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Protective capacity and absorptive capacity

Managing the balance between retention and creation of knowledge-based resources

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Abstract

Purpose – In order to understand the pros and cons of an open organization regarding the flow of knowledge between firms, this paper introduces the concept of "protective capacity". The purpose of the paper is to elaborate the concept of "protective capacity" especially in relation to absorptive capacity, by presenting a number of propositions.

Design/methodology/approach – Literature on mainly interfirm relationships, absorptive capacity and resources-based theory are reviewed and combined.

Findings – Protective capacity is defined as the "capacity to sustain, or to reduce the speed of depreciation of knowledge-based resources by preventing knowledge from being identified, imitated, and/or acquired by direct or indirect competitors". Owing to the strong moderating factor of organizational openness, it is argued that protective capacity is inversely related to absorptive capacity. A number of propositions that can explain and moderate the inverse relationship between protective capacity and absorptive capacity are elaborated and discussed. These propositions concern organizational openness, knowledge management practices, realized and potential absorptive capacity, and dyadic relationships.

Originality/value – Acquiring external knowledge is a key feature of knowledge management. In order for a firm to absorb external knowledge, it is generally argued that it has to be open towards the environment. However, according to resource-based theory, firms have to safeguard their knowledge by, for example, having a secluded organization, thereby enhancing the uncertainty associated with tacit knowledge in order to sustain their competitive advantages. Whereas numerous studies have discussed the capacity to absorb knowledge, few studies have analyzed the capacity to protect knowledge.

Keywords Absorptive capacity, Resource-based theory, Knowledge management, Alliances, Knowledge creation, Knowledge management, Corporate strategy, Intergroup relations

Paper type Conceptual paper

1. Introduction

The concept of absorptive capacity (AC) has attracted considerable attention in research on inter-organizational learning, as well as in other areas of business research (Zahra and George, 2002). Most scholars agree that AC refers to the capability of recognizing, assimilating, and applying external knowledge (Cohen and Levinthal, 1990). Also, it has been argued that AC can be regarded as a dynamic capability that can be affected by managerial activities, i.e. a capacity that can be formulated and implemented with specific intents (Zahra and George, 2002). In resource-based theory (RBT), it is widely acknowledged that knowledge constitutes a key strategic resource (Kogut and Zander, 1992) and knowledge management has been identified as a key feature of the resource-based view (Bollinger and Smith, 2001; Selen, 2000). Thus, the development and/or acquisition of new knowledge (i.e. the outcome of AC) is essential

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in order to develop competitive advantages (Alvarez and Busenitz, 2001; Barney *et al.*, 2001; Khamseh and Jolly, 2008). This notion has strong support in traditional RBT (Barney, 1986, 1991; Peteraf, 1993; Wernerfelt, 1984) as well as in the knowledge-based view of the firm (Grant, 1996) and in dynamic capability approaches (Eisenhardt and Martin, 2000; Teece *et al.*, 1997).

However, most RBT studies have focused on factors that can explain the sustainability of competitive advantages and not on how competitive advantages can be created (see, for example, Barney, 1991; Wernerfelt, 1984). This sustainability has mainly been explained by different attributes associated with resources. For example, concepts such as casual ambiguity, social complexity (Barney, 1991), or information asymmetries (Brush and Artz, 1999; Peteraf, 1993) are often used to explain the level of sustainability of knowledge-based competitive advantages. In research on inter-firm relationships, it has been argued that companies often safeguard their resources (Hamel *et al.*, 1989; Sampson, 2004) and "protect information from bleeding through to a partner" (Hamel, 1991, p. 96) in order to prevent leakage of knowledge. Whereas some studies have examined the relationship between organizational antecedents and the capacity to absorb knowledge (e.g. Jansen *et al.*, 2005), few studies have sought to explain the sustainability of competitive advantages from an organizational or managerial approach, i.e. the capacity to protect knowledge. Authors who have discussed the organizational capacity to protect knowledge (i.e. Brown and Duguid, 2001; Liebeskind, 1996; Norman, 2002) have not discussed the issue in relation to the capacity to absorb external knowledge. However, if the creation of knowledge-based competitive advantages can be explained at least to some extent by managerial or organizational capabilities (i.e. AC), one can assume that the sustainability of competitive advantages can also be affected by organizational factors and that these two capacities (i.e. AC and the capacity to protect knowledge) are highly interrelated.

