Knowledge management (KM) refers to the multiple processes that support the creation and use of knowledge in an organization, or as March (1991) describes it, the exploration and exploitation of knowledge. KM is relevant to the information systems (IS) discipline, because information and communication technologies (ICT) are important tools involved in managing knowledge, especially given the increasingly distributed nature of organizational activity. However, despite the marketing of various ICT packages as “KM tools” by vendors, the IS discipline has recognized that ICT tools alone (i.e., the ICT artifact) are not sufficient. The combination of people and technology, in a particular context will influence how knowledge is produced and reproduced. This (re)production can be either purposive (e.g., when knowledge is integrated in order to develop a new method for dealing with customer enquiries or when knowledge is shared so that a new process in one geographical location can be reproduced in another location) or an emergent and unintended outcome of practice (e.g., when people start to use their e-mail to save important files for themselves rather than to communicate with other people). How the ICT, people, and context interrelationships are theorized will vary, of course, depending on the ontological and epistemological assumptions of the author (e.g., we will contrast an epistemology of possession and an epistemology of practice, Cook and Brown (1999), later in this chapter) but simplistic notions of ICT as the causal or determining factor in managing knowledge have long since been exploded, at least in the IS discipline. In other words, we now recognize that even though an organization might adopt ICT for some purpose (e.g., to improve knowledge sharing), simply introducing technology will not, on its own, lead to the desired change. Indeed, the introduction of ICT can sometimes have the opposite outcomes to those anticipated, for example, when the introduction of an intranet reduces knowledge sharing across organizational units rather than improving
knowledge sharing as intended (Newell et al., 2001). Thus, we do not agree with Spender (2006, p. 128) when he writes that: “IT or management information theorists and economists normally treat knowledge as separable from the people who generate and use it in their decision-making.”

It is perhaps unfortunate that there is still a focus, even if only in practice and not our theorizing, on the ICT tools in KM. When things go wrong, the tools and the people who create the tools are then blamed, rather than recognizing the people–technology–context interactions that are actually at the root of any unsuccessful (as well as successful) initiative that is aimed to improve knowledge production and reproduction in an organizational context. This fallacy of blaming “the ICT” and information technology (IT) specialists for any KM initiative problem is captured nicely in the following joke that has done its rounds on the Internet:

A man piloting a hot air balloon discovers he has wandered off course and is hopelessly lost. He descends to a lower altitude and locates a man down on the ground. He lowers the balloon further and shouts “Excuse me, can you tell me where I am?”

The man below says: “Yes, you’re in a hot air balloon, about 30 feet above this field.”

“You must work in Information Technology,” says the balloonist.

“Yes I do,” replies the man. “And how did you know that?”

“Well,” says the balloonist, “what you told me is technically correct, but of no use to anyone.”

The man below says, “You must work in management.”

“I do,” replies the balloonist, “how did you know?”

“Well,” says the man, “you don’t know where you are, or where you’re going, but you expect my immediate help. You’re in the same position you were before we met, but now it’s my fault!”

The skit nicely sums up how ICT (and those who work in the IT function) can become the scapegoat for KM initiatives. In this chapter, we will examine how a more sophisticated conceptualization of the interrelationships between people, technology, and context can help us to better understand how to create a working KM system for the production and reproduction of knowledge. We begin, though, with a discussion about “what is knowledge” because this is essential for our understanding of attempts to manage knowledge in an organization. We use production and reproduction of knowledge (rather than creation and use), because, as we will argue, knowledge is not transferred between individuals or collectives “ready-to-wear” or use directly. It is rather reproduced (or translated) in each new context of application, indeed, from a practice perspective, in each new moment of time.

Following the discussion on the nature of knowledge, the rest of the chapter is as follows: The next section provides an overview of knowledge (and KM) with respect to the epistemology of possession and the epistemology of practice; the following section (17.3) highlights how technology supports organizational memory (repository view), which is in line with the epistemology of possession. In contrast, Section 17.4 illustrates the “network view,” which is rooted in the epistemology of practice. Section 17.5 provides an overview of KM systems (KMS), while Section 17.6 adopts the lens of absorptive capacity to highlight two contrasting aspects of knowledge: exploration and exploitation. The last section (17.7) draws some conclusions.

17.1 What Is Knowledge?

We watch detectives on TV piece together evidence, using a variety of tools, talking with colleagues, following up leads, interviewing suspects, and finally working out “who did it.” The novice detective marvels at the demonstrated ability, having been unable himself/herself to make sense of all the various cues that point to the guilty suspect. We also watch doctors, ask others to do particular kinds of tests, conduct their own examination of a patient using various pieces of medical equipment, discuss the case with other specialists, and finally determine “what’s wrong” and “what’s the cure.” Again, the trainee doctor can only stand and watch, unable to work out how all the different symptoms add up
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to a particular diagnosis. We recognize these people as having (or not having) knowledge and acting (or not acting) knowledgeable. The main feature that distinguishes between the expert and the novice in these situations is their ability to differentiate within and between the patterns of complex information and data that they can draw upon in the particular context in which they are operating. As Tsoukas and Vladimirou (2001) put it, knowledge is “the individual ability to draw distinctions within a collective domain of action, based on appreciation of context or theory or both” (p. 979). The ability to discriminate and so draw meaning in a particular context, then, is the essence of knowledge. The next question is how do we gain knowledge?

