Absorptive Capacity (of Organizations)

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Abstract

A firm's competitive advantage originates increasingly from absorbing external knowledge. Absorbing external knowledge and the underlying learning processes are referred to as a company's *absorptive capacity*. In this article, we outline research trends on absorptive capacity. We apply a bibliometric analysis to describe the concept's historical development, define the intellectual core of the absorptive capacity concept, and discuss recent conceptualizations. Then, we identify two prominent streams in the absorptive capacity literature and provide a new approach on how to integrate them. Finally, we provide an outlook on possible themes in future research on absorptive capacity.

Introduction

Both practitioners and academics increasingly recognize that competitive advantages no longer rely on internal knowledge alone, but rather originate from absorbing external knowledge. This in turn is based on learning processes, which are directed at exploring, assimilating, transforming, and exploiting external knowledge (Camisón and Forés, 2010; Gebauer et al., 2012; Lane et al., 2006). These learning processes support companies in converting their external knowledge into innovations. The literature refers to the absorption of external knowledge and the underlying learning processes as a company's *absorptive capacity* (Cohen and Levinthal, 1989, 1990).

Absorptive capacity, as an application of external knowledge for commercial purposes, can lead not only to product or service innovation but also to strategic innovation. Strategic innovation aims at reshaping the existing business model, opening up new and uncontested markets, and creating a leap in customer value (Christensen et al., 2002). Thus, absorptive capacity is a crucial channel for creating new and maintaining existing competitive advantages.

This article outlines most important research trends in the theoretical and practical discussion of absorptive capacity. Applying a bibliometric analysis, we start with describing the historical development of the absorptive capacity research. Afterward, we define the intellectual core of the absorptive capacity concept and discuss the recent conceptualizations. We identify two prominent streams in the management literature that are specifically linked to the concept of absorptive capacity and provide a new approach on how to integrate the two streams. The article ends with an outlook into the future of the absorptive capacity research.

Absorptive Capacity

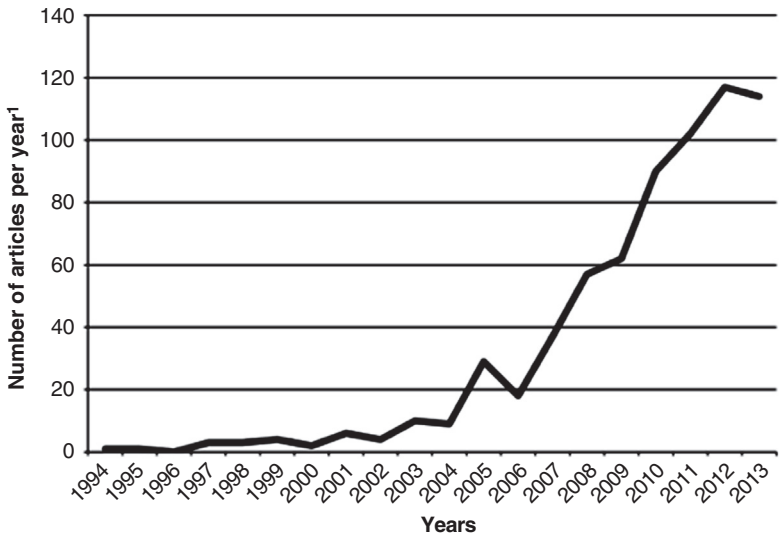
Absorptive capacity was originally defined as a firm's ability to recognize the value of new information, assimilate it, and apply it for commercial purposes (Cohen and Levinthal, 1990). Cohen and Levinthal's (1989, 1990) notion of absorptive capacity refers to the understanding of R&D investments being not only important for creating inventions but also to the ability of a firm to internalize knowledge from external sources (Schildt et al., 2012). Since these early contributions, there have been an increasing number of articles. We applied bibliometric methods for analyzing the existing research. We first tracked the citations of the two seminal contributions by Cohen and Levinthal (1989, 1990). We second identified articles using 'absorptive capacity' as one of the keywords. We conducted the search in Scopus. The Scopus database was considered as more suitable than alternatives such as Web of Science or Google Scholar. The Web of Science database contains fewer journals than Scopus. Google Scholar has no advanced search function. The search results were merged into a master list of articles. By combining both lists, we checked for double entries and inconsistencies such as misspelled names or wrong publication years. The combination yielded 828 articles.

