

Beneath the Surface: Exploring the role of Individuals Learning in the Emergence of Absorptive Capacity

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Abstract: Drawing on the micro-foundations view of strategy, we examine the role of individuals in organizational learning and reveal the micro-macro interactions underpinning the emergence of a firm-level absorptive capacity. Whereas most of the absorptive capacity research focuses on interaction of external and internal environments, we emphasise the interplay between organizational and individual levels of absorptive capacity. We find that the nature of knowledge, the role of individuals and their social interactions are explicitly addressed in the seminal works of Cohen and Levinthal. However, these micro-level considerations are insufficiently problematized in subsequent research. This neglect has resulted in limited explanations of how absorptive capacity emerges as an organizational-level phenomenon. Based on an exploratory, longitudinal case study, we re-conceptualize absorptive capacity as a set of three, sequentially inter-linked learning processes in which individual and organization interact and suggest three propositions for further empirical research.

Keywords: Absorptive capacity, explorative case study, individual knowledge, organizational learning process, individual-organization interaction

1. Introduction

Since Cohen and Levinthal (1989, 1990) coined the term ‘absorptive capacity’, a substantial number of research examined the issue of how organizations acquire and use new external knowledge for gaining and sustaining a competitive advantage (Lane and Lubatkin 1998, Van den Bosch et al. 1999, Todorova and Durisin 2007, Zahra and George 2002). The rationale behind such high scholarly interest lies in the potential of absorptive capacity concept to link organizational knowledge, learning and performance. However, the research field remains underdeveloped and the concept suffers from reification (Volberda et al. 2010), which may be attributed to scholarly attempts of ‘black boxing’ the micro-level processes that underpin an absorptive capacity of the firm. Although Cohen and Levinthal (1990) addressed the tension between individual and organization levels of absorptive capacity, in current research it is predominantly viewed as a firm-level construct (Mowery et al. 1996, Lyles and Salk 1996, Lane and Lubatkin 1998, Van den Bosch et al. 1999, Tsai 2001, Jansen et al. 2005, Lane et al. 2001, Zahra and George 2002).

Hence, the tacit, situated and distributed nature of organizational knowledge is not sufficiently problematized, and the role of cognitive and behavioural aspects of individuals’ conduct in the development of absorptive capacity is underestimated. In this paper, we make a call back to the seminal works of Cohen and Levinthal (1989, 1990, 1994) and emphasize the role of individuals and their social interactions in value recognition, assimilation and exploitation processes underlying a firm-level absorptive capacity. We examine these micro-macro interactions in a longitudinal, exploratory case study and offer three propositions for further examination. We make two major contributions to the absorptive capacity and organizational learning literature. First, we distinguish between individual- and organization-level attributes of absorptive capacity and examine their interactions within each phase of absorptive capacity process—i.e., the recognition of value, the assimilation, and the application of new external knowledge to commercial ends. Through this lens, we give a better explanation of how absorptive capacity emerges into an organizational learning capability. Second, we explain how the tacit, situated and distributed nature of organizational knowledge influence the development of firm’s absorptive capacity. With this, we integrate a micro-foundations view of strategy (e.g., Felin and Foss 2005; Felin et al. 2012) with a process perspective of absorptive capacity (Jones 2006, Easterby-Smith et al. 2008, Lane et al. 2006) and provide a more nuanced understanding of the strategic role of individuals in organizational learning process.

2. Micro-foundations of absorptive capacity

2.1 Cohen and Levinthal (1989, 1990, 1994)

The seminal articles by Cohen and Levinthal (1989, 1990, 1994) problematizes the nature of organizational knowledge, address the multi-levelness of the absorptive capacity concept and view it as a set of sequentially inter-linked learning processes.

