 0.93				
ASS1	We quickly analyze shifts in the market		0.858		
ASS2	We quickly analyze changes in market demand.		0.838		
ASS3	We quickly analyze the changing competitive dynamics of the market.		0.828		
Transformation	Cronbach's Alpha = 0.83				
TR1	Our employees efficiently generate new business plans.			0.718	
TR2	Our organization is efficient at designing new value-creation processes.			0.777	
TR3	Our organization is efficient at redesigning organizational policies and procedures			0.793	
Exploitation	Cronbach's Alpha = 0.64				
EXP1	Customer complaints are quickly addressed.				0.784
EXP2	Customer needs are addressed through delivering new solutions.				0.771
EXP3	We rarely experience difficulty in delivering value to our customers.				0.582

Table 9

Principal Component Analysis of Strategic Thinking Dimensions for the Main Study

		Component		
		1	2	3
Systems Thinking	Cronbach's Alpha = 0.82			
ST1.1	We recognize that actions of a department can influence action of another department within our organization.	0.698		
ST1.2	We recognize the importance of collaborative actions among employees within our organization.	0.785		
ST2.2	We recognize that change in customer needs can drive change in our product/service offerings.	0.782		
ST2.3	We recognize that change in market trends require adjustments in our business activities.	0.794		
Reframing	Cronbach's Alpha = 0.82			
RFG1.1	We are aware that there are multiple approaches to describe a business problem.		0.597	
RFG1.2	We are aware that there are multiple approaches to evaluate a business problem.		0.558	
RFG2.1	Discussion with others helps us differentiate among different approaches used to describe a problem.		0.634	
RFG2.2	Discussion with others helps us differentiate among different approaches used to evaluate a problem.		0.696	
RFG3.1	We use multiple approaches to describe a business problem.		0.797	
RFG3.2	We use multiple approaches to evaluate a business problem.		0.711	
Reflection	Cronbach's Alpha = 0.81			
RFN1.1	We reflect on how we could have handled past organizational actions differently.			0.737
RFN1.2	We reflect on why some organizational actions worked and why other organizational actions did not work.			0.710
RFN2.2	We seek help from individuals across the organization to reflect on past organizational actions.			0.841
RFN2.3	We seek help from individuals within our department to reflect on the effectiveness of past organizational actions.			0.800

For the systems thinking dimension, four out of six items were retained. These four items represented the two underlying subdimensions that were used to define systems thinking. The Chronbach's alpha of systems thinking construct with four items was 0.82.

For the reframing construct, six out of nine items were retained. These six items represented the three underlying subdimensions that were used to define reframing. The Chronbach's alpha of reframing with four items was 0.82.

For the reflection dimension, four out of seven items were retained. These four items also represented the two underlying subdimensions that were used to define reflection. The Chronbach's alpha For reflection with four items was 0.81.

Reliability, Convergent Validity, and Discriminant Validity among Study Constructs

Once the relevant items were identified, the data was subjected to a PLS-SEM measuement model to confirm the reliability and convergent validity of constructs and their subdimensions and to ensure the discriminant validity among study variables. Reliability, convergent validity, and discriminant validity were tested at the sub-dimensional level as well as at the composite construct level. Table 10 shows the relaibilty (CR), convergent validity (AVE), and discriminant validity among the dimensions of strategic thinking and absorptive capacity.

Table 10

Reliability, Convergent Validity, and Discriminant Validity for the Dimensions of Absorptive Capacity and Dimensions of Strategic Thinking

	CR	AVE	1	2	3	4	5	6	7
1. Acquisition	0.848	0.651	0.807						
2. Assimilation	0.933	0.876	0.461	0.936					
3. Transformation	0.899	0.748	0.393	0.639	0.865				
4. Exploitation	0.811	0.589	0.273	0.449	0.517	0.768			
5. Systems Thinking	0.872	0.630	0.099	0.164	0.111	0.108	0.794		
6. Reframing	0.876	0.541	0.269	0.258	0.330	0.373	0.549	0.735	
7. Reflection	0.879	0.644	0.373	0.415	0.551	0.427	0.313	0.475	0.802