The second bibliographic method is citation analysis, which is an acceptable surrogate for the intellectual core of the absorptive capacity research (Culnan, 1986). We tracked the number of articles published per year, the journals, subject areas, and keywords. As shown in **Figure 1**, research on absorptive capacity is developing into a highly dynamic management discipline. The number of articles has increased steadily, with a late peak in 2012 and 2013, at 117 and 114 articles, respectively

The historical development of the absorptive capacity concept can be distinguished into three phases:

- *Phase 1*: Early emergence of the absorptive capacity concept (1989–2001)
- *Phase 2*: Conceptual foundation and establishment as a research domain (2002–07)
- *Phase 3*: Emergence of an important research domain in business research (2008–)

With the publication of Cohen and Levinthal's (1989, 1990) seminal articles, the concept of absorptive capacity had been formulated. As researchers and practitioners had quickly acknowledged absorptive capacity as a relevant concept to better understand organizational learning, knowledge



[1]– Number of articles per year using absorptive capacity as a key word. Database: Scopus.

Figure 1 Articles on absorptive capacity in the social science field.

management, R&D, innovation and competitive advantage, the concept was discussed, applied, and replicated in numerous contributions in the following years (Szulanski, 1996; Tsai, 2001). In the first phase, the concept gained momentum within management science.

In the early 2000s, the concept has been further developed with a number of important conceptual refinements and extensions. This period can be interpreted as a second phase, in which the absorptive capacity concept was established as an own research domain within the field of management research and organization theory. Central contributions in this period were among others articles by Zahra and George (2002), Jansen et al. (2005), Lane et al. (2006), and Todorova and Durisin (2007).

The third phase started at the end of the 2000s, when publications on the absorptive capacity concept were increasingly used as an approach to frame empirical research. In this enduring phase, the number of publications on the topic has experienced a substantial increase every year until a peak was reached in 2012 and 2013 with almost 120 annual publications. Various contributions inquired into the relationship between key constructs of the absorptive capacity concept. Other research aimed at gaining a better understanding of what role context conditions and other external factors played for absorptive capacity to have a significant impact on innovation performance. Contributions in this third phase include Lewin et al. (2011), Vasudeva and Anand (2011), Schildt et al. (2012), and Gebauer et al. (2012, 2014).

Five important keywords emerged from the analysis of keywords and subjects of the absorptive capacity articles. These are knowledge management (e.g., Lane and Lubatkin, 1998; Minbaeva et al., 2003; Vasudeva and Anand, 2011), organizational learning (e.g., Schildt et al., 2012), innovation management (e.g., Lichtenthaler and Lichtenthaler, 2009), research and development (Boschma and ter Wal, 2007; Stock et al., 2001), and competitive advantages (e.g., Lewin et al., 2011). Absorbing external knowledge requires adequate knowledge management and organizational learning processes. Having such processes in place to absorb external knowledge is essential for a company's innovation management and research and development. Due to the effect of these processes, it is argued that absorptive capacity is a key driver for gaining a competitive advantage.

All five components are highly relevant for the absorptive capacity concepts. However, as indicated in **Figure 2**, the relative importance of each component has changed across the three phases. Whereas the relative importance of knowledge management, innovation management, and research and development has increased, articles on absorptive capacity put less emphasis on organizational learning and competitive advantage.

Knowledge management, innovation management, and research and development cover increasingly diverse research themes. Innovation management had initially a relative narrow focus, but has now been extended to include discussions on innovation performance and open innovation into the concept of absorptive capacity (e.g., Boschma and ter Wal, 2007; Lichtenthaler and Lichtenthaler, 2009). Knowledge management has diversified into themes such as knowledge transfer, knowledge-based systems, knowledge acquisition, knowledge sharing, and human capital (e.g., Gebauer et al., 2012, 2014; Minbaeva et al., 2003; Shenkar and Li, 1999; Vasudeva and Anand, 2011). Articles on research and development have linked absorptive capacity to technology transfer, patents, and inventions (e.g., Grünfeld, 2003; Stock et al., 2001).