In this paper, the notion that it often requires a company to open up its business in order to absorb external knowledge will be taken as our point of departure. However, the knowledge-based resources of an organization that is open to the environment are likely to be more easily imitated due to reduced levels of social complexity and causal ambiguity (Barney, 1991; Lippman and Rumelt, 1982; Peteraf, 1993). For example, more technologically advanced firms are more likely to avoid locating new businesses close to competitors in order to prevent or reduce knowledge leakage (Alcácer and Chung, 2007). Consequently, according to resource-based logic, an open organization can result in faster depreciation of existing knowledge-based competitive advantages. Thus, increasing the AC by opening up the organization can also have a down-side. More specifically, the notion put forward by Appleyard (1996, p. 151) – "Firms that share knowledge often receive knowledge in the process" – are likely to be true in both directions, i.e. in order to receive knowledge a firm has to share knowledge (Kale *et al.*, 2000). To explain this and to relate this notion to AC, the concept of "protective capacity" (PC) is introduced. PC is defined as a firm's capacity to sustain, or to decrease the speed of depreciation of knowledge-based resources. Organizational openness is positively related to the level of AC (Gupta and Govindarajan, 2000; Harrington and Guimaraes, 2005; Jansen *et al.*, 2005) and, as will be argued, is inversely related to PC. Thus, an increased level of AC is likely to reduce the level of PC and vice versa. However, as will be illustrated in this paper, the relationship between the two concepts is complex and the relationship between AC and PC can be reduced. The aim of this

article is to define and elaborate the concept of PC, especially in relation to AC, by presenting a number of propositions.

The remainder of the article is organized as follows. In the next section, the concept of PC is explained and defined. This is followed by a section regarding the relationship between organizational openness, AC, and PC and factors that can moderate the relationship between AC and PC. Lastly, the conclusions of the article are discussed.

2. Defining protective capacity

In the strategic management literature, the sustainability of competitive advantages is a key concept; in RBT, this sustainability is explained by the immobility or imitability of strategic resources (Barney, 1991; Barney *et al.*, 2001). These resources are often knowledge-based (Grant, 1996) in terms of human resources and organizational resources that result in different capabilities, which can explain performance differences between firms (Andersén, 2011; Newbert, 2007). Hindrances to imitation of knowledge-based resources have generally been explained by different features of the resources, by concepts such as social complexity, causal ambiguity, and unique historical conditions (Barney, 1991). Due to the fact that strategic resources are most often protected by different factors that create uncertainty, tacit knowledge is more likely to result in sustainable competitive advantages than explicit knowledge. This is obviously a valid notion and constitutes one of the cornerstones of RBT. Thus, the features of the strategic resources will almost always be the most important predictor of the sustainability of resource-based competitive advantages.

However, organizations are also likely to differ in their abilities to prevent imitation of their resources (Liebeskind, 1996). Also, in inter-firm relationships, prevention of knowledge leaking unintentionally to the partner firm is a crucial feature of the relationship. For example, Hamel (1991) describes the importance of protecting knowledge in strategic alliances and Inkpen (1998) discusses how firms tend to be reluctant to engage in alliances due to the risk of knowledge leakage. Thus, unintended leakage of knowledge can decrease the rent of the leaking firm and result in outbound spill-over rents, i.e. "transfer of benefits from the focal firm to the partner" (Lavie, 2006, p. 644). However, a concept similar to AC but applied to the protection instead of the acquisition of knowledge-based resources has not been developed. But if we use the concept of AC in order to understand the acquisition of knowledge-based resources, why not use a specific concept in order to understand a key element of RBT – the protection of resources? This capability can be labeled a company's "PC". I define this concept as the capacity to sustain, or to decrease the speed of depreciation of, knowledge-based resources by preventing knowledge from being identified, imitated, and/or acquired by direct or indirect competitors. This definition is highly influenced by Cohen and Levinthal's (1990) definition of AC and the resource-based view of the firm (Barney, 1991). In contrast to, for example, the institutional capabilities discussed by Liebeskind (1996), this definition highlights the importance of relative absorptive capacity (Lane and Lubatkin, 1998) by taking into consideration that the learning outcomes in an inter-firm relationship are dependent on the AC and PC of the partner firms. Also, Hamel (1991) elaborates on how learning race outcomes are highly influenced by firms' learning abilities and protective practices (although they are not explicitly described as protective capacity, but the ability or choice to safeguard knowledge). Whereas previous studies have focused mainly on the learning aspect of

inter-firm relationships, the concept of PC should constitute an important construct in order to fully grasp the complexity of learning between firms.