AVE values for all four dimensions of absorptive capacity and three dimensions of strategic thinking were above 0.50 providing support for the convergent validity (Fornell & Larcker, 1981). The CR that assesses the reliability of the constructs had values above the 0.7 cut-off point for all the dimensions, which suggest that all dimensions as measured with the given indicators have good reliability (Chin, 1998). The discriminant validity among the seven dimensions is also established because the square root of AVE (represented diagonally) for each latent variable is higher than its correlation with any other latent variable. To confirm the convergent and discriminant validities of the constructs used in hypotheses testing, the reliability, convergent validity, and discriminant validity were also assessed using strategic thinking as a composite measure along with the four dimensions of absorptive capacity. Finally, reliability, convergent validity, and discriminant validity were also assessed at the construct level of strategic thinking and absorptive capacity. Table 11 and Table 12 show respective reliabilities, convergent validities, and discriminant validity among latent constructs.

Table 11

Reliability, Convergent Validity, and Discriminant Validity for Strategic Thinking and Dimensions of Absorptive Capacity

	CR	AVE	1	2	3	4	5
1. Acquisition	0.848	0.651	0.807				
2. Assimilation	0.955	0.876	0.455	0.936			
3. Transformation	0.899	0.748	0.389	0.638	0.865		
4. Exploitation	0.811	0.589	0.270	0.450	0.516	0.768	
5. Strategic Thinking	0.808	0.590	0.362	0.387	0.503	0.446	0.768

Table 12

Reliability, Convergent Validity, and Discriminant Validity for Absorptive Capacity and Strategic Thinking

	CR	AVE	1	2
1. Absorptive Capacity	0.854	0.595	0.772	
2. Strategic Thinking	0.807	0.590	0.557	0.768

Table 11 reflects that the reliability and convergent validity of all latent constructs is above the threshold of 0.7 and 0.5 respectively. All latent constructs also demonstrate discriminant validity because the square root of AVE of every latent construct exceeds its correlation with any other latent construct. Similarly, Table 12 shows that reliability, convergent validity, and discriminant validity is also established at the composite construct level of strategic thinking and absorptive capacity.

Summary

In Chapter 3, first, the constructs and measures were discussed. Specifically, the operationalization of construct dimensions and sub-dimensions was presented. Next, details of the pilot study were presented, which included pre-pilot testing (instrument refinement using a panel of experts and student samples), sampling frame for the pilot study, and sample used for the pilot study. The purpose for the pilot study was to assess the reliability and validity of the survey instrument. The details of EFA and CFA conducted on the pilot study data were provided to explain the reliability and validity of the survey instrument. Then, details of the main study including the first-phase data collection and full data collection are presented. The details of EFA and CFA for full data are provided next. After the successful demonstration of the reliability, convergent validity, and discriminant validity among the study constructs, it was concluded that the constructs are suitable for further analyses, i.e., hypotheses testing. The constructs were then

subjected to regression analyses to test the hypotheses stated in Chapter 2. The results of

hypotheses testing are discussed in the next chapter.

CHAPTER 4

RESULTS

Introduction

This chapter empirically tests the hypotheses that were developed in Chapter 2 to assess specific relationships between absorptive capacity and strategic thinking. Hypotheses testing was conducted using the linear regression tool in SPSS. In what follows, first the descriptive statistics of the latent constructs of the study are presented. Then, the first research question, what is the relationship between strategic thinking and absorptive capacity, is empirically examined. Next, the second research question, are there any specific groups present that are homogeneous within but are heterogeneous, from each other in terms of the relationship between absorptive capacity and strategic thinking, is examined by empirically testing hypotheses 2a-2b and hypothesis 3 presented in Chapter 2. Regression results are also presented in tabular form.