First, the authors address a distributed nature of organizational knowledge by arguing that new external knowledge is not equally experienced and interpreted by firm employees. Individuals possess diverse cognitive structures, and their absorptive capacities depend on the degree to which they can build their awareness about “*who knows what, who can help with what problem, and who can exploit it*” (Cohen *et al.*, 1990, 133). The authors argue that the role of the firm is to facilitate social interactions among its individual members through which their absorptive capacities can be leveraged and mobilized for strategic purposes. Cohen and Levinthal (1989, 1990) also emphasize the importance of situated learning (Brown and Duguid, 1998) in the development of individual absorptive capacities. They explicitly point out that complementary knowledge is acquired through experience that “*provides the firm with the background necessary to [...] automate particular manufacturing processes.*” (Cohen and Levinthal, 1990, 133). Individuals accumulate knowledge in the particular strategic context and through interaction with organizational structure, culture and decision-making processes. Moreover, Cohen and Levinthal (1990) address problems associated with the tacit nature of organizational knowledge (Grant 1996, Kogut and Zander 1992) which implies that knowledge is embedded in the minds and actions of individuals that is difficult to codify and articulate and, therefore, cannot be acquired and integrated by other firms without losing integrity.

Second, Cohen and Levinthal (1990) consider absorptive capacity of the firm as a multi-level construct. Implied in their work is the notion that individuals assess the value of new external knowledge, relate it to what they already know, and creatively use it in the development of new products and processes. However, a firm’s absorptive capacity is not a mere aggregate of individual absorptive capacities. Rather, it depends on the “*links across a mosaic of individual capabilities*” (Cohen and Levinthal, 1990: 133). The ‘linking’ process is embedded in organizational strategy (i.e. firm goals, actions and resource allocations), organizational structure (i.e. the degree of formality, hierarchy and specialization), and culture (i.e. the degree of shared language within and across organizational units).

Third, Cohen and Levinthal (1990) explicitly define absorptive capacity as a learning process and implicitly present it as a capability of the firm in which individuals play an important role. They maintain that through R&D activities a firm develops a particular breadth and depth of its knowledge base—i.e., a capacity to recognize value of new external knowledge. Over time, the firm develops communication structures and decision-making processes that facilitate (or inhibit) the sharing of knowledge among firm employees—i.e., a capacity to assimilate new external knowledge (Cohen and Levinthal, 1990). The outcome of this process is a renewed “collective scheme” among firm employees which leads to their engagement in combinations of newly acquired (e.g., technological) knowledge with currently existing (e.g., market) knowledge. Through individual engagement in linking of complementary knowledge, a firm becomes adept at forecasting new market trends, creating new products and maneuvering strategically—i.e., it develops a capacity to apply new external knowledge to commercial ends (Cohen and Levinthal, 1990, 1994).

2.2 Subsequent absorptive capacity research

In subsequent research, absorptive capacity has been largely defined and analyzed as an organization-level construct (Van den Bosch *et al.* 1999, Tsai 2001, Gupta and Govindarajan 2000, Jansen *et al.* 2005, Lane *et al.* 2001, Lane *et al.* 2006, Todorova and Durisin 2007). With several notable exceptions (e.g., Lane *et al.*, 2006), absorptive capacity researchers focus on knowledge stocks at the expense of knowledge flows. More emphasis is placed on characteristics of prior related knowledge of the firm (Ahuja *et al.*, 2001; Mowery *et al.*, 1996) rather than on how that knowledge is acquired, assimilated and used by firm employees. A lack of attention to the role of individuals has led scholars to conclude that organizations follow a certain “algorithmic matching process” (Lane *et al.*, 2006: 854) where investments of an amount X into absorptive capacity Y enable a firm to learn Z (Mowery *et al.* 1996, Ahuja and Katila 2001, Stock *et al.* 2001, Tsai 2001). Despite the increased efforts to bring individual in the absorptive capacity research (Jones 2006, Lenox and King 2004, Matusik and Healey 2005), we still know little about the mechanisms through which a firm strategy, structure, and decision processes affect the abilities of its individual members to recognize value, assimilate and apply new external knowledge to commercial ends. We also know little about how individual learning behaviors “translate” into absorptive capacity as an organizational capability (Volberda *et al.* 2010, Hotho *et al.* 2012).

The concepts of knowledge (the “know-how”) and information (the “know-what”) are used interchangeably in the absorptive capacity literature (Lane and Lubatkin 1998, Van den Bosch *et al.* 1999, Todorova and Durisin 2007, Zahra and George 2002), and fundamental axiological differences between the two (Kogut and Zander 1992) are neglected. Consequently, a distinction and continuous tension in interaction between individual and collective forms of knowledge creation (Spender 1996) is not problematized. Either explicitly or implicitly

researchers argue that individual expertise is an asset that is convertible into a collective good through human resource management practices (Lane et al. 2001) and is shared through formal and informal integration mechanisms (Lane and Lubatkin 1998, Todorova and Durisin 2007, Bosch et al. 1999, Zahra and George 2002). However, the collective knowledge is not consciously known by individuals nor it is easily articulable (Grant 1996); it is embedded in complex organizational routines, social relationships, shared norms and values of the firm (Nelson and Winter 1982, Spender 1996, Zander and Kogut 1995). Following this line of thought, absorptive capacity is not an aggregate of individual experiences that could be “shuffled” around, but rather emerges through continuous interaction between individual and collective forms of knowledge.