An important concept in the knowledge management literature is "knowledge retention". The established definition of knowledge retention capacity does, however, differ significantly from the concept of PC and the two concepts (knowledge retention and PC) should not be confused. Knowledge retention is generally defined as how knowledge from, for example, previous product development processes can be stored within the organization. For instance, by codifying knowledge in order to transform tacit knowledge into explicit knowledge (Marsh and Stock, 2006). Lichtenthaler and Lichtenthaler (2009) make a distinction between external and internal knowledge retention capacities. Transformative capacity (internal knowledge retention) is defined as how "firms maintain knowledge over time and reactivate it subsequently", whereas connective capacity "refers to a firm's ability to retain knowledge in inter-firm relationships" (Lichtenthaler and Lichtenthaler, 2009, p. 1320). The latter definition is about retaining external knowledge from partner firms and not about preventing knowledge from leaking to partner firms. Thus, established definitions of knowledge retention are not about preventing knowledge from being imitated by competitors (directly or indirectly); therefore, the concept of PC provides a more accurate description of the capacity to prevent knowledge leakage.

3. The inverse relationship between AC and PC

In this section, the relationship between organizational openness, AC, and PC are discussed. After this, three factors that can influence the relationship between AC and PC are described: knowledge management practices, potential and realized AC, and AC-PC in the context of a dyadic relationship.

3.1 The importance of organizational openness

According to Cohen and Levinthal (1990), AC is highly dependent on previous knowledge. It is, however, obvious that a company's ability to absorb external knowledge cannot only be a function of its existing knowledge. If so, the learning race described by Hamel (1991) would be a race in which the winner would always be the company with the highest initial level of knowledge (an extreme version of first-mover advantage). Also, although related knowledge will increase the speed of learning, highly related knowledge is not very beneficial for the company. Nooteboom *et al.* (2007), for example, argue for an inverted U-shaped relationship between relatedness of knowledge between firms and the usefulness of the knowledge absorbed. In the seminal contributions on AC, R&D spending is regarded as the main indicator of a company's AC (Cohen and Levinthal, 1989; Cohen and Levinthal, 1990) and R&D intensity has been a common method of measuring absorptive capacity (e.g. Tsai, 2001). However, the relationship between AC and R&D spending is not always significant (see, for example, Schmidt, 2010) and according to Zahra and George (2002, p. 199), using R&D spending as the only indicator of AC is "rudimentary and do not fully reflect the richness of the construct".

More contemporary AC contributions have identified several other factors that influence AC (Lane *et al.*, 2006) and that AC is composed of several dimensions (Matusik and Heeley, 2005; Vega Jurado *et al.*, 2008). For example, Van Den Bosch *et al.* (2003) argue that antecedents to AC can be prior knowledge as well as organizational

features such as communication structures and how knowledge and expertise are distributed within the organization. Other factors correlated to AC are, for example, the motivation of employees (Minbaeva *et al.*, 2003), managerial actions and environmental triggers (Zahra and George, 2002), managerial support (Lane *et al.*, 2001), transformational leadership (García-Morales *et al.*, 2008), characteristics of the technology acquired (Tidd and Trewhella, 1997), firm size (Veugelers and Cassiman, 1999), and other organizational features (Jansen *et al.*, 2005).

Thus, several antecedents to AC have been identified. However, although not always explicitly expressed in AC studies, the key explanatory factor for AC is most likely how open the organization is towards the source of the external knowledge. For example, Cohen and Levinthal (1990, p. 132) state that:

> The firm's absorptive capacity depends on the individuals who stand at the interface of either the firm and the external environment or at the interface between subunits within the firm. That interface function may be diffused across individuals or be quite centralized.