Philosophers have long discussed and argued about this question. It has carried over into the social sciences generally today and into the area of KM very specifically. While there are multiple views, a helpful distinction in terms of the nature of knowledge and how knowledge is acquired is provided by Cook and Brown (1999). These authors distinguish between an epistemology of possession (that treats knowledge as something individuals and groups have or own based on prior experience but separable from that experience) and an epistemology of practice (that treats knowing as something people do that is context-dependent and socially situated). Essentially, this distinction differentiates between the idea that people “have knowledge” and that people “act knowledgeable.”

The possession perspective focuses on cognitions (mental processes) since it is the human mind that is viewed as the carrier or engine of knowledge. Knowledge is, thus, a personal property of an individual knower (or potentially also a collective, Spender (1996)), with mental processes being the key to conferring meaning from data and information, which exist “out there” (i.e., outside the head) in the world. These mental processes are the product of past experiences, perceptions, and understandings, which create a “frame of reference” that allows an individual to infer particular things (i.e., to make discriminations) from some data or information. So, an individual with prior training in physics can infer meaning from the equation—$e = mc^2$—that someone without this possessed knowledge will be unable to. This possessed knowledge includes both tacit and explicit knowledge (Polanyi, 1967). Explicit knowledge is that which can be written down or articulated in language or some other symbolic form. Tacit knowledge is knowledge that is impossible or certainly hard to write down and, even if written down, does not express the knowledge adequately. The example that is often used is knowledge to ride a bike. This includes both explicit knowledge (you must sit on the saddle and hold on to the handle bars, which might seem obvious to you but if you had never seen a bike before you would be unlikely to know that it was something you could sit on and pedal) and tacit knowledge (you must balance to stay upright). The knowledge of balance will always remain tacit—you can be told to shift weight if you are falling to one side, but what this “shifting weight” actually means cannot be explicitly shared, although once it is mastered, the individual will possess it as tacit knowledge. It is important to remember in Cook and Brown’s classification that both explicit and tacit knowledge are possessed knowledge (tacit knowledge is not the practice element), albeit the epistemology of practice is needed, in their view, to generate this possessed knowledge.

The epistemology of practice, then, sees knowledge, or better knowing, as intrinsic to localized social situations and practices where people perform or enact activities with a variety of others (both human and nonhuman) such that acting knowledgeable emerges from this practice and cannot be separated from this practice. Knowledge and practice are thus, immanent; knowledge is not something that stands outside of practice but is rather constantly (re)produced as people and their tools work together with certain consequences (which may be more or less intentional or purposive and which may demonstrate more or less “acting knowledgeable”). The collective, or community, within which practice is undertaken is characterized by a particular set of stories, norms, representations, tools, and symbols, which together produce the knowledge-related outcomes. These outcomes include the development of shared identities as well as shared beliefs, which underpin being a knowledgeable actor in any particular setting. Moreover, these outcomes are always emergent—never completely predictable.

Cook and Brown (1999) see these two epistemologies not as alternative or opposing views, but rather as complementary, with knowledge (possessed) being a tool of knowing. Possessed and practiced knowledge, thus, work together in what they describe as a “generative dance.” Gherardi (2006) refers to this as
the mutual constitution view of knowledge and she contrasts this with the containment and the radical practice views—all practice perspectives but differing slightly in their orientation.

The containment view focuses on how practice is developed within a specific community—of nurses, flute makers, photocopy technicians, tailors, radiologists, academics, etc. All the literature on communities of practice (Lave and Wenger, 1991) fits within this containment perspective and is focused on how newcomers learn “to be” nurses, flute makers, etc., through gradual participation in the situation of doing. A good example of such a containment perspective is demonstrated in the work of Julian Orr (1996) who examined the work of photocopy technicians and showed how learning to act knowledgeably occurred socially, often emerging through storytelling as well as through physical interactions with machines-in-context. In terms of storytelling, Orr observed that the technicians would meet up for coffee between site visits where they were repairing or maintaining copy machines. At these informal (and unofficial) meetings, they would tell “war stories” of machines they were or had been working on. These stories were crucial vehicles for the sharing of know-how that contributed to their skillful practice. Unfortunately, management saw the informal meetings rather differently—as unnecessary detours from their next scheduled visit and sought to outlaw the meetings. Ironically, as Orrrelates, in doing so they reduced the ability of the technicians to learn their skills. In terms of interactions with machines-in-context, Orr points out that technicians needed to observe the copy machine in-context because its situated use would provide vital cues as to what might be the problem. Such cues could never be part of the training manual because there were so many aspects of the context that might be relevant. Learning to act knowledgeably, then, is socially situated within a particular community of practice.