Moreover, the most valuable organizational knowledge is situated (Brown and Duguid 1998); it is embedded in practice and resides in complex social interactions among firm employees (Spender and Grant 1996). Organizational knowledge is also distributed which implies that a firm consists of various domains and skills that await being connected and integrated. Factual knowledge of a certain time and place is incomplete, continuously reconfiguring, and essentially dispersed. As a result, no single mind can specify the value of organizational knowledge before it is used (Tsoukas 1996). Following these arguments, a firm’s absorptive capacity is not an automatic aggregation of individual absorptive capacities but rather a set of unique interactions of individual abilities, job-related skills, their motivation to absorb knowledge (Reinholt et al. 2011, Chang et al. 2012, Minbaeva et al. 2003) and organization-level attributes, such as strategy, structure and culture of the firm.

3. Method

In this study, we employ a longitudinal case study design to explore the role of individual learning in the emergence of a firm-level absorptive capacity. Little is known about how ‘micro’ and ‘macro’ interacts in the emergence of absorptive capacity; hence, an exploratory research design is appropriate (Eisenhardt 1989, Graebner et al. 2012).

We selected a multinational, knowledge intensive firm Verico as our research setting (company’s name is disguised to secure anonymity) where we collected data during 2000-2010. Verico is a project-based organization that provides expert services in risk management. It has 300 offices in 100 countries, and had 8440 employees in 2010. The knowledge base in the organization consists mostly of highly qualified engineers and technical personnel with 81% having a college degree, 39% having a master’s and 5% having a doctorate. Company goals are to provide quality and comparability in globally distributed services, while maintaining uniform quality and expertise worldwide. The autonomy to provide solutions is based on peoples’ expertise, and such novel solutions are sources of innovation for both the clients and Verico. The company experiences technological disruptions and global pressure to innovate, hence, provides opportunity to explore how absorptive capacity emerges over time, as a result of individuals’ involvement in project work

We conducted 148 semi-structured interviews which we taped, transcribed, and supplemented with archival data (e.g. financial reports, minutes of top management meetings, project plans, organizational surveys) and observations (e.g., visits to laboratories and managerial meetings, workshops, and training). We also used other secondary data sources, such as project management procedures and reports to clients.

To make sense of the data, we developed categories and abstracted raw data through iterations with the existing concepts of individual ability and motivation in the pursuit of acquisition and use of new external knowledge (Reinholt et al. 2011, Jones 2006, Matusik and Heeley 2005, Chang et al. 2012, Minbaeva et al. 2003). Individual abilities (i.e. overall abilities, job-related skills, and educational background), motivations (i.e. the direction, intensity and persistence of actions) and actions emerged in our data as three main categories characterizing each of the three absorptive capacity processes.

4. Findings

4.1 Value recognition

In our data, the Verico employees’ ability to recognize value of new external knowledge was linked to the firm’s strategy. The value recognition emerged as an individual act that was exploratory in nature and driven by the specific knowledge, job-related skills, general abilities and motivations of Verico employees to recognize valuable knowledge for further exploitation in the firm. However, our data shows that value recognition process ‘happens’ within a strategic context of the firm and in the pursuit of specific organizational goals by its members underlying their engagement in project work.

In Verico, consultants, surveyors or other experts capture new business opportunities and service innovations in the company's projects and through interactions with the clients. In these projects, Verico employees are trained to be good engineers, and this is where the assessment of rapidly developing technologies occurs. Verico employees execute their tasks in the best possible manner in order to attend to their client needs, while at the same time abiding by global standards and corporate requirements. An example of the relation to specific roles can be illustrated by the following quote: *"I used to work in Sub-sea before I changed to Cleaner energy section, the innovations here are very rapid...these developments are very exiting but I didn't pay much attention to the technological breakthroughs in this area before I started working here"* (Senior engineer).