As indicated in **Figure 2**, absorptive capacity is also related to many other topics. In phase 3, for example, there have been 17 articles about the link between absorptive capacity and dynamic capabilities. These articles embedded absorptive capacity in the debate on dynamic capabilities, which originates from the evolutionary theory of the firm (Zollo and Winter, 2002). Dynamic capabilities enable companies to respond to changes in the business environment. A similar argumentation is used for the absorptive capacity concept.

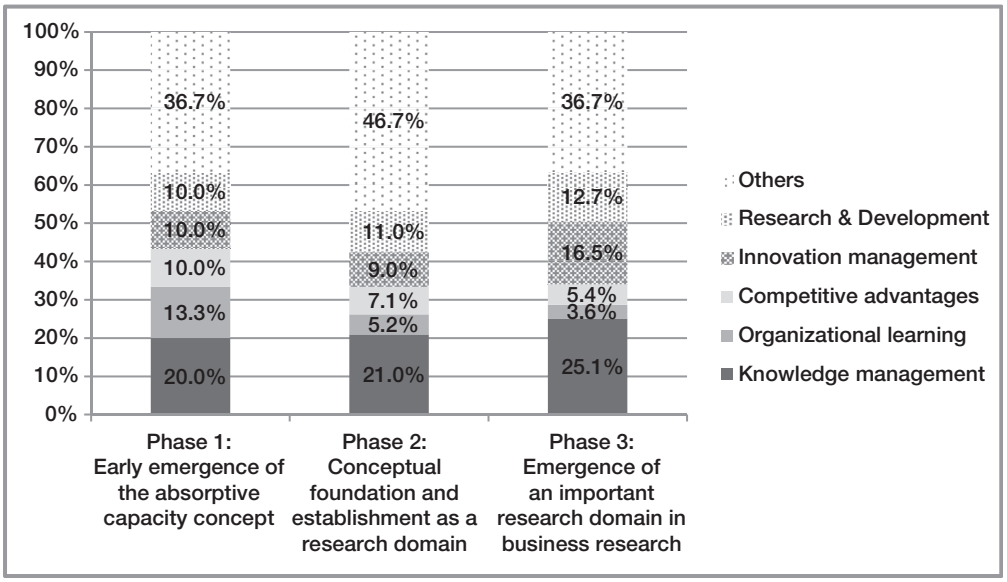


Figure 2 Main themes across the phases of absorptive capacity research.

With its focus on a firm's ability to recognize, assimilate, and apply external knowledge, the concept of absorptive capacity has a strong link to the literature on dynamic capabilities, where the reconfiguring of existing knowledge structures is a defining characteristic.

Among the 828 articles, we selected those with 100 and more citations. Applying the threshold of 100 citations leads to a core set of 26 most influential contributions to the absorptive capacity concept (Intellectual core of absorptive capacity). This core is informed purely by academic papers indicating the strong research interest in the topic. These papers are published in most prominent journals such as Strategic Management Journal, Academy of Management Journal, Academy of Management Review, and Administrative Science Quarterly among others. The 26 articles account for 72.8% of the total number of citations in the entire set of the 828 articles published on absorptive capacity.

Recent Developments in Absorptive Capacity Research

Conceptualization of Absorptive Capacity

Since the original definition, various conceptualizations of absorptive capacity have emerged (e.g., Lane et al., 2006; Lewin et al., 2011; Gebauer et al., 2012). While the early conceptualizations focused on R&D-related issues, later research broadened the concept to developing absorptive capacity at the organizational level (Tsai, 2001). The term knowledge within the absorptive capacity concept subsumes both procedural and declarative knowledge. The latter provides a description of state such as information on customer needs, technological trends, and strategic plans and refers to the notion of know-what. Procedural knowledge describes the current practices inside a firm such as the tools and processes that companies use to determine customer needs, extrapolate technological trends, and formulate strategic responses (Kogut and Zander, 1992). The notion of know-how captures procedural knowledge. There are several dimensions along which the absorptive capacity concept has evolved.