The radical view, on the other hand, broadens this perspective, focusing on the interconnectedness of practices within any social setting or as Nicolini (2011) refers to it, in a “site of knowing.” From this perspective, it is not individual cognitions that are important but the discursive practices, artifacts, and spaces that form a nexus for knowledgeable action in a particular context. For example, in a hospital, there may be a variety of communities of practice (nurses, oncologists, radiologists, and even patients with a particular disease), and to understand practice in this setting, it is important to look at the interrelationships between these communities as well as the relationships between people and objects and spaces. The knowing of the oncologist is intimately tied up with the tools that she uses and the relationships she has with a variety of other healthcare professionals (and the patient) in this setting. Without these relationships, she could not act knowledgeably. Within this context, or site of knowing, people and objects do not “carry knowledge” but instead are mediators that are actively translated (Latour, 2005) either “by contact” or “at distance” (Nicolini, 2011). Given this process of translation, practice (and so knowing) is always emergent—“pursing the same thing, necessarily implies doing something different” (Nicolini, 2007, p. 893–894). Translation captures the idea that knowledge is (re)produced rather than transferred, so that certain elements will be foregrounded or take on different meaning depending on the context and the mix of actors (human and nonhuman) that are present. Knowing is in these relationships, rather than in the heads of the individuals involved.

While the details of the differences between these practice views can be important, the key point that we wish to make in this chapter is that it is crucial to see knowledge as something that does not simply reside in individuals’ minds, but rather recognize how knowing is a practical accomplishment. A chef cannot become a master chef simply by reading about cooking or even by practicing in isolation; rather she becomes a master through working in a particular kitchen where certain norms and values, together with particular culinary tools and ingredients, produce and re-produce her ability to act knowledgeably, as an emergent accomplishment of the social setting.

Moreover, the distinctions between knowledge as possession and practice and the different variants of the practice perspective are important because they influence how one views the interrelationships between people, technology, and context. We will next discuss two different images of the role of technology and the associated views of people and contexts in relation to KM: the repository view (that we link to the possession view of knowledge and the socio-technical school in IS) and the network view (that we link to the practice perspective of knowledge and the sociomateriality school in IS).
network views have been previously discussed (Alavi and Tiwana, 2002). More recently, McAfee (2006) has distinguished between the platform and channel views of KM, which is very similar. These authors, however, make these distinctions based on developments in IT (from Web 1.0 to Web 2.0 and beyond), while we think it is important to see these different views of KM not as a product simply of technological advancement, but in terms of the epistemological perspective on knowledge and the ontological assumptions about the people–technology relationships that underpins their use.

17.2 Repository View

The repository view is probably the best established view of KM and is linked to the knowledge as possession perspective discussed earlier. From this perspective, individuals own knowledge, but they can also transfer knowledge to others, just as if I own a book I can give it to someone else, if I so choose. The idea behind the repository then is that individuals are encouraged to make explicit their knowledge (typically through a written document but this could also be through other media, like a film). This knowledge is then stored in a repository of some kind (typically a database using a document management system of some kind that can be accessed through an intranet that includes a search engine). Others can then search the repository when they need certain knowledge that they lack, and once they find what they are looking for, they can then apply this knowledge in their own context. It is a supply and demand model—all those who have knowledge provide it for those who need it.

The repository view does not assume that putting in place a searchable database will alone be sufficient to improve knowledge sharing in an organization. In other words, it is recognized that the repositories on their own will not improve KM across an organization, in the absence of attention to the social aspects of organizing (Connelly et al., 2012). We can describe this as a socio-technical perspective (Kling and Courtright, 2006) on KM (Davenport and Prusak, 1998). A socio-technical perspective recognizes how the social and the technical influence each other so that what may seem like a perfect technical solution may not operate as such, because it undermines some aspect of the social, like motivation. The technical and the social are seen as having separate ontological status but are recognized to influence each other. It is, therefore, important from a socio-technical perspective to ensure that the social and the technical are aligned in relation to the goals that one is trying to pursue. For example, implementing a lessons learned database for project managers to store their experiences from which others can learn may not be effective if project managers are very time-pressed and/or not recognized for adding to the lessons learned database. It is also not very helpful if project managers are encouraged to share their knowledge if, at the same time, they are not also encouraged to look for and reuse knowledge from others (the demand side must be addressed as well as the supply side, an issue which has often been ignored in KM initiatives; Newell and Edelman (2008)). A number of factors, therefore, are recognized as being crucial to the success of such an initiative. We discuss some of those issues next.

17.2.1 Sticky Knowledge

While the repository view assumes that knowledge can be transferred from place to place, it also recognizes that some knowledge, especially tacit knowledge, can be more difficult to transfer because as Szulanski (1996) notes, knowledge can be “sticky.” Nonaka (1994) suggests that this problem can be overcome by converting tacit knowledge to explicit knowledge. However, as already hinted at, this misunderstands the essential nature of tacit knowledge, which, as Polanyi (1961) indicates, will always remain tacit. Tsoukas (1996) summarizes this nicely when he refers to tacit and explicit knowledge as “mutually constituted,” meaning that in any knowledgeable act, there will always be both tacit and explicit knowledge at work.

