

Knowing, Power and Materiality: A Critical Review and Reconceptualization of Absorptive Capacity

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Most studies on absorptive capacity (AC) are based on assumptions that are characteristic of viewing knowledge from an epistemology of possession (knowledge is possessed by individuals and is transferrable). However, the literature on managing knowledge (or better knowledge work) acknowledges also an epistemology of practice (knowledge is unpredictable and dynamic and constituted in and through practice). Moreover, the literature on AC is relatively silent on the relationship between knowledge and power. In this paper, the authors argue that the AC construct should be interpreted in light of the possession and the practice perspectives of knowledge and power. The analysis includes a systematic literature review of AC that supports the authors' claims and, based on this, they suggest an interpretation of the construct that takes into account knowledge–power relationships. This review and theorizing contribute to a richer and processual view of AC.

Introduction

Absorptive capacity (AC) describes an organization's ability to learn from external sources of knowledge (Cohen and Levinthal 1989, 1990, 1994). Knowledge is thus focal to AC. However, the literature on knowledge indicates that there are different epistemologies – ways of characterizing knowledge – that reflect fundamentally different ways of treating knowledge. Cook and Brown (1999), for example, contrast an epistemology of possession to an epistemology of practice. The epistemology of possession assumes that knowledge resides in an individual's mind (Simon 1991) and can be shared and transferred, even if its sticky nature is recognized (Szulanski 1996). In contrast, the practice perspective implies an immanent relationship between knowing and practice (Nicolini 2011), whereby knowledge is constituted in practice (Bourdieu 1977) involving material as well as social actors (Leonardi 2011; Orlikowski 2007). The possession perspective

assumes that knowledge originates as individual *cognitions* and spreads to the group and organizational level when individuals transfer their knowledge and develop a common *understanding* of things (Nonaka and Konno 1998). The practice perspective suggests that knowing is created in *action* and cannot be transferred; instead, mediators can facilitate the translation and *re-creation* of knowledge in practices in different settings (Bresnen *et al.* 2003; Brown and Duguid 1991; Lave and Wenger 1991; Marabelli and Newell, 2012).

Some argue that these two perspectives of knowledge are contradictory (Gherardi 2006; Nicolini 2010, 2011), while others argue that they are complementary (Anderson *et al.* 1996; Cook and Brown 1999; Marshall and Rollinson 2004). We take the view here that they are complementary, where knowledge (possessed) and knowing (practice) are recursively and mutually constituted. However, as this review will show, there have been very few researchers who have recognized the importance of

combining the (traditional) possession perspective of knowledge with the practice-based aspects of knowing in relation to AC. Moreover, and quite surprisingly, very few papers on AC have discussed power (exceptions include Easterby-Smith *et al.* 2008 and Todorova and Durisin 2007) especially considering that the literature on power indicates that it is very tightly coupled with knowledge (Callon 1986; Clegg 1989; Fairclough 2001; Foucault 1977, 1980, 1982; Heizmann 2011; Latour 1986, 2005; 2; Townley 1993). Interestingly, power as well as knowledge can benefit from a mutual constitution view (Marshall and Rollinson 2004; Pozzebbon and Pinsonneault 2012); power can be seen as a possession of individuals or collectives (e.g. Dahl 1957; Emerson 1962; Hunter 1963; Pfeffer and Salancik 1974) or as performed through social practices (e.g. Callon 1986; Clegg 1989; Latour 1986; Law 1992).

Based on these observations, the aims of this paper are: (1) to provide a knowledge-focused review of the AC literature; and (2) to suggest a philosophically different way to see AC, which takes into account the literature on knowledge (and power) using both the possession and the practice perspectives and contributes to the development of a processual view of AC that others have started (Lane *et al.* 2006; Lewin *et al.* 2011; Sun and Anderson 2010; Volberda *et al.* 2010).

The next section describes the methodology underpinning the literature review; then we present the literature review focusing on AC with respect to knowledge and power. The next section integrates the possession and practice views of knowledge and power to build on one of the more recent reconceptualizations of AC – Volberda *et al.* (2010). We end the paper with a synthesis of the review, drawing conclusions and suggesting future avenues of research.

Methodology

There are two main techniques for undertaking a literature review on a research topic: bibliometric and systematic. The bibliometric review is based on the analysis of a wide number of papers, using statistics, and provides a structural overview of the field. Outcomes of a bibliometric review include an account of the number of papers that discuss a specific theme in a selected area, the number of papers on themes published in specific journals, the ‘trends’ of the publications by year and country. The limits of

the bibliometric literature review are that the outcomes do not offer insights helpful to support a theoretical development of specific themes. The bibliometric literature review can be integrated with a thematic literature review, which involves a more in-depth content analysis of a specific set of papers previously identified with the bibliometric technique and aims to identify emerging themes for subsequent discussion.

The systematic literature review aims to identify, select and synthesize themes of a specific literature topic with respect to one or more research questions. The outcomes of the systematic literature review are focused on providing a theoretical and substantial contribution to the analysed field. The systematic literature review adopts few or no statistics. Instead, inclusion and exclusion criteria, consistent with a review’s aims, are used to select relevant papers for in-depth analysis (Randolph 2007).

In this paper, we adopt the latter technique and, using ISI Web of Knowledge®, we first included papers on AC based on keywords and abstract contents. The criteria used to include (or exclude) papers were: the focus on knowledge, the substantial contribution to the AC field,¹ the number of citations and the impact factor (IF) of the journal. While the number of citations and the IF were helpful in identifying a large number of potentially relevant papers, in-depth content analysis of abstracts and papers was the main technique adopted for the final selection. We also adopted a snowball approach (accessing papers that were cited by papers that were identified as relevant) and conducted an ‘open search’ of recent papers using Google Scholar. This helped us to include a number of additional papers that were relevant to our aim – to provide an overview of how AC papers relate to and unpack knowledge/power. The main outputs of this review are discussed next.

Absorptive capacity: main reconceptualizations and open problems

Absorptive capacity was originally defined by Cohen and Levinthal (1990) as ‘the ability of a firm to recognize the value of new, external information,

¹In fact, as noted in Lane *et al.* (2006) a number of papers where AC is included in the abstract and/or main topics actually focus on themes that have little to do with the construct, and AC is often only a passing reference.

assimilate it, and apply it to commercial ends.’ (p. 128). They argue that organizational AC: (1) develops on prior investments in building AC in individuals; (2) develops cumulatively and tends to be path dependent; and (3) depends on the organization’s ability to share knowledge internally. The resulting three-phase model originates at the individual level: the individual, based on prior knowledge, captures new external knowledge; this knowledge is subsequently ‘moved about’ within the firm (team/organizational level) until it generates valuable outcomes (innovation and, in turn, organizational performance).

There have been several revisions and reconceptualizations of the construct since Cohen and Levinthal’s (1990) seminal paper. While some authors have modified the original three-phase model – most notably Zahra and George (2002) with their differentiation between potential and realized AC – the main emphasis has been on articulating the dynamics underpinning knowledge absorption (discussed below). In the next section, we review existing literature and concentrate on some of the key issues that relate to the epistemological assumptions about AC.

The epistemology of possession and the AC literature

Cook and Brown (1999) recognize four categories of possessed knowledge: individual, group, explicit and tacit. They argue that each is a unique type of possessed knowledge that does distinct work and so cannot be converted into another type. However, they note that many accounts of knowledge privilege the individual over the group and the explicit over the tacit. In other words, many discussions that include knowledge from the possession perspective assume two main characteristics: (1) knowledge is ‘owned’ by individuals (Cook 1994); and (2) knowledge is or can be made explicit and so can be ‘commodified’ (Gherardi 2000), so that it is relatively easily transferrable (Spender 1996). This review of the AC literature noted the same privileging of individual and explicit knowledge, and so these two characteristics of the epistemology of possession are examined below in light of the AC literature.

AC and the emphasis on the individual level of knowledge. Cohen and Levinthal (1990) highlight the importance of individuals’ cognitions and learning (their ‘own’ prior knowledge) to recognize,

assimilate and exploit new external knowledge. They dedicate an entire section to the cognition process, stating that ‘the concept of absorptive capacity can best be developed through an examination of the cognitive structures that underline learning’ (p. 129). Thus, organizational AC is affected by the stock of (relevant) prior knowledge possessed by individuals.

