An empirical examination of the relationship between managerial strategic thinking and absorptive capacity of the organization

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Abstract

Purpose – Recently, researchers have highlighted the limited attention that has been devoted to managerial capabilities as micro-foundational elements of absorptive capacity. Strategic thinking is one such managerial capability that guides managers during the development of organizational capabilities. The purpose of this paper is to empirically investigate the influence of managerial strategic thinking on the development of absorptive capacity.

Design/methodology/approach – Data were collected using a sample of 324 senior-level and mid-level managers from the software industry. PLS-SEM was used to test the hypothesized relationships.

Findings – Study results indicate that managerial strategic thinking is positively related to absorptive capacity, as well as to each of its four components – acquisition, assimilation, transformation and exploitation.

Originality/value – The current study adopts a micro-foundations perspective and delves into the development and orchestration of organizational capabilities. This study is the first to empirically investigate the relationship between managerial strategic thinking and absorptive capacity. Prior literature on absorptive capacity has focused on its influence on phenomena that are downstream to absorptive capacity, e.g. innovation, new product development and firm performance. The research offers new insights into the relationship between absorptive capacity and managerial strategic thinking, a hitherto unexplored upstream phenomenon. Scholars have theorized that managerial strategic thinking plays a pivotal role in managerial decisions, making it a critical factor in developing the absorptive capacity of an organization. The authors believe that the empirical evidence of the theorized relationship offers valuable insights that will aid scholarly research on organizational capabilities.

Keywords Absorptive capacity, Organizational capabilities, Managerial strategic thinking

Paper type Research paper

Introduction

In recent years, the absorptive capacity construct has emerged as a well-accepted conceptualization of organizational capability that enables the acquisition of new knowledge, its assimilation within the existing knowledge set, transformation of the assimilated knowledge into new knowledge, and its application to reconfigure business activities such that the organization remains aligned with its changing environment (Volberda *et al.*, 2010; Zahra and George, 2002). Absorptive capacity plays a pivotal role in delivering organizational performance (Volberda *et al.*, 2010). Despite a rich stream of theoretical and empirical scholarship, scholars have noted that the absorptive capacity construct is yet to be explored to its full potential (Cosaert *et al.*, 2018; Volberda *et al.*, 2010).

Recently, scholars have drawn attention to the micro-foundational perspective of organizational capabilities (Felin and Foss, 2005; Felin *et al.*, 2015; Helfat and Peteraf, 2015; Salvato and Rerup, 2011) and have highlighted the limited attention paid to managerial capabilities as micro-foundational antecedents of absorptive capacity (Lewin *et al.*, 2011; Yao and Chang, 2017). In general, antecedents of absorptive capacity have been classified

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into three groups: intra-organizational, inter-organizational and managerial (Volberda *et al.*, 2010; Rezaei-Zadeh and Darwish, 2016); however, limited attention has been paid to managerial-level antecedents. In fact, Volberda *et al.* (2010, p. 944) posited that, "[…] the understanding of absorptive capacity as a dependent variable, absent of a consideration of the level of individuals and their action, maybe inherently incomplete […] Research on absorptive capacity should explain the impact of individuals on absorptive capacity."

Despite repeated scholarly calls for research, investigations of the influence of managers on the development of an organization's absorptive capacity are sparse (Cosaert *et al.*, 2018; Distel, 2019; Yao and Chang, 2017). The lack of research on the manager's role in developing absorptive capacity is problematic because managers are the "primary source of knowledge and knowledge transfer" (Argote and Ingram, 2000, p. 156). As Barnard (1968) succinctly notes: "the individual is always the basic strategic factor of the organization" (p. 139). Therefore, it is prudent to argue that the source and the origin of knowledge-generating capabilities, such as absorptive capacity, lie in managerial capabilities (Felin and Foss, 2005; Kor and Mesko, 2013; Valentim *et al.*, 2016). Drawing on the original assumption of Cohen and Levinthal (1990) that highlights the role of individuals in the development of absorptive capacity, we focus our investigation on the role of managerial strategic thinking in the development of an organization's absorptive capacity.

To address environmental changes, managers need to keep abreast of critical trends and acquire necessary resources to support the development of organizational capabilities (Teece, 2016). The strategic thinking of managers plays a critical role in these determinations (Gross, 2017; McKenzie *et al.*, 2009). Managerial strategic thinking is defined as a capability that enables managers to understand, evaluate and make sense of a given context. Managerial strategic thinking has been shown to enable cognizant of the relationship between organizational processes and the environment (Barr *et al.*, 1992; Jelenc and Pisapia, 2015; Moon, 2013) and thus, it enables managers to understand the need to develop capabilities that address environmental changes (Teece, 2016; Kor and Mesko, 2013). Scholars have found that absorptive capacity plays a critical role in dealing with the uncertain environment (Cosaert *et al.*, 2018; Distel, 2019; Zahra and George, 2002). Others have supported these arguments by noting that managers must think strategically as they strive to efficiently develop and orchestrate the absorptive capacity of the organization (Rezaei-Zadeh and Darwish, 2016; Ocasio, 2011; Cohen and Levinthal, 1990). We posit that managers who are strategic thinkers support the development of the absorptive capacity in the organization, and thus, the managerial strategic thinking should be positively related to organizational absorptive capacity. However, there is a dearth of empirical investigations to validate this relationship. Hence, the purpose of this study is to empirically investigate the influence of managerial strategic thinking on the development of absorptive capacity.

The paper is structured as follows: first, a discussion of underlying theories to support the relationship between managerial strategic thinking and absorptive capacity is presented. Second, a brief review of the constructs-of-interest is offered. Next, a series of testable hypotheses are developed on the relationship between managerial strategic thinking and absorptive capacity. After that, details on the empirical investigation are presented, followed by an analysis of the results. The paper concludes with a discussion of the findings and their implications.