Taking a very general perspective, a number of existing conceptualizations describe absorptive capacity as the independent variable and innovation performance as the dependent variable. Such a view tends to capture absorptive capacity as an aggregated construct. It hardly allows researchers to explain the underlying processes of absorptive capacity at the firm level. Yet, aggregated concepts enable scholars to theorize and empirically test how variances of the firm-level characteristics, specific determinants, and context conditions of absorptive capacity affect innovation performance. Some of these general conceptualizations entail moderators, which can either strengthen or weaken the relationships between absorptive capacity and innovation outcomes. For example, Van den Bosch et al. (1999) propose business strategy as such a moderator. A first-mover strategy yields advantages when it involves building up absorptive capacity. By contrast, a follower strategy requires lower absorptive capacity. Similarly, Tsai (2001) argues that the centrality of a company's position in the knowledge network strengthens the impact of absorptive capacity on performance.

In contrast to the variance models, other research on absorptive capacity has defined the research agenda in this field over the past years. This stream focused on detailing the underlying processes of absorptive capacity. This led to a clearer understanding of the nature of absorptive capacity and resulted in the emergence of various process models. Zahra and George (2002) introduced the distinction of absorptive capacity into potential absorptive capacity and realized absorptive capacity. The former captures knowledge acquisition and assimilation, which refer to a firm's capacity to identify and acquire externally generated knowledge. Realized absorptive capacity refers to the capacity to transform and exploit the knowledge for

commercial purposes. The literature is contradictory on the sequence of knowledge absorption. Zahra and George (2002) and Jansen et al. (2005) conceptualize the sequence as a linear relationship between acquisition, assimilation, transformation, and exploitation, whereas Todorova and Durisin (2007) interpret assimilation and transformation as two parallel elements. Knowledge is assimilated, if the existing cognitive structure of organizational members does not change. Transformation means that new knowledge is interrelated with changing existing cognitive structures.

Independent of the sequence of knowledge assimilation and transformation, potential and realized absorptive capacity are linked through an efficiency factor. A higher efficiency factor leads to greater innovation performance because organizations pursue a course of action in response to their potential knowledge (Zahra and George, 2002). According to the efficiency factor, Winter (2000) suggests that satisficing rather than optimizing guides managers in transforming potential into realized knowledge. According to this argument, knowledge stocks accumulated through potential absorptive capacity function as strategic reference points and aspiration levels.

An important aspect of the process models is that they enable scholars to conceptualize and therefore capture learning processes as one of the central underlying elements of absorptive capacity. With the increasing emphasis on learning processes, the absorptive capacity literature has recently developed close links to two other streams in the management strategy and organization theory literature; on the one hand, the literature on interorganizational knowledge transfer and learning and on the other hand, the literature on dynamic capabilities with its focus on sustained competitive advantage through processes of learning and change. In the following, we present some contributions on absorptive capacity in the light of these two streams in management research and present the implications of these contributions.

Absorptive Capacity and Learning Processes

Both potential and realized absorptive capacities are cumulative and depend on past experiences. Past experience and prior knowledge are key elements in the absorptive capacity concept. Prior R&D investments – and therefore prior knowledge – determine at the firm level the extent and diversity at which an organization is able to recognize and understand, assimilate, transform, and apply knowledge from a variety of external sources. Thus, the starting point for a firm to absorb external knowledge and the kind of knowledge that a firm absorbs are cumulative and path dependent. This has a number of implications.

One implication is that efforts to develop absorptive capacity in one period make it easier to accumulate it in the next period (Cohen and Levinthal, 1990). Accordingly, absorptive capacity is not static, but rather evolves through learning processes (Lane et al., 2006; Todorova and Durisin, 2007). Lane et al. (2006) conceptualize absorptive capacity as a firm's ability to utilize external knowledge through three sequential learning processes: exploratory, transformative, and exploitative. Exploratory learning is about the acquisition of external knowledge and corresponds to the notion of potential absorptive capacity. Through exploitative learning, companies can apply acquired knowledge and therefore combine existing knowledge with newly generated knowledge. Such learning reflects the concept of realized absorptive capacity. Transformative learning links the exploratory and exploitative learning processes. It can span from maintaining and reactivating knowledge to conversion and combination of knowledge (Flatten et al., 2011).