Sticky knowledge that is tacit may, then, simply not be transferable through a repository, but this still leaves a lot, from the possession perspective that can be shared. Stickiness, however, resides not just in the tacitness of knowledge but also in the fact that people have to be persuaded to both share their knowledge at the supply end and then use knowledge from elsewhere at the demand end. This is
where the “people aspect” of KM is often discussed. Incentives may be necessary to encourage people to share their knowledge, because knowledge is often a source of power in an organization (Bartol and Srivastava, 2002). Knowledge hoarding can, thus, be a major barrier to the success of a KM repository initiative (Lam and Chua, 2005). This means that incentives may be needed either to discourage hoarding or because it is time-consuming to “make one’s knowledge available to others” (Alavi et al., 2006). Incentives may be financial but they can also be symbolic, as when knowledge workers share knowledge to increase their professional reputation (McLure-Wasko and Faraj, 2005).

Moreover, the possession perspective would also recognize that an individual’s mind is not open to receive any kind of new knowledge—there is a path dependency to knowledge accumulation (see section on absorptive capacity). So there will be barriers to knowledge sharing, for example, across departments where different syntax is used, or where meanings are different (Carlile, 2004) (see following section on knowledge boundaries).

### 17.2.2 Leaky Knowledge

While from the repository view the stickiness of knowledge has to be overcome, it is also the case that because knowledge can be so readily transferred, it also has to be protected since it is the main source of sustainable advantage (Trkman and Desouza, 2012), as per the resource-based (Barney, 1991) or knowledge-based view of the firm (Grant, 1996). Technical solutions to this problem are addressed to securing databases and other ICT from unwanted predators. In fact, knowledge leaks associated with security breaches are not infrequent (Desouza and Vanapalli, 2005); for instance, Fitzgerald (2003) documents a number of cases of loss of intellectual property and sensitive data due to weak security measures. However, it is also recognized that a focus on the social is important. This can be in the form of contractual obligations, for example, with stipulating that an individual leaving an organization is not allowed to join a competitor within a certain amount of time, or it can take the form of training to encourage employees to have secure passwords (not sticky-taped to their computer) or to know what information is propriety and so should not be shared. Leaky knowledge is, in effect, the opposite of absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002) discussed below. Absorptive capacity is about building the capacity to recognize, process, and use external knowledge, while in this section, we have been discussing the importance of protecting organizational knowledge from external parties.

### 17.2.3 Organizational Culture

Given these issues of both sticky and leaky knowledge, scholars have identified organizational culture as key to effective KM practice. People need to be encouraged to share their knowledge and reuse others’ knowledge through developing a culture or climate that encourages such activity (Alavi et al., 2006), or the culture needs to prevent such sharing where this is important. Culture refers to the basic assumptions and values that exist within an organization (Schein, 1992). There can be multiple cultures across an organization (Meyerson and Martin, 1987), but the key is that culture has been shown to be either an enabler (Alavi et al., 2006) or barrier (Connelly et al., 2012) to KM success. The cultivation of a culture that supports knowledge sharing has thus been described as an essential facilitator of the ability to exploit a KM repository (Donate and Guadamillas, 2010). Hackett (2000) describes this as a knowledge-sharing culture, which should include a shared vision, value-based leadership at all levels, openness and continuous communication, and rewards and recognition.

### 17.3 Network View

The network view has been linked to the emergence of social networking sites that encourage social exchanges in a much more dynamic and personalized way than repositories can. Social media are not simply platforms that individuals can communicate from (to one or many) but instead provide tools...
for ongoing dynamic exchanges using multiple channels, including video, text, chat, and discussion forums. The network view is linked to the communities of practice perspective on knowledge sharing (Wenger et al., 2002) and to the practice perspective of knowledge more generally (Gherardi, 2006). Since knowing is an emergent outcome that is negotiated through social and material interactions, repositories that contain knowledge that is divorced from context are seen to be less helpful. However, ICT that can promote dialogue and shared experiences (albeit virtual) can play a role in the social learning process that underpins becoming a knowledgeable actor. Moreover, ICT is not just a pipe through which knowledge flows, rather ICT is seen to be part of the very practice itself, scaffolding that practice along with a host of other actors (material and human). We can describe this as a sociomaterial perspective (Feldman and Orlikowski, 2011).

From a sociomaterial perspective, it is not simply that the social and the technical are interrelated, rather they are seen as “constitutively entangled in everyday life” (Orlikowski, 2007, p. 1437). As Pickering (1993) suggests, subjects and objects are mangled in the flow of practice, which can be seen as a series of resistances and subsequent accommodations in an ongoing flow of activity that is directed toward some goal (in the case he describes, the creation of a bubble chamber by a physicist). In the ongoing flow of practice, it is not possible or useful to distinguish between the social and the technical/material because they are entangled together in a form of “absorbed coping” (Dreyfus, 1995). Only when something breaks down, are we able to separate (artificially) the social and the material elements of the practice (Sandberg and Tsoukas, 2011).