Many subsequent authors have highlighted the importance of individual cognitive processes that influence the capture and spread of knowledge across the organization. For instance, Lane and Lubatkin (1998), drawing out the importance of research on cognitive processes (i.e. Bower and Hilgard 1981; Ellis 1965), conclude that ‘individual’s learning is greatest when the new knowledge to be assimilated is related to the individual’s existing knowledge structure’ (p. 461). Sun and Anderson (2010) suggest that external knowledge is acquired through processes of intuition and interpretation based on mental models of individuals. Lane *et al.* (2006) highlight the importance of the individual level, arguing that ‘individual cognition is a critical internal driver of absorptive capacity’ (p. 857). Volberda *et al.* (2010) point to the influence that managerial cognitions can have on the development of AC, in particular, the ‘dominant management logic’. Following this, Volberda *et al.* (2010) argue that ‘external knowledge that is absorbed by the organization should reach the right individuals at the right time’ (p. 942), suggesting that a necessary condition for absorbing knowledge is that at least some organizational actors ‘possess’ knowledge related to the external knowledge to be absorbed.

AC and the commodification of knowledge (transfer). Knowledge is commodified in the sense that it is treated as if it is, or can be, made explicit and is conceptualized as a tangible asset that can be moved about within and across organizations (Newell *et al.* 2009; Swan 2001). While the stickiness of knowledge is acknowledged (Szulanski 1996), the assumption remains that transfer is possible as long as appropriate mechanisms have been put in place. For instance, at the inter-organizational level, Lane and Lubatkin (1998) focus on the similarity of knowledge between organizations. Dyer and Singh (1998) concentrate on the ability of alliance partners to interact and suggest that double-loop learning processes at the inter-organizational level promote knowledge transfer. Reagans and McEvily (2003) argue that successful transfer is determined by common knowledge between individuals within an

informal network. Spinthoven *et al.* (2011) consider knowledge transfer among R&D units of networks of organizations that pursue innovation, finding that AC is particularly relevant for open innovation. In each case, it is assumed that knowledge transfers between these inter-organizational partners, as long as certain antecedent conditions, such as similar knowledge bases and communication channels, exist.

In relation to the intra-organizational level, this transfer is often depicted in terms of moving knowledge from the individual to the team/organizational level (Cohen and Levinthal 1990; Kim 1998; Lane *et al.* 2006; Sun and Anderson 2010) and the antecedents for this (e.g. communication channels) are highlighted. There is also discussion of knowledge transfer between units. For example, Tsai (2001) suggests that the extent to which knowledge can be successfully transferred depends on the network position (centrality) of organizational units; and Szulanski (1996) indicates that the extent to which it is possible to transfer best practices between organizational units depends (among other things) on the AC of the recipient unit. Finally, Volberda *et al.* (2010) provide a detailed analysis of organizational mechanisms that help knowledge transfer processes within and across firms (discussed later).

Research implications of the adoption of the epistemology of possession to interpret AC

From this review, it emerges that a restricted epistemology of knowledge dominates in the AC literature. The focus has been on how individuals' prior cognitions allow a person to 'internalize' new knowledge; that is, possessed individual knowledge is the most important influence on the recognition phase of AC. Moreover, the discussion of knowledge as something that can be made explicit underpins assumptions about the transfer of knowledge, both between and within organizations. Subsequent reviews and reconceptualizations have not questioned this dominant possession perspective. This, we suggest, helps to account for why some scholars continue to indicate that AC is a 'black-box' (Lewin *et al.* 2011). This point is developed further as we present some of the problems that emerged from the literature review: the reconceptualizations cannot fully explain the accidental nature of much innovation; they do not explain how social mechanisms actually work in practice; they do not fully examine the power dynamics involved; and finally they are weak in explaining the multilevel dimension of AC.

Lack of explanation of accidental (non-path-dependent) aspects of innovation. Cohen and Levinthal's view of AC acknowledges that a firm needs prior knowledge in order to recognize the importance of external knowledge that is subsequently assimilated and exploited for innovation. This view does not easily account for how firms can build new capabilities. In other words, path-dependency, a characteristic of the construct (Van de Bosch *et al.* 1999), would seem to lock a firm into a particular innovation trajectory (Vasudeva and Anand 2011). Volberda *et al.* (2010) recognize this when they argue that managers' mental maps (cognitions) tend to be static. Therefore, while managements' cognitions work well in stable environments and for pursuing exploitative innovation, it is difficult to see how prior knowledge (mental maps) can help in managing dynamic environments and pursuing exploratory innovation (Tushman and O'Reilly 1996). These mental maps can 'seriously limit the level of absorptive capacity of the firm' (Volberda *et al.* 2010, p. 933). The solution suggested by Volberda *et al.* (2010) is that managers seek out other sources of information. However, in our opinion, it is still not clear how the path-dependency incorporated in AC can be affected. For instance, how can new information be provided to others when they do not have the relevant prior knowledge to absorb this?

Interestingly, other AC papers have also focused on how firms can learn to do new things, rather than just improve their current innovation capabilities. Thus, a key aspect of Zahra and George's (2002) reconceptualization is the inclusion of a transformation phase, defined as 'a firm's capability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge' (p. 190). Transformation implies that the character of the knowledge (both the existing and the newly acquired) is changed, yielding new insights that might, for example, lead to the identification of new opportunities or change the way the firm sees its competition. Transformation is seen to occur through a process of biosociation, which takes place when 'two self-consistent but incompatible frames of reference' (Koestler 1966, p. 35) coexist. Others have followed in emphasizing the importance of this transformation (e.g. Sun and Anderson 2010), but do not all agree on Zahra and George's idea about when transformation takes place. For example, Todorova and Durisin (2007) reject the idea that transformation follows assimilation and, instead, see transformation as an alternative

to assimilation, which takes place only when the new knowledge does not fit with existing cognitive structures (following the seminal work on learning processes by Piaget 1952).

Vasudeva and Anand (2011) point to the relevance of similar (and prior) knowledge that enhances AC (latitudinal AC, as they define it), in contrast with constraints faced by firms that are challenged when they explore less familiar knowledge domains (defined as longitudinal AC). Vasudeva and Anand's (2011) study is particularly interesting because, even if implicitly, it acknowledges the current ambiguities associated with the relatively taken-for-granted assumption that the similarity between prior knowledge and absorbed knowledge is always positively associated with both AC and innovation. Vasudeva and Anand (2011) suggest that a trade-off between longitudinal and latitudinal AC should take place and indicate that inter-organizational alliances can help manage the balance between latitudinal and longitudinal AC. The fact that balance is often tipped in favor of exploitative forms of innovation is illustrated by Ben-Menahem *et al.* (2013), who found at Royal Dutch Shell that the knowledge they absorbed between 1996 and 2000 was focused on improving operational efficiency at the expense of radical innovation (and organizational performance). In contrast, Zahra *et al.* (2008) argued that having the right mix of people (e.g. with different backgrounds) can allow greater absorption of external knowledge, which is not necessarily just a refinement of prior organizational knowledge. Finally, Jones (2006) notes that, especially in mature organizations, it is difficult to develop AC because of the need to break down existing path dependencies and suggests that 'Change agents are particularly important in assisting others to recognize the benefits of adopting new ways of working' (p. 368).

Despite the above key contributions to AC, a problem remains about how people who are familiar with breakthrough knowledge will be able to share it with others (who are not) and create new organizational knowledge. In other words, current AC research cannot adequately explain how breakthrough (or at least non-path-dependent) innovation occurs at the organizational level, because knowledge absorption is seen as a purely cognitive process. This ignores how, sometimes, innovation occurs 'accidentally' and is not explicable as a purely cognitive thought process (Austin and Sullivan 2012). Thus, sometimes accidents (or breakthroughs) happen as people play with non-human objects rather

than ideas (Pickering 1993), a point that we develop when we consider the practice perspective below.

Lack of explanation of how social mechanisms support knowledge absorption. Cohen and Levinthal's (1990) seminal paper acknowledges that a firm needs to develop processes, policies and procedures to facilitate knowledge sharing internally. Others have built on this and more explicitly consider how social processes of interaction are key in facilitating the evolution of AC, focusing on this either inter-organizationally or intra-organizationally.