Camisón and Forés (2010) extend that perspective on transformative learning further. The authors describe transformative learning as developing and refining "… the internal routines that facilitate the transference and combination of previous knowledge with the newly acquired or assimilated knowledge. Transformation may be achieved by adding or eliminating knowledge, or by interpreting and combining existing knowledge in a different, innovative way" (Camisón and Forés, 2010: p. 709).

Alternatively, exploratory and exploitative learning processes can be linked through assimilative learning. The term assimilation is more about integrating this knowledge into the organizational knowledge base. Considering the dynamic capability perspective, exploratory and transformative learning are of particular importance in turbulent environments.

Another dimension of interorganizational knowledge transfer and learning is directly linked to the knowledge base on which absorptive capacity is built. In a recent contribution, Vasudeva and Anand (2011) highlight the distinction between latitudinal and longitudinal absorptive capacity. "[L]atidudinal absorptive capacity processes and uses diverse knowledge, and longitudinal absorptive capacity processes and uses distant knowledge" (Vasudeva and Anand, 2011: p. 612). This is an important distinction and a further development of the absorptive capacity concept because it decomposes absorptive capacity into qualitatively different parts. In fact, this distinction specifies the path dependency of absorptive capacity. If the two components are linked to different search approaches, then this has the implication that a firm may not only have too little absorptive capacity in general but may also have an imbalance (or suboptimal) composition of latitudinal and longitudinal absorptive capacity. Consequently, a firm may be restricted regarding the knowledge that it can absorb. This, in turn, determines the breadth of areas, from which a firm can absorb knowledge and subsequently develop new knowledge and innovation. In this sense, the concept of absorptive capacity is closely related to interorganizational learning and knowledge transfer and the internal capacities to recognize and access this knowledge.

Absorptive Capacity and Dynamic Capabilities

The concept of absorptive capacity is also embedded in the debate on dynamic capabilities (Teece et al., 1997; Zollo and Winter, 2002). The debate on capabilities originates from the resource-based view of the firm. Organizational capabilities are firm-specific resources and processes to accomplish strategic goals by utilizing the available know-how and nonfirm-specific resources (e.g., Teece et al., 1997; Zollo and Winter, 2002). One of the most prevalent terms for capabilities is the distinction into operational and dynamic capabilities (Teece et al., 1997).

Operational capabilities comprise the competences and skills that determine a firm's efficiency and effectiveness in executing its current business activities and in accomplishing specific tasks (Zahra et al., 2006). Dynamic capabilities encapsulate the evolutionary nature of resources in firm organizations (Teece et al., 1997; Zahra and George, 2002). Dynamic capabilities enable companies to respond to changes in the business environment and change their operational capabilities accordingly. Teece et al. (1997: p. 516) defined dynamic capabilities as "… the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments." Zollo and Winter (2002: p. 340) specify the meaning of dynamic capabilities as being "… a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness …". In fact, dynamic capabilities define an organization's ability to identify the need for change, formulate an appropriate response, and implement a course of action.

Dynamic capabilities avoid a competence trap, in which competences become irrelevant due to changes in the business environment. Zahra et al. (2006: p. 918) define dynamic capabilities as the managerial ability "to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate." Dynamic capabilities are beneficial in highly turbulent settings (Zahra et al., 2006).

As seen in more detail below, it is exactly in this context of distinguishing between operational and dynamic capabilities to interpret the relationship between absorptive capacity as learning and knowledge transfer processes and the dynamic capabilities as a higher level concept. As absorptive capacity is defined as a firm's ability to recognize, assimilate, and apply external knowledge, it can be interpreted in the context of dynamic capabilities and specifically in the context of being a concept that underpins the conditions to generate the level of adaptability that is required for adjusting and reconfiguring the absorptive capacity and its corresponding processes at the organizational level to acquire new knowledge from external sources. Some recent contributions in the absorptive capacity literature have highlighted this link (e.g., Lewin et al., 2011; but also Lane et al., 2006).