Theoretical development and hypotheses

Our investigation is anchored in the managerial capability literature that supports the role of managerial capabilities in the development of organizational capabilities (Adner and Helfat, 2003; Helfat and Martin, 2015; Kor and Mesko, 2013). Managers are responsible for defining and redesigning the competitive boundaries in dynamic environments (Castanias and Helfat, 1991; Teece, 2016, 2017). To succeed in this endeavor, managers must create

capabilities to develop new knowledge such that organizational processes remain aligned with the changing environment (Teece, 2016; Volberda *et al.*, 2010; Zahra and George, 2002).

Absorptive capacity is one such capability that allows organizations to identify and acquire the relevant information from the environment, assimilate it to create new knowledge, and apply it to commercial ends (Cohen and Levinthal, 1990; Todorova and Durisin, 2007). The role of absorptive capacity in knowledge generation is well recognized in the literature (Cosaert *et al.*, 2018; Distel, 2019; Kotabe *et al.*, 2017). Organizations understand the importance of external knowledge and invest in the development of absorptive capacity (Yao and Chang, 2017). To develop an organization's absorptive capacity, managers must be cognizant of the dynamic relationship between organizational processes and the environment, the gap between internal processes and required changes, and the ability to explore and assess multiple options in terms of the new knowledge and its utility. Managerial strategic thinking is a capability that enables the development of these competencies in managers.

Research suggests that managerial strategic thinking is a capability that enables a holistic understanding of the organization, and it allows managers to understand the interdependencies between the organization and its environment (Fontaine, 2008; Norzailan *et al.*, 2016). Therefore, managers who are strategic thinkers understand the value of an acquisition capability that allows organizations to collect information from the environment. Further, managerial strategic thinking enables managers to understand that divergent views and multiple perspectives are required to comprehend the information collected from the environment and transform them into comprehensible forms (Gross, 2016; Pisapia *et al.*, 2009). Overall, managerial strategic thinking enables managers to collect and interpret new information on the environment (Gross, 2016, 2017), which allows managers to appropriately assess the interface between organizational processes and the changing environment. Besides, managerial strategic thinking has been found to enable managers to use multiple perspectives to assess this interface (Pisapia *et al.*, 2009), which in turn allows them to create new and unconventional solutions (McKenzie *et al.*, 2009). Since managerial strategic thinking leads to decisions that are based on "ongoing acquisition of new knowledge and strategic direction" (Gross, 2017 p. 64), this study suggests that managers who are strategic thinkers support the development of absorptive capacity in their organization. Next, a brief review of absorptive capacity and managerial strategic thinking is presented, followed by hypotheses development.

Absorptive capacity

Cohen and Levinthal (1990, p. 128) offer one of the most cited definitions of absorptive capacity as the organization's "ability to recognize the value of new information, assimilate it, and apply it to commercial ends." Zahra and George (2002) offer a widely accepted operationalization of absorptive capacity as a combination of four capabilities – acquisition, assimilation, transformation and exploitation. The acquisition dimension represents an organization's ability to identify and collect new information that is critical for an organization's operations. Assimilation represents an organization's ability to absorb and interpret newly acquired information (Zahra and George, 2002). That is, assimilation enables organizations to understand the newly acquired information, determine whether it fits with the organization's existing knowledge set, and alter the new information such that it can be assimilated (Lefkowitz and Lesser, 1988). Transformation represents an organization's ability to combine existing knowledge with the newly assimilated knowledge to arrive at a new knowledge schema (McGrath and MacMillan, 2000). Exploitation represents the incorporation of new knowledge schema into an organization's existing operations (Zahra and George, 2002).

Although the four dimensions taken together represent absorptive capacity at the "construct level," each serves a unique purpose and therefore, can be characterized as distinct "dimensional-level" capability in terms of their functionality (Jansen *et al.*, 2005).

For example, an organization can have superior acquisition capability but a weaker exploitation capability. Such an organization will fail to utilize new information for new product/service development (Baker *et al.*, 2003). Therefore, it is vital to investigate the influence of managerial strategic thinking on absorptive capacity at both the construct level and at the dimensional level.

Antecedents of absorptive capacity

Volberda *et al.* (2010) note that the antecedents of absorptive capacity can be categorized into three groups: inter-organizational antecedents, intra-organizational antecedents, and managerial antecedents. Inter-organizational antecedents of absorptive capacity that have been identified in the literature include prior knowledge (Cohen and Levinthal, 1990; Puranam *et al.*, 2009), similarity in compensation practices, structures, problem sets (Lane and Lubatkin, 1998), partner's cognitive attention (Andersen and Kask, 2012) and network position (Jansen *et al.*, 2005). Intra-organizational antecedents that have been shown to influence absorptive capacity are formalization, routinization, cross-functional interfaces and job rotation (Adams *et al.*, 2016; Jansen *et al.*, 2005), RD intensity (Tsai, 2001), type of knowledge flows (Van Wijk *et al.*, 2008), structural and human capital (Engelman *et al.*, 2017) and organizational integration (Distel, 2019). Managerial antecedents that have been explored by scholars include managerial cognition (Zahra and George, 2002; Volberda *et al.*, 2010), dominant logic (Eggers and Kaplan, 2009; Volberda *et al.*, 2010; Rezaei-Zadeh and Darwish, 2016), leadership styles (Flatten *et al.*, 2015), learning goal orientation (Yao and Chang, 2017), perspective talking and creative behavior (Distel, 2019), systems thinking (Kim *et al.*, 2014) and managerial strategic thinking (Bonn, 2005; Pisapia *et al.*, 2005).

One striking difference among the three groups of antecedents is that two of these groups – inter-organizational and intra-organizational antecedents – represent relatively indirect influence on absorptive capacity. While the third group – managerial antecedents – by its very nature has the potential to directly influence the absorptive capacity of the organization (Volberda *et al.*, 2010; Rezaei-Zadeh and Darwish, 2016). Managerial antecedents like dominant logic, leadership style, learning goal orientation and managerial strategic thinking represent active vectoral forces that can be readily configured by managers to directly influence the development of absorptive capacity. Besides, researchers have noted that managerial antecedents also influence absorptive capacity indirectly through intra-organizational and inter-organizational antecedents (Rezaei-Zadeh and Darwish, 2016), making them the most influential group of antecedents of absorptive capacity.