From the practice perspective, ICT is a potential mediator, which will provide access to information that will be translated-in-context. For example, Nicolini (2011), examining telemonitoring in a hospital, describes how the ICT, infrastructures, programs, and interfaces that allow the doctors to collect information from a patient’s home are all mediators of knowledge that is translated in different settings. For instance, Nicolini (2011) quotes a dialogue (phone call) between a patient (at home) and a nurse (in the hospital). The nurse first gathers a lot of information from the patient (i.e., the patient was sick the previous night, his daily pressure reading is fine, and he made a decision to stop taking a drug). Then the nurse needs to reach the doctor (in the example, a cardiologist), refer everything to him/her, and make sure that the doctor listens carefully to the whole conversation and makes the right decisions that will then be reported to the patient (as Nicolini highlights, from the nurses perspective, “often doctors listen to you only briefly and support your decisions”—p. 7). In this example, the nurse acts as a mediator “at distance” that translates knowledge across contexts.

Given that, from this perspective, the social and the technical are seen as inseparable, it would not be sensible to think about ICT independent of its use in practice. Nevertheless, there are a number of important points to recognize from this perspective, which we discuss next.

### 17.3.1 Emergent (Unintended) Use

The material (including ICT) may scaffold the social (Orlikowski, 2007), but the scaffold is not fixed in design but rather unfolds through practice. So, the video conferencing facility that was designed to support virtual teamwork may be used by those involved in the project to watch movies together, rather than to hold joint team working sessions. In other words, from the practice perspective, there is always some emergence that may not be predicted but which managers need to be aware of if they hope to promote knowledgeable work. In saying this, we are not suggesting that managers should be trying to constrain this emergence—a distributed team using their video connection to watch films together (rather than, or at least as well as, to conference call) may actually promote strong team bonds that can facilitate project work (as with Orr’s photocopy technicians taking time out to meet and chat between customer visits). Managers rather should be aware of why emergence happens and work with the users to create technical scaffolds that can support the work that they are doing, in ways that suit the particular context, recognizing that this may differ across time and space.
17.3.2 Role of Boundaries

The role of boundaries in managing knowledge is crucial for both the possession and the practice perspectives; boundaries exist between groups of any kind that are needing to share knowledge. Carlile (2004) distinguishes between syntactic, semantic, and pragmatic boundaries that increase in importance as the novelty of the collaboration increases, making knowledge sharing increasingly difficult:

**Syntactic boundaries:** When novelty is low and there are few differences between those sharing knowledge because they have worked on similar problems before, the main boundary is a syntactic one. Developing and maintaining a common lexicon can resolve this boundary problem. Once a common lexicon is in place, knowledge can be *transferred* relatively unproblematically (Carlile, 2004, p. 558).

**Semantic boundaries:** As novelty increases, differences between the collaborating groups become greater since they are working on new problems so that there are likely to be more ambiguities because there will be different meaning for the same word or convention, for example, about what to call something. Different workers might use conventions that are not clear to those outside a “circle,” leading to different interpretations. In these situations, ambiguous terms and expressions (semantics) need to be *translated* to ensure consistent use of words and conventions.

**Pragmatic boundaries:** In situations where novelty is high, differences between collaborating groups are likely to cause the most problems for knowledge sharing. In these situations, it is not simply that different groups have different meaning systems, but that there are political issues associated with whose knowledge is to be most highly valued. Thus, we are “invested” in our knowledge, and if a change threatens our knowledge, we will resist it. For example, in healthcare, a new medical breakthrough may potentially move the treatment of a particular disease like cancer from surgeons (who cut out the cancerous cells) to radiologists (who kill the cells using radioactive treatments), and in this situation, we might expect the surgeons to resist the change (Swan and Scarbrough, 2005). In these situations, knowledge needs to be *transformed* through negotiations that may eventually change the frame of reference, dominant values, and the practices of the participating parties.

Linking this work on boundaries to the different perspectives on knowledge, from the possession perspective, the major challenges related to sticky knowledge are addressed by overcoming syntactic and semantic boundaries. However, from the practice perspective, a more formidable challenge is to overcome pragmatic boundaries that arise because we are invested in our practices (Carlile, 2004). Thus, while Nonaka (1994) defines knowledge as “justified true belief” what is justified depends on ones’ practice history. In this sense, it is the boundaries between communities that create problems for knowledge sharing with community members “blinded” by their particular worldview and taken-for-granted sociomaterial practices. Since most action in organizations occurs in the context of multiple communities “tied together by interconnected practices” (Gherardi and Nicolini, 2002), the socially situated and contextually based nature of knowing poses as many problems as opportunities. Recognizing pragmatic boundaries between diverse epistemic communities (Knorr-Cetina, 1999) indicates the importance of considering the role of boundary objects (Star, 1989) and mediators (Latour, 2005) for helping the translation (or transformation in Carlile’s terms) of knowledge across communities and contexts.