In sum, there have been significant developments at the conceptual level of absorptive capacity with some recent contributions on interorganizational knowledge transfer and dynamic capabilities. However, both streams lack some aspects. The interorganizational learning approach is relatively quiet about the capabilities required to structure and configure the adequate absorptive capacity processes. The capability approach, in contrast, remains often on a relatively general conceptual level without making the links to the various absorptive capacity processes (i.e., acquisition, assimilation, transformation, exploitation) explicit. In the next section, we provide an approach how to integrate the two streams and provide an interesting new view of absorptive capacity as learning and adaptation processes with a link to dynamic capabilities. **Table 1** summarizes the most prominent conceptualization of absorptive capacity.

Table 1 Most prominent conceptualization of absorptive capacity

Conceptualization of absorptive capacity as…	*Description of the conceptualization*	*References*
Aggregated concept	● Absorptive capacity as independent variable, innovation performance as dependent variable ● Allows inquiring how variances of firm-level characteristics and context conditions of absorptive capacity affect innovation performance ● Business strategy as moderator (Van den Bosch et al., 1999) ● Company's position in the knowledge network as moderator (Tsai, 2001)	Van den Bosch et al. (1999), Tsai (2001)
Learning process	● Absorptive capacity evolves through learning processes ● Typical phases of the learning process are knowledge recognition and acquisition, knowledge assimilation, knowledge transformation, knowledge exploitation ● Prior knowledge as base for learning processes ● Refinement of the absorptive capacity concept by distinguishing various types of knowledge that a company aims to absorb and process: e.g., diverse vs distant knowledge (Vasudeva and Anand, 2011)	Zahra and George (2002), Lane et al. (2006), Jansen et al. (2005), Todorova and Durisin (2007), Vasudeva and Anand (2011)
Learning process configured through dynamic capabilities	● Absorptive capacity evolves through learning processes with firms requiring capabilities (dynamic capabilities) to build, configure, and reconfigure these learning processes ● Dynamic capabilities were initially understood as strategic context conditions driving and influencing the absorptive capacity process (e.g., Lane et al., 2006) ● Recently, dynamic capabilities have been understood as endogenous part of the absorptive capacity concept as interrelated learning processes conceptualized as combinative capabilities (e.g., Gebauer et al., 2012) and Metaroutines (e.g., Lewin et al., 2011)	Lane et al. (2006), Lewin et al. (2011), Gebauer et al. (2012)

Integrating Dynamic Capabilities into the Conceptualization of Absorptive Capacity

One way to bring the two streams together is to conceptualize the capabilities required in various process phases of absorptive capacity as operational capabilities and interpret combinative capabilities as dynamic capabilities. More specifically, the absorptive capacity's learning processes interact with combinative capabilities, which describe how a company systematizes, socializes, and coordinates knowledge (Zollo and Winter, 2002). Systemizing, coordinating, and socializing knowledge can either contribute to or hinder learning processes at the corresponding level of absorptive capacity (Van den Bosch et al., 1999). Coordinating knowledge refers to cross-functional interfaces and participation in decision processes. Knowledge can be systematized by the formalization and routinization of organizational actions. The socialization of knowledge is based on the density of social linkages (structural aspects) and shared social experience (cognitive aspects) in an organization and between the organization and its external partners (e.g., customers, suppliers) (Van den Bosch et al., 1999; Jansen et al., 2005).

This argumentation indicates that increasing the level of external knowledge does not always enhance innovation. More important is how combinative capabilities interact with learning processes of the absorptive capacity process. The key point is that creating an in-depth understanding of the interaction between learning processes and combinative capabilities could also explain why, in similar business environments, some companies achieve greater competitive advantages than others, through converting external knowledge into strategic innovations. That is because companies may differ in the dynamic capabilities they possess to reconfiguring the learning and knowledge transfer in the absorptive capacity process.

Figure 3 presents the new conceptualization. Against this background, past experiences set the reference points for developing absorptive capacity. The degree of strategic innovation is the dependent variable. Learning processes (exploratory, assimilative, transformative, and exploitative learning processes) driving absorptive capacity form the independent variable. Combinative capabilities (systematization, coordination, and socialization) mediate the relationship between learning processes and innovation outcomes, whereas strategy and network position are considered as moderating the evolution of learning processes and combinative capabilities.

Implications and Outlook

The integrated view presented in the previous section has a number of implications. It allows us to address some new aspects, provides an outlook on emerging topics, and lays out some directions for future research. This new approach enriches the theoretical knowledge on relationships between absorptive capacity, learning processes, combinative capabilities, and (strategic) innovations. The general contribution is twofold.