Earlier, we highlighted several managerial antecedents of absorptive capacity found in the literature. There is scholarly discourse to suggest that the underlying thought process that enables these managerial antecedents of absorptive capacity is managerial strategic thinking. For example, some scholars have suggested that managerial strategic thinking serves as the "brain" of the organization (Prahalad and Hamel, 1994, p. 6). That is, it serves to activate and maintain other antecedents like dominant logic, leadership style, and learning goal orientation of managers. In the next section, we will delve into details of the managerial strategic thinking construct itself.

Managerial strategic thinking

Managerial strategic thinking has been characterized as a capability when the phenomena have been studied in the context of the strategic actions of an organization (Nuntamanop *et al.*, 2013; Goldman, 2012; Zahra and Nambisan, 2012). This study follows prior scholarly recommendations and characterizes managerial strategic thinking as one such capability. Early literature on managerial strategic thinking was influenced by the debate on conceptual differences between managerial strategic thinking and strategic planning since both were conceptualized interchangeably (Näsi, 1991; Porter, 1980; Wilson, 1994). Later,

researchers highlighted the conceptual differences and suggested that the two concepts are different and, in fact, managerial strategic thinking precedes strategic planning (Heracleous, 1998; Liedtka, 1998; Mintzberg, 1994; Graetz, 2002).

Over time, the conceptuilization of managerial strategic thinking had been refined (Dhir *et al.*, 2018). For example, early work by Heracleous (1998) characterized managerial strategic thinking as individuals' competencies in creative thinking and synthesizing. Graetz (2002) extended the characterization by conceptualizing managerial strategic thinking as individuals' ability in being creative, intuitive and innovative. Bonn (2005) presented a model of managerial strategic thinking that incorporated the abilities of systems thinking, creative thinking and vision orientation thinking. At about the same time, Pisapia *et al.* (2005) described a model of managerial strategic thinking that was also based on three similar abilities – systems thinking, reframing and reflection. Recent literature supports the capability characterization of managerial strategic thinking. For example, Nuntamanop *et al.* (2013) characterize managerial strategic thinking as a managerial competency characterized by conceptual thinking, visionary thinking, creativity, analytical thinking, learning, synthesizing and objectivity. Gross (2016) presented managerial strategic thinking as a construct that was comprised of three cognitive dimensions: systems thinking, reframing and reflection. Similarly, Dhir *et al.* (2018) conceptualize managerial strategic thinking as managerial capabilities in reflection, organizational awareness, trend analysis and pattern recognition.

A root-cause analytic review of the operationalization noted above suggests that they reflect three core dimensions. The first dimension is "systems thinking" that is noted by Bonn (2005), Pisapia *et al.* (2005) and Gross (2016). The second is "divergent thought processing" that leads to creative and innovative outcomes as noted by Heracleous (1998), Graetz (2002), Bonn (2005), Pisapia *et al.* (2005), Gross (2016) and Dhir *et al.* (2018). The third is "reflection" that represents the recursive use of knowledge and experiences in synthesizing a new vision for the future, as characterized by Heracleous (1998), Bonn (2005), Pisapia *et al.* (2005) and Dhir *et al.* (2018). Thus, in this study, managerial strategic thinking is conceptualized as consisting of three cognitive abilities, i.e. systems thinking, divergent thought processing and reflection. The following paragraphs offer brief discussions on each of the three dimensions of managerial strategic thinking used in this manuscript.

Managerial strategic thinking guides managers in visualizing the future (Zahra and Nambisan, 2012). Since moving forward requires organizations to engage with multiple components of their ecosystem, managers must understand the interrelationship among these components (Moon, 2013; Bonn, 2005). As Zahra and Nambisan (2012) suggest, managerial strategic thinking entails establishing linkages among different components. The dimension "systems thinking" represent this underlying theme. Other researchers have also noted that systems thinking represents the ability to view an organization holistically by recognizing the interdependencies within the system and across systems (Bonn, 2001, 2005; Capra, 2002; Pisapia *et al.*, 2005; Gross, 2016, 2017; Liedtka, 1998).

Managers must integrate divergent views to comprehend the complexities of organizational systems (Zahra and Nambisan, 2012). Such abilities are essential because they enable managers to think beyond existing conceptions and beliefs and connect events and issues that may otherwise seem fragmented (Robinson *et al.*, 1997; De Bono, 1996). While systems thinking enables managers to recognize that various organizational systems are interlinked, it may not provide the ability to interpret various complexities arising from the interdependencies between multiple systems. Managers must understand the nuances of each systems to comprehend the complex interconnectivity of these systems. Divergent thought processing represents the ability to collect and analyze rich information, then interpret it using multiple mental models (Gentner and Stevens, 2014; Pisapia *et al.*, 2005). In an organizational context, divergent thought processing complements systems thinking by enabling managers

to use multiple perspective/views to understand the interconnectedness of multiple idiosyncratic organizational systems (Bonn, 2005; Heracleous, 1998).

Managerial strategic thinking is central to the strategic decision making and planning processes, and reconciling competing hypotheses is a necessary element of the managerial strategic thinking process (Zahra and Nambisan, 2012). Reflection represents a cognitive process that allows managers to analyze a situation by referencing existing beliefs, perceptions and experiences, and then using the knowledge to solve the problem (Dewey, 1933). It embodies a sequential process used by managers to assess organizational situations within the boundary of organizational beliefs and vision. Moreover, strategic decision-making theories also suggest that reflection is an integral part of the overall decision-making process (Kahneman and Tversky, 1979).