Descriptive Statistics and Preliminary Tests

Descriptive statistics and correlations for the main study constructs are presented in Table 13. Because of the nature of the data collection method, there is potential for the existence of common method bias in the measures. I used Harman's single-factor test to confirm the absence of common method variance in the measures. All observed variables were subjected to factor analysis to see whether a single factor emerges that accounts for the majority of the variance. The Harman's test confirmed that common method bias was not present because one factor accounted for only 30.19% of the overall variance, which is less than the threshold of 50% (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Table 13

Descriptive Statistics and Correlations for Main Study

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Firm Age	4.07	1.08	–								
2. Firm Revenue	3.51	1.46	0.41**	–							
3. Acquisition	4.03	0.79	-0.07	0.04	–						
4. Assimilation	4.09	0.95	-0.05	0.08	0.46**	–					
5. Transformation	3.90	0.89	0.04	0.02	0.39**	0.63**	–				
6. Exploitation	4.30	0.65	-0.05	-0.05	0.27**	0.44**	0.51**	–			
7. Absorptive Capacity	4.08	0.64	-0.04	0.04	0.69**	0.85**	0.83**	0.68**	–		
8. Strategic Thinking	4.30	0.48	0.05	0.01	0.31**	0.35**	0.43**	0.40**	0.48**	–	
9. Firm Type	0.32	0.46	0.02	0.15*	0.14*	0.22**	0.13*	0.09	0.20**	0.03	–

$N = 219$, ** $p < 0.01$. * $p < 0.05$. Firm Type coded as 0 = "others" and 1 = "Prospectors."

Hypotheses Testing

Hypothesis 1

Hypothesis 1 states that strategic thinking is significantly related to absorptive capacity. This hypothesis was tested using a composite measure of strategic thinking as the independent variable and a composite measure of absorptive capacity as the dependent variable. The arithmetic mean of items was used to compute the composite constructs for both the strategic thinking and absorptive capacity variables. Hypothesis 1 is supported, as results suggest that strategic thinking is significantly related to absorptive capacity ($\beta = 0.48$, $p = 0.000$). A summary of regression findings is presented in Table 14.

Hypothesis 2

Hypotheses 2 (hypotheses 2a, 2b, 2c, and 2d) explored whether the relationship between strategic thinking and four dimensions of absorptive capacity for prospector is different from other type of firms. To test hypotheses 2a, 2b, 2c, and 2d, a dummy variable for firm type was created such that prospectors = '1' and all else = '0'. In addition, to test the difference in the

relationship between strategic thinking and dimensions of absorptive capacity an interaction term

(strategic thinking X firm type) was created. Four models were created to test the four

hypotheses (i.e., hypotheses 2a, 2b, 2c, and 2d).

Table 14

Regression Results for the Main Study

	ACAP	Acquisition	Assimilation	Transformation	Exploitation	ACAP
Firm Age	-0.09	-0.13	-0.12	0.01	-0.06	-0.10
Firm Size	0.06	0.07	0.10	-0.00	-0.03	0.05
Strategic Thinking (H1)	0.48**	0.44**	0.48**	0.54**	0.58**	0.65**
Firm Type		0.13*	0.20**	0.12	0.08	0.18**
ST X Firm Type (H2, H3)		-0.17^	-0.19*	-0.16^	-0.24**	-0.24**
R-Square	0.24	0.14	0.20	0.21	0.20	0.30

$N = 219$, ** $p < .01$, * $p < .05$, ^ $p < .1$. Standardized Coefficient shown.

ACAP = Absorptive Capacity. ST = Strategic Thinking. Firm Type is coded as 0 = "others" and 1 = "Prospectors."

Model 1 was created to test hypothesis 2a, which states that the relationship between

strategic thinking and acquisition is stronger for prospectors than other type of firms. In model 1,

acquisition was used as the dependent variable while strategic thinking, dummy variable for firm

type, and the interaction term "strategic thinking X firm type" were used as independent

variables. A significant coefficient for interaction term reflects that the relationship between

strategic thinking and acquisition for prospectors significantly differs from other firms. Thus, the

results of the regression analysis do not support hypothesis 2a. Although the coefficient for the

interaction term "strategic thinking X firm type" is moderately significant ($\beta = -0.17$, $p = 0.057$)

but in the opposite direction.