Firstly, using strategic innovation as the dependent variable, the absorptive capacity conceptualization includes the interactions of learning processes and combinative capabilities and as such forms the independent variable. Therefore, this conceptualization departs from the existing preoccupation

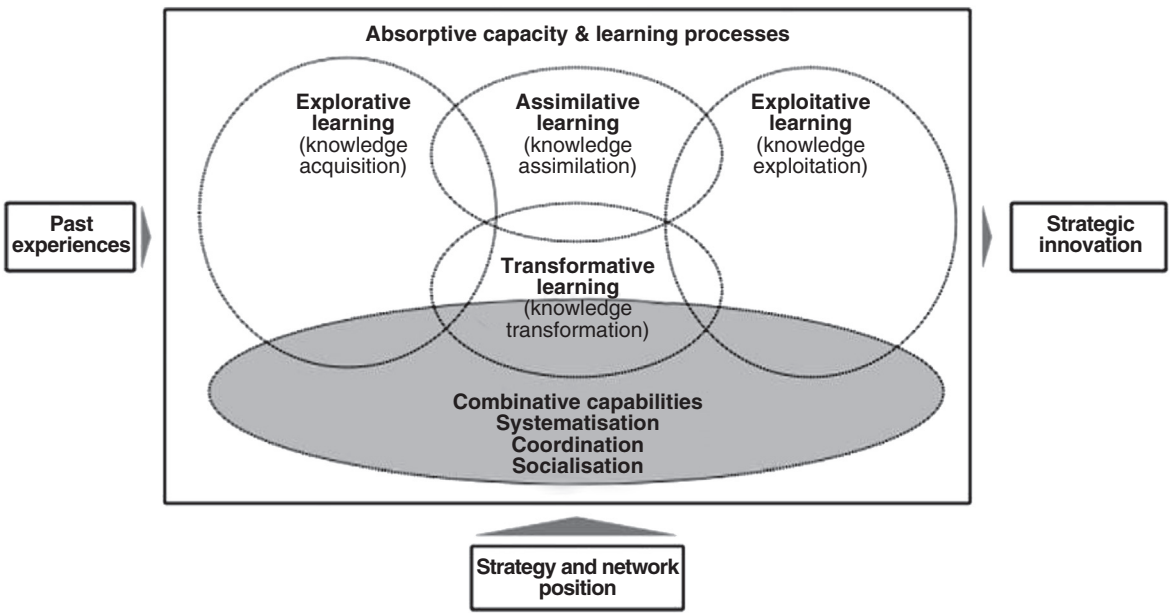


Figure 3 Dynamic capabilities, absorptive capacity, and learning processes: a new conceptualization (Gebauer, H., Worch, H., Truffer, B., 2012. Absorptive capacity, learning processes and combinative capabilities as determinants of strategic innovation. European Management Journal 30 (1), 57–73). Adapted from Lane, P.J., Koka, B.R., Pathak, S., 2006. The reification of absorptive capacity: a critical review and rejuvenation of the construct. Academy of Management Review 31 (4), 833–863; Zahra, S.A.S., George, G.G., 2002. Absorptive capacity: a review, conceptualization, and extension. Academy of Management Review 27 (2), 185–203; Zollo, M., Winter, S.G., 2002. Deliberate learning and the evolution of dynamic capabilities. Organization Science 13 (3), 339–351.

with absorptive capacity having direct innovation outcomes. This insight is in the tradition of Lane et al. (2006), but includes dynamic capabilities as independent variable rather than solely as a context condition.

Secondly, to explain how the necessary knowledge for strategic innovation is absorbed, our approach provides an understanding of how learning processes and combinative capabilities contribute to strategic innovation. The conceptualization suggests that assumptions on strategic behavior, network position, and the sequence of learning processes need to be reconsidered. This new view has implications and allows us to reconsider (and reinterpret) some findings in the absorptive capacity literature.