Hypotheses development

To investigate the relationship between managerial strategic thinking and absorptive capacity, we anchor our development in the organizational capability literature. Specifically, we focus on the attention-based view of the firm that emphasizes the role of managers in the development of organizational processes and actions (Eggers and Kaplan, 2009; Kor and Mesko, 2013; Ocasio, 1997; Teece, 2016; Tushman and Rosenkopf, 1996). It posits that the strategic actions of an organization are shaped by managerial perceptions and interpretation of their environment (Daft and Weick, 1984; Cho and Hambrick, 2006). Specifically, what "[…] managers pay attention to shapes how they decide and act" (Eggers and Kaplan, 2009, p. 4). Managerial strategic thinking shapes managerial attention and interpretation and thus influences the decisions and actions of managers (Liedtka, 1998; Bonn, 2005; Moon, 2013). In the context of this study, managerial strategic thinking leads to the recognition of the need for change, and thus, the adaptive actions of the firm such as the development of organizational capabilities (Helfat and Martin, 2015; Teece, 2016). Drawing on current scholarly thinking on managerial capabilities, and absorptive capacity, this study posits that managerial strategic thinking is one such managerial capability that enables managers to influence the development of absorptive capacity in the organization (Bonn, 2005; Cohen and Levinthal, 1990; Distel, 2019; Lewin *et al.*, 2011; Teece, 2016; Yao and Chang, 2017; Zahra and George, 2002; Zahra and Nambisan, 2012).

Organizations do not operate in silos, and changes in the environment need to be addressed by making necessary adjustments in organizational processes. To make appropriate changes, however, managers need to understand how the environment affects their organization (Daft and Weick, 1984). Managerial strategic thinking enables managers to establish the relationship between the environment and organizational processes (Barr *et al.*, 1992; Capra, 2002; Gross, 2017). Once managers establish the linkage, they understand the need for new information/knowledge to adjust internal processes as per the environmental needs (Zahra and Nambisan, 2012). The recognition of the need for new knowledge triggers an adaptive response forcing managers to then focus on developing capabilities that will help the organization in acquiring/generating new knowledge (Floyd and Lane, 2000; Huff *et al.*, 1992). Thus, managers with sound strategic thinking capabilities are likely to promote the development of absorptive capacity. In addition, managerial strategic thinking enables managers to integrate divergent views to analyze, interpret and comprehend the complexities of the organizational ecosystem (Zahra and Nambisan, 2012). Managerial strategic thinking, thus, enables managers to think beyond existing conceptions and beliefs and connect events and issues that may otherwise seem fragmented (Robinson *et al.*, 1997; De Bono, 1996). Hence, managers that are strategic thinkers understand the need of capabilities that enable organizations in analyzing and interpreting new and diverse knowledge (Gentner and Stevens, 2014; Pisapia *et al.*, 2005), and therefore, are supportive the developing absorptive capacity in their organization.

Based on these arguments, we believe that managers that are strategic thinkers will support the development of absorptive capacity. Therefore, we posit that organizations, where managers are better strategic thinkers, are more likely to exhibit higher levels of absorptive capacity, and we hypothesize a positive relationship between managerial strategic thinking and the absorptive capacity of the organization:

H1. Managerial strategic thinking is positively related to absorptive capacity.

Barney (1986) notes that managerial strategic thinking enables managers to recognize valuable resources and unique market positions ahead of the competition. Since managerial strategic thinking opens up new opportunities that are different from the organization's current domain (Lumpkin and Dess, 1996; Venkatraman, 1989), managerial efforts are directed to acquire new information to support this discovery process. Managers who are good strategic thinkers are cognizant of the relationship between their business strategies and the environment (Liedtka, 1998). These managers understand that changes in the environments require changes in their strategies and internal processes (Pisapia *et al.*, 2005). Managerial strategic thinking, therefore, allows managers to understand the importance of dynamic balance with the environment and the constant need of new information that is required to maintain this balance (Capra, 2002) thus, are better positioned to envision the need to acquire additional information. For example, they may want to efficiently and effectively scan an appropriate range of environmental components to identify potential opportunities (Wang, 2008). Therefore, we posit that managers who are better strategic thinkers understand the importance of engaging with and scanning the information from the environment and, thus, are more likely to support the development of acquisition capabilities. In other words, organizations, where managers are strategic thinkers, are more likely to exhibit higher levels of acquisition capability. Therefore, we hypothesize a positive relationship between managerial strategic thinking and the acquisition dimension of absorptive capacity:

H2. Managerial strategic thinking is positively related to the acquisition dimension of absorptive capacity.

Assimilation enables organizations to fit the new information with the existing knowledge base by altering the existing organizational knowledge-base (Lefkowitz and Lesser, 1988). In order to recognize the need to develop assimilation capabilities, however, managers must understand that the new information acquired from the environment will likely be diverse and may not fit with the existing knowledge schema of the organization (Jansen *et al.*, 2005). Managers that have diversified knowledge and are efficient in applying divergent perspectives are cognizant of the diversity in newly acquired knowledge from the environment (McKenzie *et al.*, 2009). Managerial strategic thinking not only enables managers to establish a relationship with the environment but also enables them to apply multiple perspectives to assess and interpret the diversified knowledge from the environment (Gross, 2017). Managerial strategic thinking, thus, enables managers to, first, recognize that information emanating from the environment is different from organization's existing knowledge domain, and second, the necessity of linking the new information emanating from the environmental changes with the existing knowledge within the organization (Zahra and George, 2002; Todorova and Durisin, 2007). Drawing on the attention-based view of the firm (Ocasio, 1997), we posit that since managers perceive and interpret the need to combine the new information with an existing knowledge domain, they are likely to support the development of capabilities that can internalize newly acquired knowledge. Jansen *et al.* (2005) also suggested the having diverse perspectives support the assimilation of new knowledge. Based on these arguments, we argue that managers who are better strategic thinkers are more cognizant of the importance of supporting organizational

capabilities that enable the assimilation of new information. Therefore, we posit that organizations, where managers are better strategic thinkers, are more likely to exhibit higher levels of assimilation capability, and we hypothesize a positive relationship between managerial strategic thinking and the assimilation dimension of absorptive capacity:

H3. Managerial strategic thinking is positively related to the assimilation dimension of absorptive capacity.