17.4 Technology for Support of KM Processes

While earlier we have differentiated between the repository and network views of KM and suggested that these are the product of different epistemological and ontological assumptions, in reality, most organizations combine the repository and network perspectives in developing their KMS. This is consistent with our mutual constitution view that recognizes both possessed knowledge and practice-based knowing. A variety of technical systems are thus introduced, together with social systems that can support the use of these technical systems. Quaddus and Xu (2005), for example, identified a number KMS, which are reported in Table 17.1 (the % in the table indicates the popularity of the different technologies).
Alavi and Tiwana (2002) categorize these different KMS in terms of the knowledge processes that they aim to enhance (knowledge creation, storage, transfer, and application) as depicted in Table 17.2.

This is helpful in the sense that it recognizes that different types of ICT will be more or less useful for different knowledge processes. At the same time, the Quaddus and Xu (2005) study demonstrates that it is the storage and transfer technologies (based on the repository view) that have been most popular in terms of the types of KMS that are used in practice. However, unfortunately this was a 2005 published paper and may not reflect the current state of play.

### 17.5 Knowledge Exploration and Exploitation

Most of the discussion so far has considered knowledge at the individual or local level—in particular, sites of knowing. However, we are also interested in looking at KM from an organizational perspective. On the one hand, organizational knowledge can be described as “more than the sum of the parts” (Simon, 1962); on the other hand, “organizations know more than they can tell” (Polanyi, 1967). To some extent, these two sayings reflect the possession and the practice perspectives, respectively, and so from a mutual constitution perspective, both are, paradoxically, insightful even though they seem to be opposite ideas. Moreover, from the perspective of this section of the chapter, the issue of organizations knowing more than they can tell relates to the problems surrounding exploitation, while the issue of organizational knowledge being more than the sum of the individual parts relates to the opportunities for exploration.

It is widely argued that organizational knowledge is a key asset for any organization and can lead to success (Grant, 1996). It is also suggested that a balance between knowledge exploration and knowledge...
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exploitation is positively associated with performance (Cohen and Levinthal, 1990; Levinthal and March, 1993). Among others, March (1991) indicates that achieving a balance between exploitation and exploration will affect an organization’s survival and prosperity. In this section, we aim to deepen the issues associated with organizational knowledge, knowledge exploration, and knowledge exploitation. In so doing, we will apply the lens of absorptive capacity (Cohen and Levinthal, 1990), that is, the capability to capture external knowledge and transform it into organizational assets for innovation. In particular, we will focus on Zahra and George’s (2002) reconceptualization of the construct. In their paper, they highlight that knowledge should be “explored” (potential absorptive capacity) and then “exploited” (realized absorptive capacity), and they also provide a process view of knowledge absorption that fits with the view of managing knowledge taken in this chapter.

17.5.1 Absorptive Capacity (a la Zahra and George)

Absorptive capacity was originally defined by Cohen and Levinthal (1990) as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (p. 128). Cohen and Levinthal (1990) also suggest that organizational absorptive capacity (1) builds on prior investments in building absorptive capacity in individuals; (2) develops cumulatively and tends to be path-dependent (i.e., what has been learnt in the past sets limits on what can be learnt in the future); and (3) depends on the organization’s ability to share knowledge internally. Thus, since individual learning is cumulative, learning performance is greater when the object of learning (the new knowledge to be identified, assimilated, and applied) is related to what individuals already know. In sum, absorptive capacity is a mix of capabilities that allow individuals and organizations to capture external knowledge, process it, and apply it to innovation and therefore to organizational performance.

Zahra and George (2002) revised the absorptive capacity construct and highlighted that it has two main states, potential and realized: “potential capacity comprises knowledge acquisition and assimilation capabilities, and realized capacity centers on knowledge transformation and exploitation” (p. 185). This suggests that potential absorptive capacity captures processes of (external) knowledge exploration; that is, organizational actors scan the external environment with the aim to identify knowledge that, potentially, can be processed and used within the organization. However, potential absorptive capacity “does not guarantee the exploitation of this knowledge” (Zahra and George, 2002, p. 190). Realized absorptive capacity reflects the firm’s capability to elaborate and exploit the knowledge that has been identified. Therefore, knowledge exploration and knowledge exploitation are complementary (March, 1991). Moreover (as discussed in the next sections), processes and mechanisms that support potential absorptive capacity incorporate characteristics of the epistemology of possession while processes and mechanisms that support realized absorptive capacity incorporate characteristics of the epistemology of practice. This twofold lens of analysis of absorptive capacity (possession vs. practice perspective) and the assumption that potential and realized absorptive capacity are complementary follow the mutual constitution view of knowledge that was introduced in the first part of this chapter. The next paragraphs discuss this in more detail.

17.5.2 Potential Absorptive Capacity and the Epistemology of Possession

Potential absorptive capacity includes two main capabilities: knowledge acquisition and knowledge assimilation (Zahra and George, 2002).