4.2 Assimilation

The employees' ability to assimilate new external knowledge was evident in the case, and was associated with Verico's structure and knowledge sharing practices. These influenced the internal search behaviour of Verico employees as well as the scoping and sourcing of projects within the firm. We observed that when projects demanded specialized competence, or when customer requirements stemmed from different locations, the project managers used their internal networks, searchable databases or experts at the headquarters to source relevant knowledge. As senior project manager put: *"We are always outreaching. Whenever I look for people or competence, or wonder about something professional, I discuss it with people around me. If they don't know, I continue. I look at the organizational chart and start calling."*(Project Manager).

In Verico, the assimilation of new external knowledge was also linked to how individuals shared their knowledge and related with other individuals within and across different units. Collaboration and mutual sharing of knowledge appeared problematic when knowledge was tacit, situated and highly distributed. Verico engineers were reluctant to spend time for articulating and storing their experiences in shared databases, as they were concerned that their explicated knowledge can be misinterpreted and, hence, irrelevant when used in other contexts. The challenge for senior managers was to prioritize time for reflection upon and codification of the lessons learned at the end of each project. One example is a project on a seabed installation in the North Sea: *"If one generalizes about experiences gained in this ecosystem and applies them on installations in the gulf with very different meteorological and geological conditions, it can be so dangerous"* (Senior engineer).

Beyond ICT-based systems, there were also conscious efforts by Verico employees to strengthen people-to-people interactions. Our data shows that these interactions emerged through job rotations and daily project work practices within and across various knowledge domains. Overall, what emerges in our data is that in the knowledge assimilation phase, the primary role of the firm is to mobilize its employees across different functional domains and to facilitate their interactions through formal and informal knowledge sharing practices. As a London-based engineer reported: *"We need to search to see if other units can help us out. But that search requires that we have sufficient competence ourselves to identify the competence deficit"* (Project Manager).

4.3 Application

Our data illustrates links between the Verico employees' ability to apply new external knowledge to commercial ends and the firm's strategy and knowledge sharing practices. The Verico case reveals a number of procedures of how new external knowledge is incorporated into the operations of the firm. For example, in the tailor made work support system, no new certificates can be issued if checklists are not followed consciously and mandatory data is not filled into the system. As such, the system guarantees and enables the application of new knowledge, based on project presentations, technical specifications and reports delivered on prior projects. However, whether exploitation opportunities are pursued, in which areas they are pursued and with what resource allocations is determined by the Verico strategy. As such, a firm's strategy determines the direction, intensity and persistence of individual efforts to use and combine different types of knowledge for commercial purposes.

Based on our data, we also argue that these are not the individuals *per se*, but rather combinations and re-combinations of their knowledge across R&D, manufacturing, marketing and other domains that determine the scope and speed of knowledge exploitation processes in the firm. In Verico, the linking of knowledge emerged through formal and informal knowledge sharing practices, including the use of ICTs, direct personal contacts between units, job rotations, cross-functional task forces and project teams, and through dedicated project management functions. The resulting changes in the knowledge base of Verico appeared in the form of new services, internal processes and areas of developed expertise. An example is: *"The experiences one gets in the*

projects? It is all in the heads of each of us... and to some degree in the reports.. searchable in our systems...we utilize our experience to provide customized solutions in each of our projects” (Section Head) .

5. Discussion

Our study examines how absorptive capacity emerges as an organization-level capability and echoes recent calls for the improved micro-level understanding of organizational capabilities (Felin and Foss 2005, Abell et al. 2008, Felin et al. 2012). Through a longitudinal, exploratory case study, we explain how value recognition, assimilation and application capabilities of the firm emerge through exploratory, transformative and exploitative learning processes involving interaction between individual and organizational antecedents of absorptive capacity.