Also, they discuss the circumstances under which a company benefits from a high or a low number of gatekeepers. In their first proposition, Zahra and George (2002, p. 193) state that "The greater a firm's exposure to diverse and complementary external sources of knowledge, the greater the opportunity is for the firm to develop PACAP" (PACAP is an abbreviation for potential AC). Other contributions on AC have identified several relationships between the level of AC and concepts highly related to organizational openness, for example, a culture of external focus (Harrington and Guimaraes, 2005), the presence of cross-functional interfaces (Jansen *et al.*, 2005), richness of transmission channels (Gupta and Govindarajan, 2000), a willingness to share knowledge as a prerequisite to receiving knowledge (Appleyard, 1996), the importance of interactive learning (Lane and Lubatkin, 1998), and trust (Lane *et al.*, 2001). All of these studies illustrate the importance of an openness towards the environment (or towards a partner firm in a dyadic relationship) in order to achieve a high level of AC.

For PC, on the other hand, the relationship is reversed and an open organization is likely to have a lower level of PC. An open organization with several sources of input, as well as output, of information and knowledge are likely to leak knowledge to competitors and other actors to a greater extent than more protective and closed organizations (Cassiman and Veugelers, 2006; Hamel, 1991; Inkpen, 1998; Norman, 2002; Sampson, 2004). Thus, an open organization will have reduced barriers to imitation in terms of, for example, causal ambiguity or social complexity (Barney, 1991). Numerous RBT scholars (e.g. Barney, 1986, 1991; Lippman and Rumelt, 1982; Wernerfelt, 1984) have argued, or shown, that tacitness and uncertainty are crucial in order for firms to maintain their knowledge-based resources, and that an open organization is likely to reduce the element of uncertainty. Thus, the degree of openness is likely to be inversely related to PC and positively related to AC. Consequently, firms have to make a trade-off between protecting existing knowledge and absorbing new knowledge; and opening up the organization will reduce the flow of knowledge in both directions. Due to the important moderating factor of organizational openness, we can formulate these three basic propositions:

P1. Organizational openness is positively related to AC.

P2. Organizational openness is inversely related to PC.

Hence:

P3. PC is inversely related to AC.

These propositions are neither new nor controversial. However, by introducing the concept of PC and by relating it to AC, we can determine which factors can influence the inverse relationship between the two constructs.

3.2 PC, AC and knowledge management

Knowledge management is a broad concept and can, for example, include practices to enhance organizational learning (Argyris, 1977; March, 1991; Nonaka, 1994) as well as methods of how to generate sustainable knowledge-based competitive advantages (DeCarolis and Deeds, 1999; Grant, 1996; Kogut and Zander, 1992). By using the AC-PC framework, the management of external knowledge can be better understood. This approach enables an analysis on how to handle the flow of knowledge between the focal firm and competing firms (Hamel *et al.*, 1989), collaborative firms (Hamel, 1991; Lavie, 2006), or the environment (Cohen and Levinthal, 1990).

Thus, from an AC-PC approach, the aim of knowledge management is to manage the flow of information from and to the company with the purpose of maximizing the inward flow of knowledge while minimizing the outward flow of knowledge. This is, of course, a highly difficult task and inter-firm relationships are to a great extent based on the mutual sharing of knowledge. Also, due to the importance of openness for AC and a secluded organization for PC, the relationship will most likely always be inverse between the two capacities. However, the relationship between protecting and acquiring external knowledge is complex (Oxley, 2004) and there are some specific knowledge management practices that can be implemented in order to weaken the relationship. Liebeskind (1996) argues that companies can protect valuable knowledge by, for example, rigorous employment contracts, long-term incentive plans, or by disaggregated job designs. Also, Hamel (1991) describes how loyal employees can help companies to protect important knowledge; thus, fostering a culture of loyalty is likely to reduce leakage of knowledge.