Inter-organizationally, both Lane and Lubatkin (1998) and Dyer and Singh (1998) question Cohen and Levinthal's assumption that a firm has equal capacity to absorb knowledge from any other organization, provided that the recipient firm has relevant prior knowledge. Instead, both these papers argue that a firm might be more able to absorb knowledge from a particular outside source (an alliance partner) because trust, developed by interactions over time, promotes knowledge transfer. Interactions should be face to face, argue Dyer and Singh, and are important because they allow individuals within the absorbing firm to know 'who knows what and where critical expertise resides within each firm' (Dyer and Singh 1998, p. 665). Lane and Lubatkin (1998) suggest that it is easier to absorb knowledge from a partner when organizational structures and policies allow and incentivize this and when the partner firms share similar dominant logics. Both these papers, therefore, highlight how AC is achieved through a process of iterative exchanges rather than a simple arms-length transfer of external knowledge into a host firm.

Intra-organizationally, subsequent papers have also emphasized the social processes involved in absorbing new knowledge. For example, Zahra and George (2002) focus on internal processes that can facilitate AC and identify unique antecedents for the potential and realized stages of AC. In doing this, they indicate that social integration mechanisms, which promote mutual understanding and comprehension, are significant for transforming and exploiting knowledge (realized AC). Todorova and Durisin (2007); however, they argue that these social integration mechanisms are important not just for realizing the potential of previously acquired external knowledge, but for all stages of AC, citing literature that shows the importance of social ties for acquiring (e.g. Granovetter 1973) and making sense of new knowledge (e.g. Boland and Tenkasi 1995).

Similarly, in Volberda *et al.* (2010) antecedents include social integration mechanisms.

These authors, therefore, certainly recognize how knowledge is more easily transferred and used through a social process (e.g. drawing on Nonaka's (1994) emphasis on 'Ba') than through an arms-length transfer of codified knowledge. Moreover, these scholars implicitly acknowledge that transferring knowledge might be problematic. However, the above papers have not said much about *how* these social processes influence knowledge absorption, e.g. why transferring knowledge is problematic and how to overcome barriers to knowledge transfer with social practices (Bresnen *et al.* 2003). Theoretically, closest to doing this is the work of Volberda *et al.* (2010), who suggest that managerial dynamic capabilities may involve 'identifying and using those employees who serve as gatekeepers and boundary spanners' (p. 940). Empirically, Foss *et al.* (2011) indicate that organizational mechanisms and practices are key in developing AC, and Chang *et al.* (2012) suggest that informal social ties are critical for knowledge sharing and absorption. However, neither Volberda's paper, nor the empirical papers develop this point from a processual standpoint (i.e. considering how these mechanisms contribute to knowledge absorption), and they limit their discussion to cognitive dynamics of managers, leaving mostly untouched topics such as managerial improvisation and adaption to contingencies which, in our opinion, can be nicely unpacked looking at knowledge from a practice perspective (Feldman and Orlikowski 2011).

Lack of understanding about how power influences knowledge absorption. Todorova and Durisin (2007) introduce power as an AC contingency variable that influences the valuing and exploitation of new knowledge. They note that previous authors have ignored the political aspects of knowledge absorption. In terms of power affecting knowledge assimilation, they argue that firms can become too 'compelled' by external partners, so that they ignore new opportunities. In terms of exploitation of this new knowledge, they identify how internal structures of power can inhibit the development of new products. While Todorova and Durisin (2007) provide the first contribution to the understanding of AC power dynamics, they do not develop their account of the political processes involved and do not consider the multidimensional nature of the power concept (Clegg and Haugaard 2009), rather treating power as some-

thing that is owned because of the interdependencies between partners (influencing knowledge absorption from external partners) or because of hierarchical position (influencing internal knowledge absorption). Easterby-Smith *et al.*'s (2008) empirical study on AC is promising in that they highlight the difference between episodic and systemic power, where the first refers to discrete political acts initiated by self-interested people, while the latter refers to power that is diffused through social systems. Moreover, they found that external access to information is affected by episodic power, while the diffusion of knowledge within a firm depends mainly on systemic power. However, the fact that other recent reconceptualizations and reviews (e.g. Lewin *et al.* 2011; Sun and Anderson 2010; Volberda *et al.* 2010) as well as empirical papers (e.g. Ben-Menahem *et al.* 2013; Chang *et al.* 2012; Vasudeva and Anand 2011) do not discuss power issues (even while power is intimately associated with knowledge, see Foucault 1977), reinforces our aim to consider how power influences AC processes.

Limited articulation of the multilevel processes involved in AC. Multiple levels were inferred in Cohen and Levinthal's (1990) work and subsequent authors have sought to more fully unpack this, especially those who have approached AC from a learning perspective. For example, Lane *et al.* (2006) emphasize the three concepts of exploratory, transformative and exploitative learning. At the individual level, transformation occurs when individuals relate some new knowledge to what is already known. At the firm level, knowledge management processes affect how such knowledge is shared between, and transferred to, different parts of the organization for exploitative learning. Sun and Anderson (2010) also review and explore AC from a multilevel perspective, drawing upon Crossan *et al.*'s (1999) idea of four learning processes (intuition, interpretation, integration, institutionalization). Sun and Anderson (2010) associate the acquisition phase of AC with the 'mental models of individuals in opportunity finding teams' (p. 139). Moreover, the authors emphasize the team level as enabling the assimilation and transformation of new external knowledge. They also associate the exploitation phase of AC with the institutionalization of knowledge at the organizational level. While these developments of a multilevel analysis are helpful, Volberda *et al.* (2010) acknowledge that more theory is needed that addresses a multilevel perspective.

While the multilevel perspective has been – even if in a limited way – considered by theory papers, there are only a few empirical studies that have conducted multilevel research. Jansen (2005) studies the antecedents of AC in a large sample of European banks, focusing on the tension between potential and realized AC at the firm and unit levels. He identifies a number of organizational mechanisms, which, at different levels, promote a balance between exploration and exploitation. However, the analysis is quantitative and only outputs are identified at the expense of the processes (e.g. nothing is said about how AC spreads from the unit to the firm level). Arbussa and Coenders (2007) focus on the organizational and industry levels and identify two types of AC: (1) the capability to scan the environment for new technology; and (2) the capability to integrate complex technologies. They also find that both types of AC are firm and industry specific. However, the two analyses (organizational and industry levels) are relatively poorly integrated and a clear link between the two levels is not provided. Finally, Zhao and Anand (2009) analyse knowledge transfer processes between individuals and collectives, looking at the Chinese automotive industry. They identify differences between individual and collective AC but, as per the other studies, the quantitative nature of their study does not shed light on how AC actually develops across multiple levels.

The failure of empirical research to unpack a multilevel perspective of AC can be partially explained by the difficulties involved in collecting both individual and firm-level data within the same study. Moreover, quantitative studies on AC have tended to privilege antecedents and outcomes at the expenses of processes (Ben-Menahem *et al.* 2013; Easterby-Smith *et al.* 2008; Jones 2006). However, developing a solid theory around the multilevel aspects of AC, we argue, can provide a significant contribution to the AC field. And here again, a practice perspective can be helpful, because it moves us away from the problematic assumption that knowledge moves sequentially from the individual to the organizational level, rather viewing the individual, group, and organization as simultaneously involved in knowledge absorption (an aspect that the practice view of knowledge helps us develop using the metaphor of zooming in and out, see below). Table 1 summarizes the literature previously analysed.

As this review shows, the possession perspective has been adopted by most of the scholars who have developed the AC construct. Thus, even though

scholars have questioned the original assumption in Cohen and Levinthal (1990), which treated transfer as relatively straightforward, arguing that AC processes need to be unpacked in a more sophisticated way, they do not provide insight into *how* this rework actually happens other than highlighting the importance of communication channels (social integration mechanisms) and cognitive processes (biosociation). Nor do they fully account for innovation that involves experimentation with objects, and they do not adequately address power and multilevel issues. Next, we consider how the practice epistemology can overcome some of these limitations.