Model 2 was created to test hypothesis 2b, which states that the relationship between

strategic thinking and assimilation is weaker for prospectors than other type of firms. Statistical

analysis for model 2 followed the same pattern as model 1, with assimilation as the dependent

variable. The coefficient for the interaction term "strategic thinking X firm type" is significant (β = -0.19, p = 0.031). Thus, results of the regression analysis support hypothesis 2b and suggest that the relationship between strategic thinking and assimilation is significantly lower for prospectors in comparison to other type of firms.

Model 3 was created to test hypothesis 2c, which states that the relationship between strategic thinking and transformation is weaker for prospectors than other type of firms. Again, statistical analysis for model 3 followed the same pattern as model 1, with transformation as the dependent variable. The coefficient for the interaction term "strategic thinking X firm type" is moderately significant (β = -0.16, p = 0.055). Thus, results of the regression analysis support hypothesis 2c, and suggest that the relationship between strategic thinking and transformation is significantly lower for prospectors in comparison to other type of firms.

Model 4 was created to test hypothesis 2d, which states that the relationship between strategic thinking and exploitation is weaker for prospectors than other type of firms. As above, statistical analysis for model four followed the same pattern as model 1, with exploitation as the dependent variable. The coefficient for the interaction term "strategic thinking X firm type" is significant (β = -0.24, p = 0.005). Thus, results of the regression analysis support hypothesis 2d, and suggest that the relationship between strategic thinking and assimilation is significantly lower for prospectors in comparison to other type of firms.

Hypothesis 3

Hypothesis 3 states that, overall, the relationship between strategic thinking and absorptive capacity for prospectors is different from those of other type of firms. To test hypothesis 3, the composite measure of absorptive capacity was used as the dependent variable. The rest of the statistical analysis was the same as used for hypotheses 2a-2d. Strategic thinking,

dummy variable for firm type, and the interaction term "strategic thinking X firm type" were used as independent variables. Regression results support hypothesis 3. The coefficient for the interaction term "strategic thinking X firm type" is significant (β = -0.24, p = 0.003). It implies that the overall relationship between strategic thinking and absorptive capacity is significantly lower for prospectors in comparison to other type of firms.

CHAPTER 5

DISCUSSION AND CONCLUSION

Given the prevalence of environmental dynamism in various industries, organizational adaptation is inevitable. Organizations adjust their structure and strategy to adapt to changes in the industry. Absorptive capacity has emerged as an important capability-anchored construct that can explain how organizations efficiently adapt to the changes in the environment. However, the research on the factors that influence the absorptive capacity of organizations is limited. This study is the first attempt to theorize and empirically investigate the relationship between absorptive capacity and one of its antecedents, "strategic thinking." Therefore, the primary objectives of this study are to (1) understand the relationship between strategic thinking and absorptive capacity, and (2) characterize this relationship across identifiable groups of organizations. Extant literature suggests that this relationship has not been adequately explored in the past and that no framework exists to characterize the relationship between strategic thinking and absorptive capacity.

To address these gaps in the literature, I first used capability theory and Miles & Snow's (1978) organizational adaptation process to explore the relationship between strategic thinking and absorptive capacity. Both frameworks suggest that strategic thinking and absorptive capacity are part of the organizational change process and therefore are aligned with each other. Strategic thinking, as a metaphysical capability of the organization, is a necessary antecedent to initiate and manage organizational change. Strategic thinking enables organizations to acquire, assimilate, transform, and exploit the knowledge needed for appropriate and adequate organizational adaptation.

Most of the previous literature on strategic thinking and absorptive capacity used contingency theory and capability theory to suggest the idiosyncratic nature of these two capabilities. Uniqueness to the organization makes them an ideal candidate to pull off sustained competitive advantage (Kotabe et al., 2017; Liedtka, 1998; Moon, 2013; Narasimhan, Rajiv, & Dutta, 2006; Tsai, 2001). Mere organization level elucidation, however, makes further investigation of this relationship difficult and somewhat futile. The absence of a generalized theory to explain the relationship between strategic thinking and absorptive capacity makes the development of practitioner-focused prescriptions difficult. Therefore, I suggested that the relationship between strategic thinking and absorptive capacity could be grouped based on organizations' strategic orientation. The findings of this study that strategic thinking and absorptive capacity as organizational capabilities can be grouped among organizations corroborates Eisenhardt and Martin's (2000) conceptualization of capabilities, as they suggested that the "functionality of dynamic capabilities can be duplicated across firms" (Eisenhardt & Martin, 2000, p. 1106). Similarly, previous research (e.g., Eisenhardt & Martin, 2000; Peteraf, Di Stefano, & Verona, 2013) also suggested that organizational capabilities could be homogeneous. However, how capabilities are duplicated and why capabilities can be homogeneous has not been explored in the past research, nor has any empirical evidence been presented.