Regarding AC, several knowledge management practices have been identified. For example, companies with well-developed socialization capabilities are likely to be superior in exploiting external knowledge, whereas companies with coordination capabilities are better at acquiring and assimilating knowledge (Jansen *et al.*, 2005). Fostering the motivation of employees is another practice that is likely to strengthen the level of AC (Minbaeva *et al.*, 2003), without necessarily reducing the level of PC, especially if combined with incentives to strengthen employees' loyalty as proposed by Hamel (1991). Without pinpointing any specific knowledge management practices, Kale *et al.* (2000) argue that companies that are able to manage the flow of information best have learned to use appropriate routines, possess a strong relational capital, and are able to manage conflicts. These relational capabilities can to a great extent be explained by the firm's alliance experience (Kale *et al.*, 2000). Also, concepts such as relational capabilities (Capaldo, 2007; Ling-yee and Ogunmokun, 2001; Lorenzoni and Lipparini, 1999), network capabilities (Hagedoorn *et al.*, 2006), or alliance capabilities (Draulans *et al.*, 2003; Ireland *et al.*, 2002; Kale *et al.*, 2002; Schilke and Goerzen, 2010) have been used in research on inter-firm relationships and generally refer to the ability to interact with other companies, mainly regarding the flow of knowledge into the organization (and not protecting knowledge from flowing out of the organization). For

example, Draulans *et al.* (2003, p. 153) state that "The capacity to manage alliances and absorb knowledge on alliances is a distinct management capability: the alliance capability". However, regarding these concepts (i.e. relational capabilities, network capabilities, and alliance capabilities), it would make sense to include protection of knowledge as well as absorption of knowledge.

To summarize, there are some specific knowledge management practices that can be implemented in order to strengthen the two capacities that are not – at least, not to a great extent – related to the openness of the organization. Consequently, implementation of these specific practices and other knowledge management techniques can weaken the relationship between AC and PC. This discussion can be summarized in the following proposition:

P4. Well-developed (external) knowledge management practices will decrease the inverse relationship between AC and PC.

3.3 The relationship between PC and potential and realized AC

AC can be regarded as a dynamic capability that consists of several different separate capacities (Jansen *et al.*, 2005; Zahra and George, 2002). For example, Cohen and Levinthal (1990) define AC as the capacity to recognise, assimilate, and apply external knowledge. According to Zahra and George, and as later validated by Jensen *et al.* (Todorova and Durisin, 2007), these capacities are distinct, separate constructs. Thus, some firms can, for example, have a high capacity to recognize/identify value but a less developed capacity to assimilate knowledge. Zahra and George (2002) make a distinction between potential AC that acquires and assimilates external knowledge and realized AC, which refers to the transformation and exploitation of external knowledge. Thus, potential AC is more externally oriented (Fosfuri and Tribó, 2008) whereas realized AC refers to the mainly internal processes of assimilating and applying external knowledge that has already been absorbed. Whereas organizational openness is a prerequisite for potential AC (Zahra and George, 2002) (see the discussion in the previous sections), it is not likely to be important regarding realized AC.

Even so, realized AC can also be inversely related to PC, at least to some extent. Sharing and disseminating knowledge (i.e. key features of realized AC) within the organization will (by definition) increase internal awareness regarding the knowledge of the firm, and the internal causal ambiguity is likely to be reduced by implementation of such practices (Ambrosini and Bowman, 2010; Bowman and Swart, 2007; King and Zeithaml, 2001). According to RBT, when the firm's awareness of its knowledge-based resources increases, other firms are more likely to learn about the knowledge of the focal firm (Barney, 1991; Lippman and Rumelt, 1982). Consequently, the realization of AC (as defined by Zahra and George, 2002) is likely to increase the unintended leakage of knowledge to actors outside the company, thereby decreasing the PC.

To summarize, the inverse relationship between potential AC and PC is likely to be strong due to the moderating factor of organizational openness (as previously discussed). However, internal knowledge sharing – an important aspect of realized AC – is also likely to result in spill-over of external knowledge, albeit to a lesser extent. Thus, the next proposition can be formulated as follows:

P5. The inverse relationship between potential AC and PC is stronger than the inverse relationship between realized AC and PC.