The practice perspective

The epistemology of practice indicates that knowing (knowledge in action) arises through practice in a particular situated context (Cook and Brown 1999). From this perspective, the extent to which a person or collective may acquire and process some knowledge about something is not limited to a cognitive act. Instead, an ongoing enactment of this knowledge in practice takes place (Feldman and Orlikowski 2011), with this knowing involving the exercise of power, since ‘[t]he exercise of power itself creates and causes to emerge new objects of knowledge and accumulates new bodies of information’ (Foucault 1980, p. 52). Knowing, in other words, arises from and is constituted by ongoing action (Dewey 1917). For example, an organization, through its individual members, may acquire some external knowledge about a new technology, but it is through the ongoing use of that technology in everyday work (e.g. in an R&D project) that knowing can be said to emerge as a practical accomplishment (Gherardi 2006; Tsoukas 2005). The practice perspective of knowledge uses the term ‘performativity’ to highlight that, within practical settings, knowledge is never fixed, but is always in a state of becoming (Chia 2003). In this respect, the practice perspective moves beyond the cognitive/social transfer view discussed above, to view AC as a constantly emergent and performative accomplishment. Moreover, from the practice perspective, the relevance of material as well as human actors in knowing by doing processes is highlighted (Orlikowski 2007). This is an important point because, although there is quite a rich literature indicating that knowing occurs through *sociomaterial* practices (Leonardi 2012; Orlikowski 2007, 2010; Orlikowski and Scott 2008; Wagner *et al.* 2010), the AC literature has treated material artifacts only as the

Table 1. Examples of central papers on AC (1990–present) and links to knowledge

Author/s	Main contribution to AC	AC and knowledge
Cohen and Levinthal (1990)	Conceptualization of the construct: AC is 'the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends'. (p. 128)	The ability to evaluate and utilize external knowledge is a function of the level of prior related knowledge, which confers the ability to recognize, assimilate, and exploit it. However, organizational AC does not depend only on the organization's direct interface with external knowledge; it also depends on transfers of knowledge across and within subunits.
Szulanski (1996)	The lack of the recipient's AC, along with causal ambiguity and an arduous relationship between the source and the recipient is among the three most important barriers to knowledge transfer at the intra-organizational level. Moreover, prior knowledge can help as well as hamper the development of AC (i.e. sometimes it can happen that the firm has to 'unlearn').	Knowledge is idiosyncratically sticky (especially when it is embedded in best practices) and can be transferred when knowledge barriers are removed.
Kim (1998)	AC develops from the individual to the organizational level with the result that organizational learning becomes faster and larger in scale as more actors with adequate prior knowledge intensify their effort to convert knowledge within and between themselves. Interestingly, the outcome of knowledge converted feeds back to the prior knowledge base at the individual level.	A relevant organizational challenge to increase learning is to be able to transform tacit knowledge into explicit knowledge in order to be able to manage knowledge and, increase AC. Prior relevant knowledge is a necessary ingredient of AC that, as shown in the case company, they did not have, as documented in the fieldwork.
Dyer and Singh (1998)	AC involves a set of inter-organizational processes of double-loop learning that allow collaboration in order to identify valuable know-how to transfer across organizational boundaries.	Knowledge is easily transferred as long as there is similarity between partners of an inter-organizational alliance.
Lane and Lubatkin (1998)	Theorization of relative AC and the 'learning dyad' (a student and a teacher firm). Whether learning takes place is relative and depends on organizational variables (e.g. structure and compensation practices) and on the type of knowledge that is transferred.	Knowledge can be transferred from the student to the teacher firm. The extent to which the student firm can learn is a function of AC.
Van de Bosch <i>et al.</i> (1999)	Extension of the relative AC construct definition that focuses on organizational structure; moreover, the environment (stable vs. turbulent) can determine different ways to combine knowledge.	Organizational design affects the extent to which knowledge can be absorbed. Moreover, given that externally acquired knowledge has to be shared internally, business units' coordination, cross-division communication, and integration processes can facilitate knowledge flows.
Reagans and McEvily (2003)	AC is a function of the extent to which knowledge is transferred between two individuals. Similarity of background and training and informal network structures facilitate knowledge transfer.	Successfully knowledge transfer is determined by common knowledge between individuals. Moreover, it is easier to transfer codified rather than tacit knowledge.
Tsai (2001)	The effect of network position of organizational business units is moderated by AC with the consequence that AC significantly affects business units' innovation and their performance.	The patterns of knowledge transfer across an organization's units are relevant and have implications on units' performance. Intra-unit learning involves knowledge transfer.
Lane <i>et al.</i> (2001)	Examination of the role of international joint venture structures and processes and their association with the development of relative AC, which is related to learning and performance (dependent variables). Prior knowledge seems not to influence assimilation of new external knowledge (empirical results). The focus on the study is on foreign parent firms.	The level of trust does not affect the downward knowledge transfer from the parents to the international joint venture. On the contrary, active management involvement and training (by the foreign parent) allows transfer of explicit knowledge and promotes learning and transfer of tacit knowledge.
Zahra and George (2002)	The reconceptualization has two main characteristics: (1) AC is seen as a dynamic capability; and (2) the four capabilities – acquisition, assimilation, transformation, and exploitation of new external knowledge – are combinative in nature and build upon each other to produce a dynamic organizational capability (AC). A process view of the construct is also developed.	The focus is on knowledge flows within firm rather than knowledge identification: effective internal knowledge sharing and integration are critical processes for AC to successfully develop.
Jones (2006)	Incorporation of managerial agency into the AC construct (Zahra and George reconceptualization).	Gatekeepers, boundary spanners and change agents are associated with processes of knowledge transfer between business units and organizations.
Lane <i>et al.</i> (2006)	A reconceptualization of AC develops around the three concepts of exploratory, transformative, and exploitative learning. Moreover, it is highlighted that the AC construct has been reified in the last decade. Finally, the importance of studying AC using a multilevel perspective is pointed out.	Individual prior knowledge is helpful to recognize and understand external knowledge, using exploratory learning; transformative learning is used to assimilate valuable external knowledge and occurs at the individual and organizational level; exploitative learning is used to apply the assimilated external knowledge.
Todorova and Durisin (2007)	Introduction of power relationships in the AC construct: the revised model (based on Zahra and George) highlights that power acts in particular in the phases of acquisition and exploitation. Moreover, it is suggested that power can partially explain why some firms are better in exploiting external knowledge.	Pieces of knowledge may move backwards and forwards between assimilation and transformation processes (and, in turn, between the potential and the realized AC phases, à la Zahra and George) before being fully incorporated into the organizational knowledge structure and ready for exploitation. The capacity to identify external knowledge is independent of the capacity to exploit that knowledge.

Table 1. Continued

Author/s	Main contribution to AC	AC and knowledge
Easterby-Smith <i>et al.</i> (2008)	Identification of an association between lack of research on a process view of AC and lack of qualitative works on AC. Moreover, power and boundaries are relevant to adopt a process view of the construct.	Knowledge transfer is frequently a political act; different forms of knowledge can be moved across different types of boundaries (syntactic, semantic, and pragmatic); moreover, AC increases when an organization moves from syntactic to semantic boundaries; finally, pragmatic modes of knowledge transfer depend on the mobilization of episodic power.
Zahra <i>et al.</i> (2008)	Boards of directors and AC are key and complementary in processing underpinning the production of innovation in corporate entrepreneurship (CE) activities.	A mix of relevant prior knowledge along with individuals with different background can lead to greater development of AC which, consequently, leads to innovation.
Sun and Anderson (2010)	Links between AC and organizational learning (OL): AC is part of OL and Zahra and George's four phases (learning capabilities) of AC are integrated with Crossan <i>et al.</i> (1999) OL model.	Following Crossan <i>et al.</i> (1999), it is crucial that knowledge (and learning) is transferred from individuals and groups to the organizational level; moreover, internal drivers that allow the transfer of learning across levels are identified.
Volberda <i>et al.</i> (2010)	The field of AC needs to focus on micro and macro antecedents of AC, interactions among individuals, and a multilevel perspective.	It is suggested that the link between prior knowledge and AC is mediated by individuals' behaviors and their interactions.
Lewin <i>et al.</i> (2011)	A routine-based model of AC is suggested, which distinguishes between internal AC processes/routines that support knowledge creation, transformation, exploitation and assimilation, and external AC processes/routines that allow acquisition, assimilation, transformation and exploitation of new external knowledge. Balancing internal and external processes/routines is crucial to developing AC as a dynamic capability.	The links between internal and external AC metaroutines are (a) 'management of adaptive tension' (p. 89) that determines exploration of internal innovation and exploitation of new ideas and good practices in the external environment; and (b) 'transferring knowledge back to the organization' (p. 90) that supports the assimilation of external acquired knowledge.
Spithoven <i>et al.</i> (2011)	Collective effort of research centers (i.e. a network of organizations that pursue similar objectives) can enhance AC.	Communication activities that are not strictly related to R&D can contribute to the achievement of AC through promoting knowledge transfer across research centers.
Vasudeva and Anand (2011)	AC is conditioned by prior knowledge; however, learning can be difficult when external knowledge is not similar to the knowledge that the firm already has, and this represents a limit to innovate.	A balance between latitudinal and longitudinal AC (the capacity to absorb similar vs. 'distant' prior knowledge) should be achieved to pursue innovation. Inter-organizational alliances can help understanding how to manage the trade-off between latitudinal and longitudinal AC.
Gebauer <i>et al.</i> (2012)	Using AC, learning processes, and combinative capabilities as independent variables and using innovation as the dependent variable, they unfold relationships between combinative capabilities and innovation.	First-mover strategy might hinder departure from a strong formalization of knowledge sharing; a firm's central position in a network and strong ties with network partners tend to constrain knowledge creation processes; knowledge socialization influences exploratory, transformative and exploitative learning.
Ben-Menahem, <i>et al.</i> (2013)	Potential AC can be positively associated with the alignment of internal and external rates of change. This alignment is also related to organizational performance.	Knowledge exploitation processes require the development of AC as an in-firm capability and this takes time. Yet potential AC is a function of prior knowledge.

output of AC processes (e.g. technological innovations) rather than as meaningful actors in knowledge absorption itself.