One of the major contributions of this study is providing the empirical evidence that commonalities exist among organizations in terms of organizational capabilities. Specifically, the identification of the unique alignment between strategic thinking and absorptive capacity provides support to the notion that organizations exhibit common processes to deal with environmental changes and undergo a similar organizational adaptation process. In addition, this study explored boundary conditions for commonalities. It showed that the alignment of

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capabilities is homogeneous within the type of organizations based on their strategic domain, but, outside the strategic domain, the alignment between strategic thinking and absorptive capacity is heterogeneous. This study used Miles and Snow's typology (prospectors, defenders, and analyzers) to establish the difference in the relationship between strategic thinking and absorptive capacity. I tested this hypothesis at the construct as well as the dimensional level of absorptive capacity. The results of this study are summarized in Chapter 4. Study results provide some interesting insights about the differences between prospectors and other type of firms. The discussion of the findings of this study is presented next.

<div align="center">Findings</div>

Hypothesis 1

Hypothesis 1 posited that there is a positive relationship between absorptive capacity and strategic thinking. The relationship between strategic thinking and absorptive capacity came out as significant and positive in the analysis. The results provide assurance that strategic thinking makes managers cognizant of changes in the environment – a necessary precursor devising internal changes needed to align the organization with its environment. This study supports and provides empirical evidence to the theoretical argument offered by Lietdka (1998) that strategic thinking allows managers to devise strategic decisions that in turn help organizations adapt to changes in the external environment. Of course, organizational adaptation is a dynamic process and any modifications in the existing strategy and structure are governed by managerial insight that serve as sense-making conduits, and offer direction for organizational change (Gioia & Chittipeddi, 1991). Strategic thinking at the managerial level is instrumental in enabling a focus on the bigger picture relating to organization-environment relationships, and the deployment of organizational capabilities (e.g., absorptive capacity) to implement changes (Barr et al., 1992).

Hypotheses 2a-2d

Hypothesis 2a posited that the relationship between strategic thinking and acquisition dimension of the absorptive capacity is stronger for prospectors as compared to other type of firms (defender and analyzers). Contrary to the expectation, the relationship between strategic thinking and the acquisition dimension of absorptive capacity for prospectors was not different from that of other type of firms. In fact, this relationship is weaker for prospectors in comparison to defenders. However, the difference is marginally significant at $p = 0.057$. Results suggest that defenders and analyzers also scan their environment as frequently as prospectors do. It seems that although defenders and analyzers do not intend to develop new products or services, they acquire substantial information about their current market, customers, and competitors. Since both defenders and analyzers aggressively defend their territory, they focus on developing a strong acquisition capability that is focused on their existing product-market domain. In addition, analyzers keep a close track on the development of new product and market domain (although they do not create new product/market domain by themselves) and therefore focus on developing strong acquisition capabilities. Another reason for not finding the support for this hypothesis could be the industry effect. The target industry for this study is the software industry, which is highly dynamic. Because of the rate of change in the environment of the software industry, all organizations invest time and effort in scanning the external environment regardless of their strategy type.

Hypothesis 2b posited that the relationship between strategic thinking and the assimilation dimension of the absorptive capacity is weaker for prospectors as compared to other type of firms (defender and analyzers). The results suggest that the relationship between strategic thinking and assimilation is significantly weaker for prospectors than defenders, which

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validated the assumption of the study that the strong outward focus of prospectors deviate their attention from capabilities that are required to internalize the gathered information. Another reason could be information overload faced by managers in prospector organizations, limiting their ability to adequately assimilate all the new information that is acquired (Edmunds & Morris, 2000).