We conceptualize “value recognition capability” as an outcome of the firm’s strategy, which influences the abilities and motivations of its individual members to engage in exploratory learning. Individuals search for new external knowledge within areas of science and technology that are relevant to the firm (Lane et al. 2006). They judge the value of knowledge by performing specific organizational roles in the pursuit of strategic goals of the firm (Cohen and Levinthal 1990, Todorova and Durisin 2007). Our findings show that value identification is not an automatic process. Given a biased nature of individual learning (March 1991), valuation of new external knowledge is continuously nurtured and directed by the firm. In essence, a purposeful learning behavior is exploratory in nature as it reflects the depth and breadth of search activities of the firm employees. Exploratory learning processes determine the extent to which a firm embodies different skills in multiple areas of expertise and the extent to which those skills are mastered thoroughly and completely (Zahra et al. 2000). Drawing on the above, we suggest the following:

Proposition 1: *A firm’s strategy affects the abilities and motivations of its employees to assess the value of new external knowledge through exploratory learning that, in turn, determines the value recognition capability of the firm.*

In our data, “assimilation capability” emerges as the outcome of a firm’s structure and knowledge sharing practices that influence the abilities and motivations of its individual members to engage in transformative learning. Employees share and internalize new external knowledge by bridging “syntactic”, “semantic”, and “pragmatic” knowledge boundaries (Carlile 2002, Carlile 2004). When a commonly shared syntax among individuals exists, the boundary proves to be “unproblematic”, and the primary concern is the extent of information processing across the boundary (Carlile 2004). Provided a highly routinized and formalized decision-making process is developed within the firm, communication and information systems suffice to facilitate information exchange among firm employees (Szulanski 1996, Jansen et al. 2005). However, a sufficiency requirement for a commonly shared syntax is problematic when knowledge is tacit, situated and highly distributed (Postrel 2002). We find that knowledge is disseminated through a combination of ICTs’ use and utilization of social networks. The primary role of the firm is to mobilize its employees across different functional domains and to facilitate their interactions. The importance of cross-functional interfaces, co-location and brokerage functions increases as the firm enables the flow of knowledge among employees and helps to create shared meanings among them (Jansen *et al.*, 2005). Novelty also creates competing interests among employees that impede their abilities and motivations to share knowledge (Carlile 2004). We argue that organizational structure (i.e., the degree of hierarchy and formality) and knowledge sharing practices are critical in helping individuals to transform their diverse interpretations and interests into a commonly shared knowledge of the firm. Drawing on the above, we suggest the following:

Proposition 2: *A firm’s structure and knowledge sharing practices affect the abilities and motivations of its employees to internalize new external knowledge through transformative learning that, in turn, determines assimilation capability of the firm.*

Based on our data, we conceptualize “application capability” as the outcome of a firm’s strategy and knowledge sharing practices that influence the abilities and motivations of its individual members to engage in exploitative learning. Knowledge exploitation is associated with incorporating new (e.g., technological) knowledge into a firm’s operations and matching it with the existing (e.g., market) knowledge leading to new products, services and organizational forms (Lenox and King 2004, Tsai 2001). We find that a firm’s strategy determines the direction, intensity and persistence of individual efforts to combine different types of knowledge for specific purposes of the firm. The scope and speed of knowledge exploitation processes is not determined by individuals *per se*, but rather emerge through combinations and re-combinations of their complementary knowledge across R&D, manufacturing, marketing and other domains. The ultimate goal of knowledge sharing practices is to expose firm employees to diverse but complementary knowledge domains and facilitate the selection of commercially valuable knowledge. Base on the above, we suggest that:

Proposition 3: *A firm's strategy and knowledge sharing practices affect the abilities and motivations of its employees to deploy complementary knowledge resources through exploitative learning that, in turn, determines knowledge application capability of the firm.*

6. Conclusion

Our examination of knowledge absorption processes in the focal firm Verico highlighted the prominent role of individuals in the emergence of absorptive capacity. The analysis of underlying micro–macro-level interactions reveals our attempt to conceptualize absorptive capacity as the *emerging organizational learning capability*. We show how an organization sets the direction, efficiency and flexibility for their individual members to explore, transform and exploit new external knowledge, and how it structures the decision processes and mobilize individuals for the creation of value recognition, assimilation and application capabilities. We conclude that organization- and individual-level absorptive capacities interact in such a way that a firm's strategy, structure and knowledge sharing practices determine the exploratory, transformative and exploitative learning behaviors of its individual members through its effect on cognitive abilities and motivations to act and interact. Our study shows that organizational antecedents of absorptive capacity act as opportunity sets for individuals to learn and are of relative importance. Whereas a firm strategy determines the extent, flexibility and scope of exploratory and exploitative learning, organizational structure is of primary importance for realization of transformative learning behaviors of firm employees.

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