The transformation dimension of absorptive capacity represents the ability to combine existing knowledge with newly assimilated knowledge to arrive at a new knowledge schema (McGrath and MacMillan, 2000). Senge (1990, p. 8) argued that existing schemas represent "deeply ingrained assumptions" that shape the manager's view of the world and restrict managerial thought processes to known and familiar paths. Scholars have examined and found support for the notion that existing cognitive schemas and routines need to be abandoned or transformed to fit the new knowledge, (Balogun and Johnson, 2004; Todorova and Durisin, 2007; Zollo and Winter, 2002). Managerial strategic thinking enables managers to challenge and disrupt existing perceptions and beliefs and support the transformation of existing cognitive structures to fit the new information (Pisapia *et al.*, 2009). Managers that are strategic thinkers recognize that to generate new knowledge existing knowledge schemas need to be transformed, and, therefore, are expected to encourage the development of transformational capabilities in their organization. Hence, we posit that organizations, where managers are better strategic thinkers, are more likely to exhibit higher levels of transformation capability, and we hypothesize a positive relationship between managerial strategic thinking and the transformation dimension of absorptive capacity:

H4. Managerial strategic thinking is positively related to the transformation dimension of absorptive capacity.

Exploitation represents the incorporation of new knowledge in an organization's existing operations (Zahra and George, 2002). The newly generated knowledge is used to change or refine the organization's value-creating capabilities such as production, marketing, sales and eventually alter the organization's competitive positioning (March, 1991). To appropriately apply the newly transformed knowledge and create new competencies, managers must first understand which competencies are to be modified based on the changes in the environment (Teece, 2016), second, link the new knowledge structure with the routine/competency to be modified (Zahra and George, 2002; Todorova and Durisin, 2007). Managerial strategic thinking enables managers to establish the link between organizational processes and changes in the environment and, thus, enables them to identify the routines and competencies that need to be modified (Bonn, 2001, 2005; Kim *et al.*, 2014). Since managerial strategic thinking helps managers understand the relationship between various systems and processes, it also allows them to understand how new knowledge can be useful in altering various exploitation process. In fact, Liedtka (1998, p. 122) posited that "A strategic thinker has a mental model of the complete end-to-end system of value creation, and understands the interdependencies within it." Therefore, we posit that managers that are strategic thinkers recognize that new knowledge is required to modify the existing routines, they are likely to support the development of organizational capabilities that enable organizations to exploit existing knowledge (Daft and Weick, 1984; Eggers and Kaplan, 2009; Cho and Hambrick, 2006). Hence, we posit that organizations, where managers are better strategic thinkers, are more likely to exhibit higher levels of exploitation capability, and we hypothesize a positive relationship between managerial strategic thinking and the exploitation dimension of absorptive capacity:

H5. Managerial strategic thinking is positively related to the exploitation dimension of absorptive capacity.

Method

Since the focus of this study is on organizational capabilities, we applied a purposive sampling procedure and collected data from senior-to-mid level managers working in the information technology industry. Previous research (e.g. Cruz-González *et al.*, 2015; Thornhill, 2006) has demonstrated that, typically, the technology industry experiences more change compared to other industries, thus, need higher levels of managerial strategic thinking. Information published by the USA Department of Labor (US 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 to 2022 (US Bureau of Labor Statistics, 2013). Managers of firms operating in the USA that fall in the above mentioned SIC codes comprised the sample frame for the study.

The approach required us to select a key informant from each firm. Previous studies have supported the key-informant approach because such respondents have been shown to provide a valid representation of organizational phenomenon (Garg *et al.*, 2003; Li and Atuahene-Gima, 2002). To ensure the validity of respondents, we only selected those who had at least 10 years of work experience. A total of 324 responses were obtained. There were 210 males and 114 females in the sample. The mean age of the respondents was 42.6 years, with a standard deviation of 9.1 years. One percent of respondents had doctorates, 27 percent of the respondents had masters' degrees, approximately 52 percent of respondents had bachelor degrees, and the remaining 20 percent of the respondents had an associate-level of education or below. Almost 25 percent of respondents represented firms with < 10m in revenue, and 35 percent of respondents represented firms with > 50m in revenue. Almost 65 percent of respondents were from firms that are in operation for more than 15 years, and 42 percent of respondents represented firms with more than 20 years in operation.

Panel data were provided by Qualtrics, a survey administering company (Long *et al.*, 2011). Qualtrics also provides prescreened respondents appropriate to the study requirements. Qualtrics develops panels based on respondents' qualification. Based on the researchers' need, Qualtrics provides by-invitation-only panels, thus eliminates self-selection and professional survey takers. Thus, the process ensures the legitimacy of respondents (Hagtvedt, 2011). Previous studies have validated the use of reputed research organizations for participants' recruitment, especially, when the focus is on managerial capability (Ferguson *et al.*, 2017; Nguyen *et al.*, 2018). Also, a screening question was embedded in our survey instrument as a cross-check to maintain the relevance of study participants (Anaza and Nowlin, 2017).

PLS-SEM was used to test for convergent validity, discriminant validity and to test the study hypotheses. Both managerial strategic thinking and absorptive capacity were modeled as second-order formative latent constructs. Dimensions of managerial strategic thinking and absorptive capacity were modeled as first-order reflective latent constructs. The use of PLS-SEM is appropriate to test the model because the theory on the relationship between managerial strategic thinking and absorptive capacity is underdeveloped, and the research is still in the exploratory stage. This study represents the first attempt to test the relationship between these two constructs. Researchers suggest PLS-SEM as the preferred method of analysis in such situations (Hair *et al.*, 2011; Rigdon, 2016; Sarstedt *et al.*, 2016). Moreover, PLS-SEM analysis handles both the formative and reflective indicators, as required in our research model (Hair *et al.*, 2011). Further, PLS-SEM does not impose regression- or covariance-based SEM constraints such as normal distribution, minimum sample size and model complexity (Hair *et al.*, 2011).