3.4 PC and AC in dyadic relationships

AC is often analyzed at an aggregated level and the object of analysis is often the "overall" AC of the organization or the relationship between the firm's AC and the "environment" (Cohen and Levinthal, 1990). So far in this article, no distinction has been made between AC-PC applied in dyadic inter-firm relationships and the "overall" AC-PC of an organization. All the propositions described are likely to be valid regarding both aspects of AC and PC. However, the level of AC is also dependent on who the company absorbs knowledge from. For example, the similarity of the firms in terms of knowledge bases and organizational structures in dyadic relationships will influence the level of AC (Lane and Lubatkin, 1998). Thus, the AC of a company is dependent on which firm the company shares knowledge with. Also, if we are to define AC as a dynamic capability (as proposed by Zahra and George, 2002) we must take the element of manageability into consideration. Consequently, when AC and PC are applied in a dyadic inter-firm relationship, for example, the level of utilized AC applied in the relationship can be influenced by managerial activities and intents. For example, if the counterpart in a relationship possesses knowledge of high value to the focal firm, it is, of course, likely that the focal firm will become more engaged in the relationship in order to absorb the valuable knowledge. Thus, the level of AC and PC will be influenced by the level of similarity between the firms (Lane and Lubatkin, 1998) and by how the specific relationship is managed (or not managed) by the firms involved.

The latter notion is important as a moderating factor for the relationship between AC and PC. In a dyadic relationship, the management of the flows of knowledge is likely to be less complex than the "overall" knowledge management of the company. In a specific relationship, a firm is likely to be able to, for example, safeguard certain key resources while opening up other, less strategic resources to the partner firm. For example, the choice of alliance type can influence the transfer of knowledge (Chen, 2004; Oxley and Wada, 2009). Thus, it is easier to implement specific knowledge management practices (such as those described in the knowledge management section of this paper) in order to protect knowledge and to absorb knowledge in dyadic relationships. Nevertheless, trust and the importance of opening up the business to partners have been identified as key success factors in inter-firm relationships (Das and Teng, 1998). Consequently, there will most likely always be an inverse relationship between the level of AC and the level of PC (both regarding the overall AC-PC and regarding AC-PC applied in dyadic relationships). However, due to the fact that dyadic relationships are more manageable, the relationship is likely to be weaker in specific inter-firm relationships than, for example, the flow of knowledge between the firm and the general environment (e.g. less formalized collaborations with customers, suppliers, competitors, educational institutions, government agencies etc.). This can be summarized in the following proposition:

P6. The inverse relationship between AC and PC is weaker in a dyadic relationship than between the overall levels of AC and PC.

4. Conclusions

Analysis of the pros and cons of having an open approach to the environment is neither new nor controversial. Thompson (1967), for example, argues for the importance of isolating certain organizational functions (i.e. the operating core) whereas other

functions (i.e. the top management team) require an open approach to the environment. However, contemporary studies in inter-organizational learning and inter-firm relationships have mainly analyzed the positive effects of having an open organization. RBT scholars, on the other hand, often focus on the sustainability of knowledge-based resources. This is almost always explained by resource features (and not the capacity to protect resources). By introducing the concept of PC, we can combine the protective approach, which is one of the hallmarks of RBT, with the open approach, which characterizes most of the contributions that involve AC. Thus, by using the PC concept and relating it to organizational openness and AC, both the negative and the positive aspects of an open organization can be analyzed in a contemporary framework.

The AC construct has been refined, discussed, and developed in numerous studies since the seminal publications of Cohen and Levinthal (1989, 1990). The concept of PC is, however, new and would of course benefit from being scrutinized and developed further. There are also several other variables that are likely to influence the inverse relationship between AC and PC. For example, concepts such as trust (Lane *et al.*, 2001), alliance experience (Kale *et al.*, 2000), and organizational structure (Jansen *et al.*, 2005) have been identified as antecedents to AC and are likely to influence the AC-PC relationship in one way or another. Another highly interesting area of research is the relationship between PC and performance in various contexts, for example in stable or dynamic business environments.

To conclude, using the concept of PC and relating it to AC can have several important theoretical implications. Grounded in established contributions on RBT and AC, the AC-PC framework can constitute a contemporary basis for our understanding of the flow of knowledge to and from the organization. Even so, as for AC, the concept of PC will have to be developed further and the relationship between organizational openness, AC, and PC should be addressed in more detail in future research.

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Further reading

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