Knowledge acquired externally is, thus, a 'tool of knowing' (Cook and Brown 1999) and when knowledge is not used as a tool in practice, knowing will not develop (there will be no absorption). Knowing resides in discursive practices and in the practical use of artifacts (rather than in the assumed essences of artifacts derived from some external knowledge) so that the 'meaning of artifacts only springs to life in the actual real-time practicing' (Nicolini 2011, p. 610). Moreover, as Nicolini (2011) continues, 'looking at knowledge in practice necessarily requires addressing issues of interest, conflict, and power' (p. 617). The above suggests that to fully

understand AC processes, it is necessary to examine everyday practices through which knowledge/power is translated and knowledgability is achieved in a particular organizational context (Sandberg and Tsoukas 2011).

Knowing, thus, involves more than simply interaction; it involves negotiation and engagement in practice with both human and material actors in a generative dance (Cook and Brown 1999). While related to human agency, we found one attempt to use AC to consider practical interactions: – Volkoff *et al.* (2004) suggest that AC develops through communities of practice – to our knowledge, there are no AC papers that address knowledge absorption processes in light of the practice perspective that includes material agency. Table 2

Table 2. AC with respect to the epistemologies of knowledge

Epistemology of Possession (key concepts)	Epistemology of Practice (key concepts)	Consequences of the Practice View for the AC construct
Knowledge is associated with individuals (who own it)	Knowledge is associated with sociomaterial contexts (where it is created)	Although individuals own some knowledge, organizational knowledge is associated with context, situations and practices that take place with everyday interactions, including interactions with material objects (i.e. working knowledge).
Knowledge is transferred	Knowledge is translated	The processes of knowledge absorption are not straightforward in each phase of AC. That is, some knowledge (i.e. ideas) can be brought in from external sources; however, this knowledge needs to be translated and applied to new contexts.

synthesizes the main differences between the possession and the practice epistemologies of knowledge in light of AC.

It is now clear that, from our standpoint, knowledge conceived as a practice that is interwoven with power is extremely relevant to fully interpret AC, especially in terms of developing a processual account. We develop such an account further in the next section.

Rethinking AC

As this review of the existing literature bears out, previous studies of AC highlight the relevance of individuals' and groups' prior (possessed) knowledge. However, they do not deepen understanding of how this knowledge is actually used in practice to create new organizational knowledge and ultimately produce innovation. Putting it differently, in most reconceptualizations, while the authors identify phases in the process of AC, their models tell us little about *how* knowledge moves between phases. As Feldman and Orlikowski (2011) argue, to fully investigate processes, it is important to carefully label and unpack both the phases of a process (i.e. the boxes in a graphical representation) *and* the arrows that link the boxes, since essentially it is the arrows that denote the processes (and practices). Previous reconceptualizations of AC have focused on the boxes, while we next describe the phases of the AC processes (what happens – the boxes), but also carefully examine and describe the arrows that connect these boxes (how things happen).

Importantly, the practice perspective offers insights about *how* knowledge moves (or better is recreated) across time and space. Thus, while prior literature has recognized knowledge boundaries and hence the stickiness of knowledge (Szulanski 1996)

that might restrict AC, it has said little about how these boundaries can be overcome, except, as seen, indicating that some social interaction will be necessary.² Yet, there is a rich literature on how knowledge boundaries can be overcome, which indicates that it is often more than simply a case of interaction. For example, Carlile (2002) identifies how transfer is possible when the boundaries are only syntactic, but indicates that, where boundaries are semantic and/or pragmatic, knowledge must be translated and/or transformed.³ Translation and transformation depend on cross-functional interactions, as in previous models of AC, but they also depend on people taking on specific boundary-spanning roles, the use of different types of objects and, at the pragmatic boundary, also rely on a political approach: novelty leads to different interests among organizational actors, and this represents a barrier to knowledge sharing; common interests must be negotiated in order to transform knowledge and *interests*. This reminds us that simply having an open communication channel, and even recognizing the iterative nature of what happens through this channel, is insufficient to explain how knowledge moves between the phases of AC, because this ignores that the process is affected not only by human cognitions, but also by human and material practices and that this can be a heavily political process.

In integrating these ideas with the existing AC literature, we focused on one of the most recent reconceptualizations of AC: the integrative framework of Volberda *et al.* (2010). The reason for our choice lies in the fact that their bibliometric literature

²Volberda *et al.* (2010) do talk briefly about knowledge brokers, but do not develop on this point.

³Note that Carlile's use of the term 'transformation', which includes a specific political aspect, is different from the notion of transformation used typically in the AC literature, where it is viewed as a purely cognitive process.

review identifies a number of elements of AC, offering an effective synthesis of most reconceptualizations and providing an effective overview of the field. However, we believe that the systematic review and theory development can be a key complement for improving the understanding of AC from a process perspective (in fact, Volberda and colleagues highlight process issues in their paper, but do not develop a comprehensive model that unpacks them). We first unpack the middle AC process box in the Volberda *et al.* (2010) model in order to: (a) highlight the role of practice, depicted here as the arrows that link the boxes representing the phases of AC that are labeled as social and material translators; (b) highlight the importance of power and, therefore, distinguishing between power-over (power as a resource that is possessed (Weber 1958)) and power-to (power that is enacted (Foucault 1977, 1980, 1982)) – in all AC phases; and (c) highlight the iterative interactions between the phases (rather than depicting them as a

one-way arrow between potential and realized AC), as portrayed in Figure 1.

The Volberda model also identifies a number of variables that affect AC, grouped into six categories: (1) managerial antecedents; (2) intra-organizational antecedents; (3) inter-organizational antecedents; (4) prior related knowledge; (5) outcomes; and (6) environmental conditions. We re-present their model, but in doing this we differentiate between the elements in their framework that can be described as relevant to the possession perspective and those elements that are aligned with the practice perspective. In so doing, we are able to explain how the particular structural antecedents get involved in AC processes through practice. It is important to note that our differentiation between these elements is for illustrative purposes only, our main purpose being to show how it is important to consider both the acknowledged structural/cognitive elements (antecedents) that affect AC and the ways in which