Hypothesis 2c posited that the relationship between strategic thinking and the transformation dimension of the absorptive capacity is weaker for prospectors as compared to other type of firms (defender and analyzers). The hypothesis is marginally supported at $p = 0.055$ significant level. It seems that prospectors put less emphasis on developing transformation capability in comparison to other type of organizations. It is also likely that the process of transformation itself may significantly differ between prospectors and other type of firms. Prospectors develop transformation capability to transform the acquired information into knowledge that provides capability to create new and innovative products and services, whereas defenders and analyzers utilize their transformation capability to devise strategies that enhance their efficiency in defending their existing product-market domain.

Hypothesis 2d posited that the relationship between strategic thinking and transformation dimension of the absorptive capacity is weaker for prospectors as compared to other type of firms (defender and analyzers). As expected, the relationship between strategic thinking and exploitation capability for prospectors is significantly weaker for prospectors in comparison to defenders. Since the strategic thinking of prospectors is to look for new opportunities and continue to develop new product-market domains, they devote less of their strategic thinking efforts to support the development and sustenance of exploitation capabilities. On the other hand, defenders and analyzers are aggressive in their existing markets with limited product offerings.

Therefore, the strategic thinking of defenders and analyzers focuses on developing exploitation capabilities that allow efficient uses of existing exploitation capabilities. Support for this hypothesis provides empirical proof to Miles and Snow's (1978) assumption that "for a prospector, maintaining a reputation as an innovator in product and market development may as important as, perhaps even more important, than high profitability" (p, 551).

Hypothesis 3

Hypothesis 3 posited that the relationship between strategic thinking and absorptive capacity at the construct level is different for prospectors than other types of firms. The results of this study confirm that, based on the differences in the strategic orientation of prospectors and other types of firms, the relationship between strategic thinking and absorptive capacity can be categorized into at least two groups.

Implications and Future Research

Conceptualization of strategic thinking as an antecedent of absorptive capacity provides several research and managerial implications and is in line with recent calls to research antecedents of absorptive capacity in details (Roberts, 2015; Setia & Patel, 2013; Volberda et al., 2010). Research can also be expanded to identify specific resources, capabilities, and processes that are needed to maintain a stable strategic thinking and absorptive capacity. Leadership, upper echelon, and other organizational level theories can be used to identify some of the factors that enhance strategic thinking (Bass, 1969; Hambrick & Mason, 1984). Moon (2013) found that attitude toward risk, centralization, interdepartmental teams, and technological competency positively influence strategic thinking. More recently, Goldman et al., (2015) discussed work experience, work environment, and professional education and development as some of the techniques to develop strategic thinking and call for further research in this area.

Characterizing this relationship based on the type of strategic orientations of the organization provides a starting point to explore the homogeneity of relationship within each group and heterogeneity of the relationship across groups. Practitioners can use the group-specific norms to assess the appropriateness and alignment of their organization's strategic thinking and absorptive capacity. The results of this study suggest that the relationship between strategic thinking and absorptive capacity is germane to the strategic orientation of the organization. By extension, identifying and understanding group-specific strategic thinking and absorptive capacity is critical to attaining a strong competitive position in the product-market domain. In addition, firms can use the heterogeneity in relationship to move from one strategic domain to another. The level of heterogeneity across domains will play a crucial role in such transitions. The greater the heterogeneity across domains, the greater the requirements for organizational adjustments.

Absorptive capacity represents the ability of the organization to capture and gainfully utilize new knowledge, be it from within or outside the organization. The ability to characterize an appropriate level of absorptive capacity for an organization based on its chosen strategic orientation can provide additional insight on how organizations maintain their competitive position. At the construct level, the results of this study suggest that prospectors should strengthen their absorptive capacity if they want to move to a more stable product-market domain. In addition, this study went a step further and explored the strategic thinking and absorptive capacity relationship at the dimension level. The results suggest that the difference in absorptive capacity between prospectors and other type of organizations are, in fact, at the dimension level. The relationship of strategic thinking with individual components of absorptive capacity then opens another venue for research. Based on the results of this study, I suggest that

researchers need to look at the process of knowledge generation through absorptive capacity rather than considering absorptive capacity as a composite capability (Daspit & D'Souza, 2013).