This study uses self-reported data, which is likely to introduce common method variance bias. First, to reduce concerns about common method bias, the anonymity of the respondent was ensured. Anonymity has been shown to minimize evaluation apprehension (Podsakoff *et al.*, 2003). We also used remedial measure suggested by MacKenzie and Podsakoff (2012), such as selecting appropriate respondents that have the necessary experience to address the issue of interest, using simple vocabulary, syntax and avoiding double-barreled questions. In addition, we conducted Harman's one-factor test (Podsakoff and Organ, 1986) to rule out the possibility for common method variance. The un-rotated matrix of initial exploratory factor analysis resulted in more than one factor and the highest variance accounted by any factor was 36.3 percent, thus confirming that results are unlikely to be affected by common method variance.

Measures

Absorptive capacity was measured using Zahra and George's (2002) operationalization as a combination of four capabilities – acquisition, assimilation, transformation and exploitation. The scale used to measure absorptive capacity on each of these four dimensions was adapted from Jansen *et al.* (2005), which is in line with the theoretical conceptualization of absorptive capacity scholars (Lane *et al.*, 2006; Todorova and Durisin, 2007; Distel, 2019). Some of the items were modified to appropriately correspond to the industry and the managerial sample of the study. A sample item is: "our employees frequently meet with customers to acquire new information." Cronbach's α for the acquisition dimension was 0.75. Three items were adopted, and two additional items were generated for the assimilation dimension. A sample item is: "we quickly analyze changes in market demands." Cronbach's α for the assimilation dimension was 0.93. Three items were adapted for the transformation dimension. A sample item is: "Our employees efficiently generate new business plans." Cronbach's α for the transformation dimension was 0.84. Three items were adapted for the exploitation dimension. A sample item is: "Customer complaints are quickly addressed." Cronbach's α for the exploitation dimension was 0.71. Finally, Cronbach's α for the composite absorptive capacity construct was 0.92.

Managerial strategic thinking was measured using prior operationalization provided by Pisapia *et al.* (2005) and Moon (2013), and was modified, per study requirements, to reflect the three underlying dimensions. The scale is in line with the theoretical conceptualization provided in the previous sections. The items were modified to appropriately correspond to the industry and the managerial sample of the study. Systems thinking was measured using four items. A sample item is: "We recognize that change in customer needs can drive change in our product/service offerings." Cronbach's α for the systems thinking dimension was 0.82. Divergent thought processing was measured using a six-item scale. A sample item is: "We are aware that there are multiple approaches to evaluate a business problem." Cronbach's α for the divergent thought processing dimension was 0.83. Reflection was measured using a four-item scale. A sample item is: "We reflect on how we could have handled past organizational actions differently." Cronbach's α for the reflection dimension was 0.83. Cronbach's α for the composite managerial strategic thinking scale was 0.89.

Convergent and discriminant validity

Convergent validity was assessed using three criteria: item reliability, composite reliability (CR), and average variance explained (AVE). Item reliability was assessed based on the loading of the observed variable on the latent variable. A loading of at least 0.6 is recommended (Bagozzi, 1979; Fornell and Larcker, 1981). Table I indicates that all items exhibited loading of 0.70 or above. Additionally, the associated *t*-statistics suggest that all loadings were significant. The CR statistics for acquisition, assimilation, transformation and exploitation (0.86, 0.94, 0.90 and 0.84, respectively) were above the 0.7 cut-off point, which suggests good CR (Chin, 1998). AVE values for acquisition, assimilation, transformation and

	Construct items	Loading	*t*-stats	CR	AVE
	Strategic thinking			0.90	0.42
	Systems thinking			0.88	0.65
1	We recognize that actions of a department can influence action of another department within our organization	0.75	15.56		
2	We recognize the importance of collaborative actions among employees within our organization	0.82	31.00		
3	We recognize that change in customer needs can drive change in our product/service offerings	0.84	31.22		
4	We recognize that change in market trends require adjustments in our business activities	0.80	23.58		
	Divergent thought processing			0.88	0.55
1	We are aware that there are multiple approaches to evaluate a business problem	0.70	13.78		
2	We are aware that there are multiple approaches to resolve a business problem	0.72	15.24		
3	Discussion with others helps us differentiate among different approaches used to describe a business problem	0.76	23.80		
4	Discussion with others helps us differentiate among different approaches used to evaluate a business problem	0.79	25.24		
5	We use multiple approaches to describe a business problem	0.73	25.99		
6	We use multiple approaches to evaluate a business problem	0.74	22.05		
	Reflection			0.89	0.66
1	We reflect on how we could have handled past organizational actions differently	0.82	34.52		
2	We reflect on why some organizational actions worked and why other organizational actions did not work	0.80	27.22		
3	We seek help from individuals across the organization to reflect on past organizational actions	0.81	33.15		
4	We seek help from individuals within our department to reflect on the effectiveness of past organizational actions	0.81	35.62		
	Absorptive capacity			0.93	0.50
	Acquisition			0.86	0.67
1	Our employees frequently monitor competitors to acquire new information	0.85	51.36		
2	Our employees frequently meet with customers to acquire new information	0.83	38.73		
3	Our employees frequently collect industry information through informal channels	0.76	19.24		
	Assimilation			0.94	0.78
1	We quickly analyze changes in market demand	0.86	41.17		
2	We quickly analyze the changing competitive dynamics of the market	0.89	62.06		
3	We quickly interpret shifts in the market	0.87	51.14		
4	We quickly interpret changes in market demand	0.89	58.63		
5	We quickly interpret the changing competitive dynamics of the market	0.90	67.18		
	Transformation			0.90	0.76
1	Our employees efficiently generate new business plans	0.85	46.12		
2	Our organization is efficient at designing new value-creation processes	0.89	64.25		
3	Our organization is efficient at redesigning organizational policies and procedures	0.86	41.71		
	Exploitation			0.84	0.63
1	Customer complaints are quickly addressed	0.79	26.36		
2	Customer needs are addressed through delivering new solutions	0.82	38.01		
3	We rarely experience difficulty in delivering value to our customers	0.76	20.72		