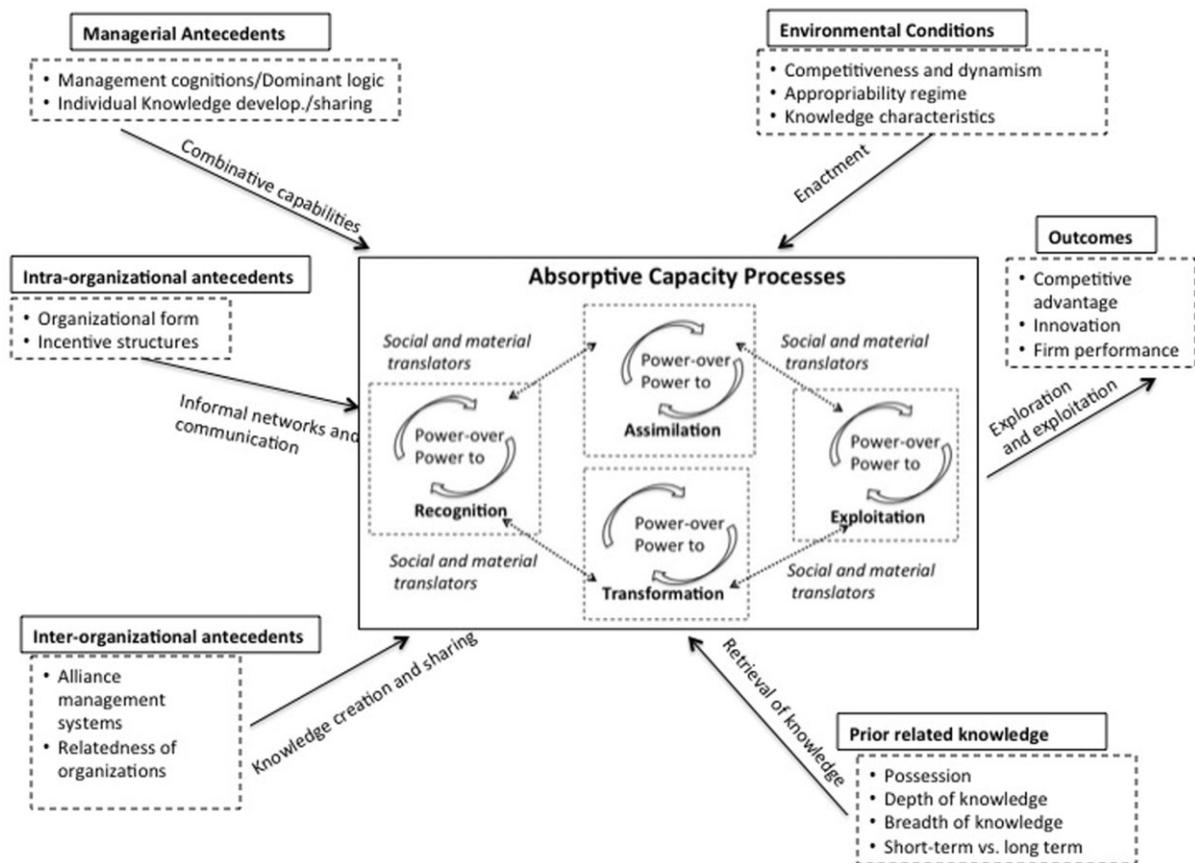


Figure 1. Reconceptualization of AC

these are enacted in practice. Future research can further unpack these antecedents, based on acknowledging the dynamic interactions between knowledge possessed and practiced.

The AC processes box

Starting with the central portion of the model, we follow the Volberda model in depicting AC as a four-phase construct, building on some of the reconceptualizations of the original Cohen and Levinthal (1990) model (chronologically, Zahra and George 2002; Todorova and Durisin 2007; and Sun and Anderson 2010), but we present these as four interacting phases, rather than portraying them as linear processes that move from potential to realized AC (see also Gebauer *et al.* 2012). As noted by Lane *et al.* (2006), on the one hand, Cohen and Levinthal's model – and following reconceptualizations such as Lane and Lubatkin (1998) and Van de Bosch *et al.* (1999) – describes AC as a funnel emphasizing exploratory learning; on the other hand, Zahra and George (2002) depict AC as a pipeline, considering efficient exploitation of knowledge. Yet, both metaphors are meaningful to AC, in that an efficient pipeline helps to capitalize new knowledge generated by the funnel. Therefore, although we acknowledge that both AC perspectives are equally relevant to the construct, the specific purpose of analytically highlighting how the different phases can be linked to knowledge and power led us to adopt the four-phase model, which is similar to Zahra and George (2002), but without a clear distinction between potential and realized AC, given some of the subsequent criticisms of this idea (Lane *et al.* 2006; Todorova and Durisin 2007).

We depict the different phases of AC as interactive, given the practice idea that knowing is a continuous performative accomplishment. That is, as with the idea of interactive innovation (Swan and Scarbrough 2005), innovation does not move smoothly from acquisition of new ideas, through development of these ideas during assimilation and transformation, to final exploitation as an innovation. Rather, there will be a continuous back-and-forth between acquisition, assimilation, transformation and exploitation; and this reflects the messy unfolding of innovation in practice (Dougherty and Dunne 2012) that is continuously influenced by power. Stating it differently, research, development and use occur concurrently in many cases (e.g. Swan *et al.* 2010); similarly, we can expect that acquisition, assimilation, transformation

and exploitation will also take place iteratively, feeding complex interactions between the distinct, and yet overlapping, phases of knowledge absorption.

Social and material translations. In our model, the arrows that connect the phases, and so represent how knowledge moves across time and space, are depicted as involving social and material translations. This follows the practice epistemology's description of the role of mediators: actors (human and material) that translate knowledge 'into the scene' (Nicolini 2011, p. 610), thus enabling the sharing of knowledge between, for example, different communities of practice (and so phases of AC). Mediators do not 'carry' (transfer) knowledge but 'establish and support an active process of translation' (Nicolini 2011, p. 615). Mediators can be both human and non-human (Latour 2005). Human mediators are boundary spanners who translate knowledge (Carlile 2002, 2004), e.g. from one community to another, therefore acting in the borderland (Bowker and Star 2000). While the role of human translators is clearly important, here, given its absence in prior AC literature, we highlight the relevance of boundary objects and the associated idea of material agency.

Star and Griesemer (1989) define a boundary object as 'an object that lives in multiple social worlds and which has different identities in each' (p. 409). Boundary objects can be physical or conceptual artifacts that can be used by people in different communities. While each group can interpret the boundary object somewhat differently (boundary objects have interpretive flexibility), they nevertheless allow for communication that can provide some temporary agreements, albeit these can be constantly renegotiated as the boundary object generates new ideas. In this sense, they allow local understandings to be reframed in the context of some kind of collective activity (Bechky 2003). The important point about the boundary object concept is that it emphasizes how practical knowing comes from engagement with material objects, not just from cognitive processes.⁴ Levina and Vaast (2005) note that it is not some inherent property that makes an artifact a boundary object, but rather the way the object is used in 'collective-reflection-in-action' and so comes to acquire a common identity. In this sense, material objects do not simply play a role in creating common

⁴For an extended review of the role of objects in knowledge integration processes, see Nicolini *et al.* (2012).

understanding that allows coordinated actions; they also play a symbolic role, legitimating certain practices for those involved (Swan *et al.* 2007) or motivating collaboration because of the incompleteness of an object that produces emotional investment (Knorr-Cetina 1997). We should not forget, however, that objects can also become infrastructural (Nicolini *et al.* 2012) and so taken for granted, or a naturalized aspect of a community of practice (Bowker and Star 2000) and, in this way, objects can reinforce routines that will tend to drive out innovation because they do not lead to any reflection-in-action.

The idea that objects play an important role in knowledge translation processes can be extended to the idea that material (and conceptual) artifacts have agency, and so a fundamental role in processes of knowing. This is well illustrated in Pickering's (1993) idea of a 'mangle of practice'. Pickering provides an example of the mangle in the field of physics: the Bubble Chamber, invented by Donald Glaser in 1952 to detect electrically charged particles. Glaser's first attempts failed. With the metaphor of the mangle, Pickering portrays these failures as 'resistances', or 'a block on the path to some goal' (p. 569). Glaser's responses to the resistances were 'accommodations' – empirical attempts to 'workaround' the material agency of the currently constructed bubble chamber (e.g. modifying the density of liquids) in order to develop a successfully operating one. This example shows how human agents try to negotiate knowledge with respect to non-human agents and that knowing is not always predictable (accidents are involved) and needs practice: Glaser had to relate his prior knowledge (theory of physics) to new external knowledge – the unpredictable results of experiments with the Bubble Chamber. This reminds us that assimilation, transformation and exploitation will depend very often not simply on discursive practices that broker knowledge between different communities, but also on hands-on engagement with physical objects through which knowing emerges as a practical accomplishment.

Power-over and power-to. The other important difference in this model is that power is seen to affect all phases of AC. Power is a concept that is 'essentially contested' (Lukes 1974) and cannot be treated as a single entity, but rather as a cluster of concepts (Clegg and Haugaard 2009). Here, we consider two important aspects of the power concept: power as prohibitive (power-over) versus power as productive

(power-to), which we relate (but do not equate) to seeing power as possessed versus practiced, and link both to all phases of AC (see Figure 1).