For example, one implication is that the argument that first-mover strategies have advantages for a company's absorptive capacity cannot easily be transferred as a proposition for strategic innovation (Van den Bosch et al., 1999). Recent findings suggest that follower strategies seem beneficial, where first-mover strategies would generate counter-productive side effects (Gebauer et al., 2012, 2014). The reasons for such side effects are constraints on a firm's combinative capabilities, which are necessary for taking advantage of the exploratory learning processes. First-mover strategies seem to hinder the departure from a strong formalization of knowledge sharing. This, in turn, constrains the development of diverse combinative capabilities such as a broader range of problem-solving skills, a higher cognitive diversity across the management team, and moving away from vertically centralized decision-making authority. Therefore, the new approach suggests that a first-mover strategy can also hinder strategic innovations, whereas a follower strategy could enhance strategic innovation due to a more broadly underpinned – though time intensive – innovation process. Further theory-building and empirical research should elaborate how a first-mover strategy can form rigidities, which constrain strategic innovations.

Similar to the first-mover strategy, Tsai (2001) argues that a more central network position strengthens the relationship between absorptive capacity and innovation performance. Yet recent findings indicate that a central network position and strong ties with network partners tend – under certain circumstances – to constrain the knowledge creation process (Gebauer et al., 2012, 2014). This is because centrality in a network may be important to shape the interpretations and the use of knowledge, but less in perceiving new perspectives that would allow a firm to have new interpretations of its existing knowledge. Therefore, the new approach summarized in **Figure 3** suggests that increasing centrality in the network position tends to constrain strategic innovation. Further theory-building and empirical research should elaborate how centrality in the network position leads to strategic reference points, which limit the knowledge creation process and ultimately innovation performance.

The new approach also sheds light on the discussion of the sequence of the acquisition, assimilation, transformation, and exploitation of knowledge (Jansen et al., 2005; Todorova and Durisin, 2007; Zahra and George, 2002). Assimilation and transformation are not sequential, but also not necessarily parallel. As recent findings show (Gebauer et al., 2012, 2014), if the exploratory learning processes rely predominantly on previous combinative capabilities, they will not only lead to some ideas that are relatively close to the existing knowledge base, but will also assimilate, rather than transform the knowledge. Under such conditions, exploratory learning processes are preceded by an assimilation of the newly acquired knowledge. Assimilation continues with previous combinative capabilities. Other reconfigurations of combinative capabilities within the exploratory learning process may enable transformation, in which the newly acquired knowledge interacts with changes in combinative capabilities. Therefore, this conceptualization suggests that transformative learning plays a key role in strategic innovation and contributes significantly to strategic innovation.

Finally, departing from existing configurations in combinative capabilities suggests that absorptive capacity also involves the unlearning of capabilities. Adding to Todorova and Durisin's (2007: p. 777) argument that "…firms often fail to identify and absorb valuable new external knowledge, because they are hampered by their embedded knowledge base, rigid capabilities, and path dependent managerial cognition…", rigidities exist specifically in how knowledge is systematized, coordinated, and socialized. We propose that firms reconfigure their combinative capabilities. For example, exploratory and transformative learning processes benefit from decreased formalization and more interdisciplinary routines for knowledge systematization, cross-functional interfaces, job rotation, and an umbrella strategy for knowledge coordination, as well as increased cognitive diversity and more dense social linkages. While these reconfigurations essentially depart from past experiences, relying on initial systematization capabilities would promote exploitative learning processes.

The results support the argument that the socialization of knowledge influences all three learning processes (Jansen et al., 2005), and not only the impact of potential on realized absorptive capacity, as proposed by Zahra and George (2002). This line of argumentation is not restricted to the socialization of knowledge, but also includes its systematization and coordination. Furthermore, the findings support the feedback process perspective on absorptive capacity (Lane et al., 2006; Todorova and Durisin, 2007), and depart from the linear approach to absorptive capacity (Jansen et al., 2005; Zahra and George, 2002). Thus, the new approach suggests that combinative capabilities enhance exploratory and transformative learning. Further theory-building and empirical research should elaborate how combinative capabilities facilitate these learning processes and specifically enhance exploratory and transformative learning.

See also: Business Models; Business Platforms; Development: Organizational; Innovation; Learning: Organizational; Modularity and Organizations; Network Paradigm: Applications in Organizational Science; Organizational Emergence and Firm Formation; Strategic Management; Strategizing.

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