Notes: CR, composite reliability; AVE, average variance explained

Table I.
The measurement model

exploitation (0.67, 0.78, 0.76 and 0.63, respectively) were all above the threshold of 0.50, thereby providing support for convergent validity (Fornell and Larcker, 1981). Similarly, the CR statistic and AVE value for the second-order absorptive capacity construct were 0.93 and 0.50, respectively.

The CR statistics for systems thinking, divergent thought processing and reflection (0.88, 0.88 and 0.89 respectively) were above the 0.7 cut-off point, which suggests good CR (Chin, 1998). AVE values for systems thinking, divergent thought processing and reflection (0.65, 0.55 and 0.66, respectively) were all above the threshold of 0.50 providing support for the convergent validity (Fornell and Larcker, 1981). The CR statistic and AVE value for the second-order managerial strategic thinking construct were 0.90 and 0.42, respectively. As noted above, the scale for managerial strategic thinking is relatively new, and hence an AVE value between 0.4 and 0.5 is acceptable (Ping, 2009). Previous studies have also reported low AVE value of adapted scales (e.g. Iyer *et al.*, 2016).

Discriminant validity was assessed using the approach suggested by Fornell and Larcker (1981). As shown in Table II, the square root of AVE for each latent construct was higher than its correlation with the other construct. Hence, discriminant validity is inferred.

Results

H1 is supported as managerial strategic thinking is positively related to absorptive capacity (Table III; β coefficient $= 0.57$, $p < 0.001$). Table III suggests that the path coefficient between managerial strategic thinking and the acquisition dimension of absorptive capacity (β coefficient $= 0.48$, $p < 0.001$) is significant and positive, thus supporting the *H2*. *H3* is also supported since managerial strategic thinking is positively related to the assimilation dimension of absorptive capacity (Table III; β coefficient $= 0.48$, $p < 0.001$). Similarly, Table III suggests that the path coefficient between managerial strategic thinking and the transformation dimension of absorptive capacity (β coefficient $= 0.43$, $p < 0.001$) is significant and positive. Thus, the results support *H4*. Likewise, *H5* is also supported since managerial strategic thinking is positively related to the exploitation dimension of absorptive capacity (Table III β coefficient $= 0.52$, $p < 0.001$).

Table II.
Descriptive statistics and correlation among study variables

	Mean	SD	1	2	3	4	5	6
1. Acquisition	4.09	0.79	*0.82*					
2. Assimilation	4.12	0.83	0.62	*0.88*				
3. Transformation	3.99	0.88	0.51	0.63	*0.87*			
4. Exploitation	4.27	0.70	0.41	0.58	0.55	*0.79*		
5. Strategic thinking	4.32	0.52	0.49	0.48	0.52	0.43	*0.64*	
6. Absorptive capacity	4.12	0.67	0.75	0.93	0.80	0.73	0.58	*0.71*

Note: Square root of AVE shown diagonally in italic

Table III.
Results

	Path coefficient	Observed *t*-value	Significance	Hypothesis support
H1: strategic thinking is positively related to absorptive capacity	0.57	8.12	0.000	Yes
H2: strategic thinking is positively related to the acquisition dimension of absorptive capacity	0.48	7.12	0.000	Yes
H3: strategic thinking is positively related to the assimilation dimension of absorptive capacity	0.48	7.14	0.000	Yes
H4: Strategic thinking is positively related to the transformation dimension of absorptive capacity	0.43	6.72	0.000	Yes
H5: strategic thinking is positively related to the exploitation dimension of absorptive capacity	0.52	8.07	0.000	Yes

We conducted a *post hoc* analysis to check whether organization size and organization age influence absorptive capacity. To control for organization age's and organization size's influence, we included both variables as control variables (i.e. independent variable) in the analysis. The relationship of organization age and organization size with absorptive capacity and its dimensions was not significant at a 95% confidence interval.

Discussion

Our conceptualization of managerial strategic thinking as a managerial antecedent of absorptive capacity is in response to ongoing calls for empirical investigation on the micro-foundations of absorptive capacity (Distel, 2019; Rezaei-Zadeh and Darwish, 2016; Volberda *et al.*, 2010; Yao and Chang, 2017). Prior theoretical developments had predicted the existence of managerial antecedents of absorptive capacity including dominant logic, leadership styles, and managerial strategic thinking. This study provides empirical evidence that managerial strategic thinking has a positive influence on the development of an organization's absorptive capacity. Further, we find that managerial strategic thinking is positively related to all four dimensions of absorptive capacity. Thus, this study confirms the significant role that managerial strategic thinking plays in the development of absorptive capacity at both the construct level and at the dimension level.

At the broadest level, the results of our study provide empirical evidence of the importance of the role of managerial strategic thinking in the development of organizational capabilities. Further, it supports scholarly thought that in contemporary business environments, the competitive superiority of an organization depends more on "intellectual capabilities than on physical inputs" (Powell and Snellman, 2004, p. 199). In an information-intensive environment, management's ability to support the development of acquisition, assimilation, transformation and exploitation capabilities is what allows the organization to remain competitive in its product/market domain. Contemporary environments demand that organizations seek higher levels of absorptive capacities. However, the ability to identify the new knowledge is a function of managerial abilities housed within the organization. Managers must be cognizant of the organization's relationship with the environment. They should also understand that changes in the environment warrant changes in organizational processes and capabilities. Managerial strategic thinking enables managers to understand these complex interrelationships that exist between the organization and economic systems that are both internal or external to the organization. Overall, our investigation (*H1*) suggests that managers with higher levels of managerial strategic thinking are better equipped to discern these interrelationships, and can be expected to appropriately develop the absorptive capacity to fulfill organizational needs in continuously changing environments.