The prohibitive conception of power focuses on the capacity (power) of organizational actors to leverage specific rules or resources to achieve objectives at the expense of others. This can be in the form of overt domination or may be achieved more covertly, as when power is exerted through non-decision-making – excluding items on an agenda so they are not open to discussion (Bachrach and Baratz (1963) and Lukes' (1974) second dimension of power) – or through the ability to shape the construction of reality (Lukes' (1974) third dimension of power). Thus, more or less overt domination can be achieved based on a clear differential in resource endowment or because of the ability of one party to benefit from the current rules of the game (as in a game of chess where the Queen has more power because of the rules, which allow her to make more flexible moves than the Knight). In contexts where firms try to develop AC, the current distribution of resources and the particular rules of the game are not static, but can be seen to emerge from practice, as in Giddens' (1984) structuration account, where the rules and resources are recursively constituted by actors as they go about their daily practice. Thus, in Clegg's (1989) Circuits of Power idea, the exercise of power by actor A over actor B in the Agency Circuit can only be fully understood by also looking at the other two Circuits which he identifies, where social rules and social structures of domination are produced and reproduced over time. Nevertheless, at a given moment in time, there will be some who benefit from existing rules and the current distribution of resources.

Here, then, lies the idea of power as a possession in that those who have access to certain resources and benefit from the existing rules of the game have power over those who do not (Emerson 1962; Pfeffer 1981). This view of power is used by Todorova and Durisin (2007) in relation to AC when they define power relationships as 'those relationships that involve the use of power and other resources by an actor to obtain his or her preferred outcomes' (p. 782, emphasis added). Their work is promising. However, they limit their discussion on power to its resource-based conceptualization (based on the possession view). Power-over, thus, as presented in Todorova and Durisin (2007), assumes a functional relationship between power and knowledge: individuals (on their own or collectively) own

knowledge and, therefore, they can exercise power(-over) and will do this often to maintain the status quo (and their own advantageous position in the existing social structure); and this may influence AC, often detrimentally. In the model, we suggest that (a) power affects all AC phases, and (b) the discussion of power should not be limited to power-over. In fact, the productive conception of power focuses on how power can facilitate change through empowering (as well as simply disempowering) actors to change existing structures of domination (and potentially also systems of meaning), and this affects an organization's capacity to absorb knowledge through practice. For example, Townley (1993) sees power as a mechanism for the formation and accumulation of knowledge: 'Power is the desire to know. Power is not negative; on the contrary, it is creative' (p. 521). This insight, we argue, is very relevant if we look at AC as a knowledge-based construct, where AC processes involve discursive practices and can be promoted by systemic power, which is diffused through social systems that constitute firms (Easterby-Smith *et al.* 2008). Therefore, from the productive conception of power, the focus is on how actions are channeled collectively to remake social structures, so that rules of practice and structures of domination are changed and influence the acquisition, assimilation, transformation and exploitation of knowledge. Since 'no matter how much power one appears to accumulate, it is always necessary to obtain it from the others who are doing the actions' (Latour 1986, p. 276), it is relevant to define what a collective action is about, and this implies the transformation of the social from something that exists and is objectively knowable into something that is built by social actors and that is not a priori knowable.

We represent the interplay between power-over and power-to by the 'power arrows' in the AC processes. However, owing to the very scant AC literature on power-to, here we would like to highlight the relevance of the productive perspective of power that is 'situated, provisional, revisable, open-ended, and always in the making' (Marshall and Rollinson 2004, p. S75), reminiscent of the practice epistemology of knowledge. Marshall and Rollinson (2004) point to the relevance of social practices to explore the conditions under which 'the generative structures of power, knowledge, and discourses are formed, reproduced, or transformed' (p. S76), highlighting the centrality of the conception of practice. This is in line

with the emphasis that Cook and Brown (1999) give to the possession and the practice perspectives of knowledge. That is, there is a practical component to all knowledge/power. Putting it differently and linked to AC, an individual's possessed knowledge exists only in so far as it was created using social categories derived from practice that gave sense to this knowledge (Latour 2005). Thus, possessed knowledge/power is always a product of past practice. This idea draws from the pragmatism of John Dewey, who, over a century ago, in the book *The Child and the Curriculum* (Dewey 1902), highlighted the relevance of the collective environment (the class) to create knowledge which, although to some extent is 'possessed' by children, needs to be practiced socially.

Antecedent factors

Volberda *et al.*'s (2010) model also includes a number of variables that they suggest influence the AC process and/or outcomes. While prior research has shown that these variables are important, how they influence the AC process is less clear. We argue that this is because they have only adopted a possession perspective. For example, a person's position in the hierarchy influences his/her power, and this possessed fact may influence knowledge absorption – but how is not explained. We have, therefore, sought to differentiate the elements in their model to further our understanding of how these antecedents influence knowledge absorption through the generative dance between knowledge/power possessed and practice. In Figure 1 we do this by differentiating between the more 'possessed' elements of their theorizing (included in boxes under each variable) and more practice-oriented elements that can help to explain how the possessed elements influence AC processes (using these elements to label the arrows). We briefly discuss this next, acknowledging that this differentiation is for illustrative purposes only, since possessed elements are always the result of past practice, and current practice creates ongoing structures.

Volberda *et al.*'s (2010) intra-organizational antecedents include organizational form, incentive structures, informal networks and internal communication. Reinterpreting these elements in relation to our two epistemologies, we can see that organizational form and incentive structures represent characteristics that an organization can be said to possess (even though these will have been the product of past practice, as in a structuration account), while the informal networks and internal communication (or

better networking and communicating) represent how these characteristics are enacted in practice to influence the capacity to absorb knowledge. For example, incentive structures may only reward certain departments for introducing new ideas, and a hierarchical organizational form may empower only individuals in more senior organizational positions from taking forward and promoting external ideas across the organization. Other departments and individuals may recognize some external knowledge that may be valuable, but they will be restricted in enacting this practically because of their networking and communicating opportunities. Thus, we see the need to consider both the organizational structures that affect knowledge absorption and the organizational practices that enable knowing and so translation between the AC phases.

Volberda *et al.*'s (2010) managerial antecedents include those that focus on (individual) possessed knowledge/power – dominant logic – and those that focus on knowing and power-to – knowledge sharing and combinative capabilities. Thus, dominant logics are a form of institutionalized knowledge that restricts the options that are considered legitimate, so directly influencing all AC phases. However, even dominant logics must be enacted to influence AC, and this can depend on individual knowledge-sharing processes as well as organizational combinative capabilities that will influence negotiations about the type of external knowledge to internalize (i.e. acquisition), the way knowledge is shared and, to some extent, recreated (i.e. assimilation/transformation) and the use of this negotiated knowledge (i.e. exploitation).

Volberda *et al.*'s (2010) inter-organizational antecedents focus on the extent to which organizations can exchange (or share) knowledge. The possession aspect of these antecedents involves structural components, such as formal alliance arrangements and how much overlap in existing knowledge there is between partners. These structural arrangements will influence which party has power-over and so can restrict or open up opportunities for knowledge sharing. At the same time, what actually gets shared depends on the particular inter-organizational knowledge creation and sharing negotiation strategies that are enacted in practice. In other words, acquisition, assimilation, transformation and exploitation in the context of inter-organizational partnerships can be promoted by formal structures – yet these structures are not sufficient to account for knowledge absorption, and we need also to consider what happens in

practice as partners translate knowledge ‘into the scene’ (Nicolini 2011).

Volberda *et al.* (2010) also identify environmental levers that will influence knowledge exploitation, such as competitive pressures or the need to implement an innovation quickly to ensure first-mover advantage and the specific characteristics of knowledge/innovation, if it involves, for example, urgent market strategies to prevent substitute products or new entrants in a specific industry. We agree with Volberda *et al.* (2010) but, drawing from a practice epistemology, we note that these aspects of the environment are enacted (rather than objectively defined) (Weick 1979), so that it is through sensemaking that these environmental issues come to influence the use made of external knowledge.

Interestingly, the above discussion suggests that the link between the individual and organizational levels of AC processes can be understood in terms of the interplay between the possession and the practice perspectives of power/knowledge. In other words, on the one hand looking at knowledge absorption processes with a possession perspective highlights individuals' efforts to promote (the acquisition, assimilation, transformation and exploitation of) specific knowledge, which is often likely to be similar to the knowledge already in their minds (i.e. owned). On the other hand, a practice perspective suggests that the knowledge takes on a particular shape during processes of translation, depending on how it is performed among the social and material actors. We believe that the interplay between the possession and the practice perspective, as this relates to multiple levels implied by the AC construct, deserve particular attention, as we discuss next.