A constant flux in the external environment requires repeated and sometimes continuous realignment of the organizations' capabilities (Tushman & Romanelli, 1985). As empirically proven in this study, the extent of the realignment of strategic thinking (a metaphysical capability of the organization) and absorptive capacity (a dynamic capability of the organization) differs based on the strategic orientation of organizations. A further exploration of this relationship in the context of a dynamic and uncertain environment is imperative. For example, a highly idiosyncratic absorptive capacity can be limiting in a dynamic environment, as it can lead to competency traps (Levitt & March, 1988). Therefore, an organizations' choice in developing absorptive capacity has vital implications for survival in changing environment, and these choices are rooted in the strategic thinking of managers. Furthermore, since both strategic thinking and absorptive capacity must be aligned for optimum outcomes, a shift in strategic thinking also becomes necessary in a dynamic environment. Empirical and modeling based research on the dynamic/evolutionary relationship between strategic thinking, absorptive capacity, and environmental dynamics within each strategic group would probably be the first steps that researchers should take to develop a better understanding of these complex relationships.

Finally, future research on strategic thinking and absorptive capacity relationship that includes reactors can offer prescriptions for managers to develop a better insight into their own and organizational capabilities, identify the suitable strategic group, and establish the mechanism that allows sustainable operations given the selection of the group.

Limitations

Despite the theoretical and empirical contributions offered by this study, as with every study, there are some limitations that should be acknowledged. First, the study results may not be generalizable to other industries and should be interpreted in the context of the software industry. Future research using multiple industries will provide a rich comparison of the relationship between strategic thinking and absorptive capacity. It is possible that the relationship between strategic thinking and dimensions of absorptive capacity depends on the industry life cycle. For example, one may find in a mature industry that organizations with different strategic orientations have a similar focus on all four dimensions of absorptive capacity.

Emanating from the issue of generalizability, the scale for strategic thinking developed in this study should be used with caution. Although adapted from the previous literature, the scale of strategic thinking was modified based on a capability-based view of the construct. In this study, I adopted an organizational perspective and viewed strategic thinking as a metaphysical (second-order) capability of the organization. The new definitions of the underlying dimensions of strategic thinking (systems thinking, reframing, and reflection) that are offered in this study reflect this capability-anchored characterization of the strategic thinking construct. Although, the capability-centric scale development process was robust and due diligence was undertaken at every stage of the development, the scale is only used and validated in the single industry (software industry). Future multi-industry research will offer validation and generalizability to the strategic thinking scale developed in this study.

The internal reliability, measured as Cronbach's alpha, for the exploitation dimension of absorptive capacity is 0.64, which is below the threshold of 0.7 (Nunnally, 1978). However, other researchers suggest that Cronbach's alpha in the range of 0.6 to 0.69 are moderate and

should be acceptable (Robinson et al., 1991). Regardless, there is room for the improvement and future studies can refine the scale of exploitation dimension to enhance the internal consistency of the construct.

Conclusion

Processes that initiate and support organizational change are central to strategic management research (Daft & Weick, 1984; Van de Ven & Huber, 1990). In this study I take a pioneering step to theoretically position strategic thinking as a second-order (metaphysical) capability and empirically test its relationship with absorptive capacity, which has been shown to be a second order (dynamic) capability of the organization. This study empirically tests and demonstrates a positive relationship between strategic thinking and absorptive capacity at the construct level and at the dimensional level. In addition, using Miles and Snow's (1978) typology, this study proposed and empirically tested that the relationships between strategic thinking and absorptive capacity of organizations can be categorized into at least two groups. The findings are consistent with both capability theory (Collis, 1994; winter, 2000) and the organizational adaptation process explained by Miles and Snow (1978). Since both absorptive capacity and strategic thinking play key roles in the organizational adaptation process, I believe that the results of this study will help researchers to understand the organizational change phenomenon at a more granular level.

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