Knowledge acquisition is the firm’s capability to identify and acquire only the external knowledge that is relevant for its business; that is, not all external knowledge should be taken into consideration, instead, a selection process should take place. Relevant knowledge is the knowledge that might contribute to innovation and, therefore, organizational performance (Cohen and Levinthal, 1990; Jansen et al., 2005). Moreover, in order for a firm to gain and maintain a competitive advantage, it is crucial that external knowledge is acquired quickly—or, at least, quicker than other competitors.
The ICT industry is very rich with “cases” of exploration and exploitation of technology-related knowledge (and associated issues). In this chapter, we would like to use the example of Facebook’s recent acquisition of Instagram and the processes that supported the implementation of Instagram’s functionalities into the Facebook portal and led to Facebook’s users exploiting the new software (i.e., the software from Instagram).

Instagram, before being acquired by Facebook, was a start-up company that provided a set of tools to automatically upload and share photos on personal websites. Some of Instagram’s features help users to graphically modify photos so that even those users who are not very familiar with photo-editing software (such as Photoshop®) are able to create amazing graphical effects.

In April 2012, Facebook acquired Instagram. From an absorptive capacity perspective, we can say that Facebook boundary spanners identified the start-up company whose business was tightly related to one of the main functionalities of Facebook—uploading personal photos to one’s profile. After the identification of Instagram as a potential acquisition, communication between the board and the Facebook CEO (Mark Zuckerberg) took place. Shortly after, the decision to acquire Instagram was made and took less than a week to complete. Of course, at Facebook, both the boundary spanners and the board (in particular, Mr. Zuckerberg, who has considerable decision power in Facebook) had a background knowledge that allowed them to evaluate the external knowledge. That is, knowledge acquisition happened through boundary spanners, and decisions were made by powerful people in the organization (CEO and the board). How successful this acquisition will be in the long term is difficult to judge, but the case does illustrate a very swift process of (knowledge) acquisition, which is associated by some with competitive advantage (Argote and Ingram, 2000).

Knowledge assimilation includes processes of analysis and interpretation of external knowledge (Sun and Anderson, 2010). Knowledge assimilation can occur informally (through social networks) or formally (with the use of coordinators) (Zahra and George, 2002). Drawing again from the Facebook example, after the acquisition Instagram’s technology was incorporated into Facebook’s portal, moreover, Facebook users were “trained” on how to use the new service and connect it to their Facebook webpage. At Facebook, knowledge assimilation occurred once the technicians were able to make the new software available to the users; moreover, the marketing department identified effective ways to “sell” Instagram to Facebook users. Thus, while knowledge identification involved just senior management, knowledge assimilation involved technical and nontechnical processes and business units to make the new knowledge available for the users (with Facebook “customers” (i.e., the users) seen as part of the same—at large—community where absorptive capacity assimilation takes place).

In sum, both knowledge acquisition and assimilation are driven by prior knowledge; consequently, potential absorptive capacity is path-dependent (Cohen and Levinthal, 1990; Lane et al., 2006). This suggests that potential absorptive capacity is a combination of exploratory processes that can be effectively analyzed using the epistemology of possession. In fact, it is emphasized (in line with Lane and Lubatkin, 1998) that once the external knowledge is sufficiently similar to the knowledge of the potential recipient, identification and assimilation occur relatively easily. Moreover, it is quite common that the recognition and assimilation of knowledge are undertaken by individual actions rather than collective efforts, as per the Facebook example (i.e., boundary spanners and upper management identified new external knowledge and some technicians made the knowledge available for users).

Finally, the boundaries between Facebook and the environment (in the case of knowledge identification) and between Facebook and the users (in the case of knowledge assimilation) were syntactic and semantic. Syntactic boundaries were (easily) overcome in the case of knowledge identification: The knowledge related to Instagram (and its functionalities) was straightforwardly transferred to the Facebook technicians. On the other hand, syntactic boundaries were overcome when the functionalities of Instagram were made available to the worldwide Facebook users (i.e., with basic communication to the users and the translation in multiple languages of essential to-do lists on how to use the new photo-editing software and on how to manage and automatically upload the photos on one’s Facebook’s profile). Moreover, semantic boundaries existed (and were overcome) when the technicians were able
to incorporate the characteristics of Instagram into the Facebook portal to make the new service easily accessible by the users. As previously highlighted, once a relevant amount of prior knowledge overlaps the external knowledge, syntactic and semantic boundaries can be overcome without major challenges. Lane and Lubatkin’s (1998) study on “relative absorptive capacity”—that is, knowledge transfer between two firms, one “learner” organization (the donator of knowledge) and one “student” organization (the recipient)—suggests that the more the overlapping knowledge between two firms, the more the process of knowledge transfer is straightforward.