We offer empirical evidence of a significant relationship between managerial strategic thinking and the acquisition capability of the organization (*H2*). It suggests that not only can managerial strategic thinking capabilities enable managers to differentiate between multiple approaches to new information acquisition, but that it can also empower them to choose the most appropriate one. Managerial strategic thinking, thus, plays a critical role in delivering two insights that managers need to act on judiciously: not all acquired information is equally essential; the acquired information can be different from the existing knowledge structure of the organization and yet be valuable.

We found a significant relationship between managerial strategic thinking and the assimilation capability of the organization (*H3*). Scholarly research on absorptive capacity suggests that for it to be valuable to the firm, the newly acquired information should appropriately be matched with the existing knowledge-base of the organization. Our research suggests that this is easier to achieve when managers possess higher levels of managerial strategic thinking capabilities.

Enabling transformation in an organizational context is one of the most challenging tasks for managers (Kavanagh and Ashkanasy, 2006; Sastry, 1997). These challenges are exacerbated when the transformation is driven by new knowledge that inevitably runs against the grain of existing, and often entrenched schemas. In such situations integrating the new information with existing knowledge schemas to develop new, useful and monetizable new knowledge can be challenging. Our investigation (*H4*) suggests that organizations, where managers possess higher levels of managerial strategic thinking, are more likely to enable such transformations by developing transformation capabilities.

We found that organizations can have stronger exploitation capabilities if managers think strategically in terms of the application of new knowledge in altering the value creation processes (*H5*). Moreover, managerial strategic thinking enables the organization to learn from previous decisions and modify current thinking to better address the organization's value-creation mandate.

An agenda for future research

Our study opens several avenues for future research. Now that our study established the prominent role of managerial strategic thinking in the development of absorptive capacity, future research should explore the indirect effects of managerial strategic thinking on absorptive capacity (Rezaei-Zadeh and Darwish, 2016). For example, does managerial strategic thinking influence organizational factors such as, structure, cross-functional interfaces and job rotation that have been shown to positively influence absorptive capacity (Jansen *et al.*, 2005)? Further, based on the results of this study, future research can make significant contributions by investigating the relationship between managerial strategic thinking and other organizational capabilities.

Researchers should also investigate the effects of managerial strategic thinking on organizational outcomes. Absorptive capacity has been shown to have a positive association with several organizational outcomes such as innovation, new product development and financial performance (Cosaert *et al.*, 2018; Distel, 2017; Volberda *et al.*, 2010). The current study can be expanded by exploring whether managerial strategic thinking indirectly influences organizational outcomes through absorptive capacity. The literature also suggests that managerial strategic thinking may enable creativity, which can lead to innovation, opportunity recognition (Graetz, 2002; Hanford, 1995), and organizational innovativeness. Since absorptive capacity also contributes to organizational innovativeness, it will be interesting to see how managerial strategic thinking and absorptive capacity jointly influence innovation. The exploration of these interaction effects should provide valuable insights into how creativity and organizational innovativeness can be enhanced/modulated to serve the best interest of the organization.

Since empirical investigations on managerial strategic thinking are still sparse (Gross, 2016; Dhir *et al.*, 2018), there are several opportunities to contribute to the managerial strategic thinking literature. One avenue is to focus on the antecedents of managerial strategic thinking that may include investigations on specific resources and processes that are needed to maintain appropriate levels of managerial strategic thinking. Leadership and upper echelon theory can be used to investigate the influence of behavioral and structural factors that shape managerial strategic thinking in organizations (Bass, 1969; Hambrick and Mason, 1984). Others could respond to Goldman *et al.* (2015) call for more work on factors that can enhance the development of managerial strategic thinking in managers (e.g. work experience, work environment, and professional education and development).

Limitations

Despite the theoretical and empirical contributions offered by this study, as with every study, some limitations should be acknowledged. First, the study results may not be

generalizable to industries outside of the software industry, where data were collected for this study. Future, multi-industry studies are needed to assess generalizability. It should be noted that the scale used to measure managerial strategic thinking, while well anchored in theory and well suited for this study, represents a capability-based operationalization of the construct. It may not be suitable for research that characterizes managerial strategic thinking in ways other than as a capability. The absorptive capacity scale used in this study is a psychometric scale and represents the qualitative analyses based on the subjective knowledge of study respondents (Jansen *et al.*, 2005). Since the study context is the firms operating in the dynamic industry of the USA, should be interpreted and conclude with caution. Results may differ in other industries and countries with different national cultures (Flatten *et al.*, 2015; Hofstede, 2001).

Conclusion

Our research contributes to scholarly discourse on both organizational capabilities and absorptive capacity. It represents an important step toward, first, inquiry into the creation and development of organizational capability, second, research on the micro-foundations of organizational capabilities, and third, addressing gaps in our understanding of the relationship between absorptive capacity and its antecedents (Schilke *et al.*, 2018; Rezaei-Zadeh and Darwish, 2016). This study takes a pioneering step to theoretically position managerial strategic thinking as a pivotal managerial antecedent of absorptive capacity, and empirically confirm hypothesized relationships between the two constructs. Since capability theory suggests that the absorptive capacity and managerial strategic thinking could jointly play critical roles in the process of organizational adaptation, the results of this study establish the importance of one managerial capability as a micro-foundation of organizational capabilities. Our theoretical development and empirical findings serve to bridge the gap between absorptive capacity and one of its antecedents, thereby enabling researchers to develop more inclusive frameworks in the future and offer finer-grained understandings of organizational capabilities.

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