Zooming in and out on the AC processes

Many scholars have pointed to the importance of studying AC with a multilevel perspective (Cohen and Levinthal 1990; Lane *et al.* 2006; Volberda *et al.* 2010), with individuals affecting the acquisition phase and then the knowledge needing to move to the organizational level during assimilation, transformation and exploitation (e.g. Sun and Anderson 2010). However, combining the possession and practice perspectives suggests that it is not a question of taking a multilevel perspective, but rather a case of whether one is zooming-in or zooming-out (Nicolini 2011), so that all phases involve both individuals and collectives. Thus, this metaphor makes us aware that knowledge does not move from the individual to the

group and then to the organizational level. Rather, we see that it is the interplay between knowledge/power possessed and practiced that accounts for how knowledge ‘moves’ from acquisition through to use, as we discuss next.

In zooming-in, one can look at a specific point in time and appreciate with great detail, for example, what knowledge is recognized by an individual as potentially useful. Power can also be brought into focus: power is leveraged as a resource, and zooming-in reveals, for example, that actors recognize a particular type of new knowledge as potentially useful – knowledge that can boost their status. In zooming-out, in contrast, one can look at the ‘big picture’ that does justice to temporal dynamics (e.g. processes that unfold over time rather than outcomes) that lead to the achievement of specific knowledge (or power). Knowing (enacting knowledge in practice, or *doing*), in other words, is what ‘moves’ knowledge from being acquired to assimilated, transformed and then exploited, with all phases involving collective practice. Thus, for example, what is recognized by an individual cannot be divorced from the collective practices that created the labels and power dynamics that allow him/her to recognize this particular knowledge as potentially important. In developing a multilevel understanding of AC processes, then, we need to zoom-in and zoom-out to see the complementary between knowledge/power possessed and practiced, with individuals influenced by, and simultaneously influencing, collective processes. The literature is supportive of our theoretical position. As we have seen, knowledge and knowing are complementary – knowledge being a tool of knowing – and Law (1992) suggests that an appropriate conceptualization of power should take into account both power-over and power-to (as in Clegg’s 1989 Circuits of Power framework).

Zooming-in and -out is also an effective metaphor to discuss the path-dependent aspects of AC (Cohen and Levinthal 1990). In fact, continuous zooming-in can provide a series of (static) snapshots of actions that are very similar to each other, and this reflects routines that people develop, for example, when they are members of a community of practice and objects, actions and relationships become so taken-for-granted that those involved do not realize how strange these can be for external actors. To this end, Bowker and Star (2000) talk about processes of naturalization, which occur over time. For instance, communities of practice within a firm (e.g. depart-

ments) develop routines that originate through daily practices; these routines might represent lock-in barriers, which prevent them recognizing the value of some external knowledge. Routines may also limit communication and knowledge sharing between communities, thus restricting assimilation and transformation of new (external) knowledge. In this sense, routines (and norms and patterns of thinking and practice derived from prior knowledge/power) are both conditions for, but also barriers to, AC. However, in zooming-out, it is possible to capture reflective and reflexive practices that are dynamic, involved and committed processes where people are actively stimulated to ‘inquire’ (Dewey 1938) by some frustrations or interruptions that disrupt the flow of their experience (Marshall 2008; Sandberg and Tsoukas 2011). In organizational settings, these practices can originate in borderlands: boundary spanners belonging to more than one community can translate knowledge and address power-to so that knowledge absorption becomes a continuous and interactive flow of (reflective) practices leading to innovation. Reflexive and reflective action can also originate, as we have seen, in material resistance (Pickering 1993). This point, we believe, is key to understanding how relying on prior knowledge can create barriers to knowledge exploration (Vasudeva and Anand 2011), but also how a practice perspective can help us understand how this barrier can be overcome.

In sum, the metaphor of zooming-in and zooming-out helps us to go beyond a multilevel analysis of the AC construct and, to some extent, subverts the traditional idea that knowledge originates in individuals and spreads to the collective (Cohen and Levinthal 1990). Instead, AC can be viewed as a generative dance (Cook and Brown 1999) where it is our interactions (individually and collectively) with the world that allow new knowledge to be acquired, assimilated, transformed and exploited, with our possessed knowledge/power being a tool that leads us to interact in particular ways. Our approach, therefore, indicates the importance of considering the co-evolution of the individual and collective across all AC phases.

Conclusions and identification of new avenues of research

This literature review and analysis reveals that the construct of AC has been used in a wide range of contexts, but that there are still gaps in its conceptual

foundation. Most importantly, we show that the literature on knowledge has only partially been incorporated in the AC construct. In fact, only the possession view of knowledge has been used to unpack AC. Moreover, power is very weakly discussed, and little attention is paid to the relationships between power and knowledge.

Our attempt to fill the above gaps involved the introduction of the practice perspective (Cook and Brown 1999; Nicolini 2011) and the analysis of knowledge and power together (Foucault 1980). The model that was developed describes how the interaction between knowledge and knowing involving human and material actors (and power-over and power-to), produces (more or less) capacity to absorb external knowledge.

This work clearly identifies new avenues of research. First, the temporal aspects of AC need to be further unpacked. Knowledge absorption processes, being affected by prior knowledge, can be negatively affected by lock-in mechanisms, leading to absorption only of knowledge that is similar to what is already known. Therefore, how AC develops over time, and how it is possible to ‘un-learn’ some knowledge to pursue radical innovation, deserves particular attention. Second, a meaningful avenue for future research might involve examination of the evolution of power (over and to) over time and the extent to which these dynamics affect the development of AC. This focus would: (a) promote more research that focuses on AC processes; and (b) shed light on how power-over and power-to can (positively and negatively) affect AC processes.

Third, as we highlighted with the metaphor of ‘zooming-in and zooming-out’, empirical research that focuses simultaneously on individuals as well as collectives is also needed. In other words, research that adopts a multilevel perspective on absorptive capacity is needed in order to examine how recognition, assimilation, transformation and exploitation of new knowledge are interactively produced.

Fourth, it would be useful to expand the discussion of integrating the practice perspective of knowledge in considering absorptive capacity in inter-organizational settings (Lane and Lubatkin 1998). As we indicated in the discussion, knowledge brokers and boundary objects can mediate knowledge absorption across alliances or supply chain networks, as well as within a firm. However, this inter-organizational knowledge absorption requires a formal analysis that takes into account the concerns associated with inter-organizational knowledge

sharing that can jeopardize firm-specific innovations by revealing proprietary ideas and technologies (Trkman and Desouza 2012). Thus, examining knowledge protection strategies in inter-organizational alliances can help shed light on how practice can inhibit as well as stimulate knowledge absorption, even in contexts where the alliance partnership depends on joint practice.

Fifth, research that sheds light on the ‘material’ aspects of AC – which have been neglected by prior literature – is particularly important. This means that we need to adopt research methods that allow the material objects to be vocal, not simply relying on human actors to describe how material objects have, for example, been involved in assimilating new knowledge. A method that may help here is adopting an ‘ethnography of objects’ (Bruni 2005), which enables researchers to examine the performativity of objects in situated practices. Such an approach allows us to examine how the ‘equipped context’ (Gherardi 2012) makes it easier (or more difficult) to accomplish particular tasks, here the absorption of new knowledge. In this way, the context is not treated as a neutral container within which knowledge absorption takes place; rather, the material arrangement of the situated practice is treated as being more or less equipped to allow new knowledge to be, for example, recognized. Moreover, research ‘taking the material seriously’ might also look at how new technologies themselves mediate their own absorption. Thus, the information systems literature has seen several attempts to use AC to explore IT implementations using the AC lens (see Park *et al.* 2007; Volkoff *et al.* 2004; Xu and Ma 2008) – seeing IT implementation as an AC challenge (Roberts *et al.* 2012). Yet, all these scholars have focused on how human actors absorb external knowledge that relates to the new IT, without considering how IT can mediate its own use, for example, because of its material affordances, which allow the IT artifact to ‘speak for itself’ (Markus and Silver 2008), just as the design of a door handle indicates whether it should be pushed or pulled.

All the above avenues of new research suggest that, in order to go beyond the ‘traditional’ (and somewhat static) interpretations of AC, scholars should look empirically at how external knowledge is appropriated by organizations with longitudinal (and observational) research. In so doing, advances in the AC literature will be achieved by looking at how the relationships between human and material actors develop over time – and this would help also in

understanding how power (that evolves over time too) can help mobilize and so absorb knowledge (Hislop *et al.* 2000) within a firm and across firms.

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