17.5.3 Issues Associated with Knowledge Acquisition and Assimilation (Potential Absorptive Capacity)

From the preceding text, it is clear that knowledge acquisition and assimilation (potential absorptive capacity) are affected by path dependency. That is, an organization is likely to acquire knowledge that is similar to the knowledge it already knows. Once the acquisition of some particular knowledge starts, the organization is likely to keep trying to acquire similar knowledge in a particular area. In the following text, we discuss some of the most common issues that can occur within the process of knowledge acquisition and assimilation (potential absorptive capacity).

Issue 1: Context specificity of knowledge. Knowledge identification and assimilation can be difficult when external knowledge incorporates context-specific characteristics (Carlile, 2004) that often prevent outsiders from understanding and replicating such knowledge; for instance, as noted earlier in this chapter, Szulanski (1996) calls it "stickiness."

Issue 2: Complementary assets. Identifying and assimilating external knowledge can be difficult when the value of knowledge is associated with the existence of complementary assets that might not be available in the recipient firm (Teece, 1981; Zahra and George, 2002).

Issue 3: Prior knowledge and incremental innovation. One could argue that the very close relationship between prior knowledge and external knowledge might represent a hindrance to the implementation of disruptive innovation (Christensen, 1997). Namely, along with the idea that organizations are good when pursuing incremental innovation (Facebook improved an existing functionality of the platform—in fact, it was already possible to upload photos, even if with a more complex process), managers are less likely to identify knowledge that creates breakthrough innovation.

Issue 4: Power. Another issue that can be associated with potential absorptive capacity and, therefore, with the identification and assimilation capabilities is power. The idea that power affects managing knowledge is not new (Argote et al., 2003; Marshall and Brady, 2001; Pfeffer, 1981). While, in the previous sections, we highlighted that knowledge can lead to power (Bartol and Srivastava, 2002), here we also show how power can affect knowledge absorption (Easterby-Smith et al., 2008). In the literature on absorptive capacity, for instance, Todorova and Durisin (2007) focus on why some firms develop more absorptive capacity than others and suggest that power affects the extent to which organizations are able to explore external knowledge. This is interesting because it suggests that (few) people exercise power in organizations regarding decision-making processes that involve the introduction of technological innovation based on external knowledge. For instance, Marabelli and Newell (2009) document the case of an enterprise resource planning (ERP) implementation that initially was led by some managers from the adopting firm’s sales department: they decided which system to implement, when to start the implementation, and with which characteristics (a lot of customization, in their case). One negative consequence of the exercise of power by just a few organizational actors was that while the recognition process was conducted very quickly, the assimilation phase—actual introduction of the system in the organization—encountered a number of technical and nontechnical problems. Differently from Facebook and Instagram, in this example, (Marabelli and Newell, 2009) power acted as a barrier (rather than a source of competitive advantage) to knowledge identification and assimilation.
In sum, we can conclude that, although recognizing and assimilating external knowledge can be seen as straightforward, a number of obstacles can occur: External knowledge can be associated with other invisible assets that are needed to fully understand new knowledge; since external knowledge is often very similar to the knowledge that an organization already has, radical innovation is limited; and power relationships can also affect potential absorptive capacity. In terms of power, the effects can be either positive or negative and this probably depends on the core competences of the leaders who exercise power: In the case of Facebook, Mr. Zuckerberg is a visionary innovator; in the case of Alpha Co. (the example in Marabelli and Newell, 2009), the management was probably not so skilled to make decisions regarding how to introduce a new ERP system.

17.5.4 Realized Absorptive Capacity

Within realized absorptive capacity, two main capabilities are identified: knowledge transformation and knowledge exploitation (Zahra and George, 2002).

Knowledge transformation is the ability to combine existing knowledge and the newly acquired and assimilated knowledge. This can occur by adding or deleting knowledge or by interpreting existing in-firm knowledge in light of external inputs. Zahra and George, drawing from Koestler (1966), depict knowledge transformation as a process where organizations recognize two apparently incongruous sets of information (external knowledge and in-firm knowledge) and are able to combine them to arrive at a new schema. Knowledge transformation capabilities are needed for strategically managing organizational change. During the transformation phase of absorptive capacity, knowledge has to be shared internally since business units’ coordination, cross-division communication, and integration processes facilitate knowledge flows (Van de Bosch et al., 1999). Zahra and George’s conceptualization of knowledge transformation (at least the way it is interpreted in this chapter) is very similar to Carlile’s discussion on pragmatic boundaries (he also refers to knowledge transformation) and to Latour’s idea of knowledge translation—that is, knowledge needs to be, to some extent, recreated or reproduced by those who are practicing it.

Bringing up again the case of Facebook (and Instagram), we can identify processes that can be linked to knowledge transformation. For instance, once the main technical problems were solved (the incorporation of Instagram’s functionalities into the Facebook portal), and once a marketing campaign was conducted to inform the Facebook users about the availability of a new photo-editing/uploading tool, a more challenging issue emerged: The external knowledge (e.g., Instagram, and how photo digital editing can work for “dummies”) had to be acknowledged by the users as interesting, appealing, and helpful. The literature on the introduction of new technology highlights that if the users are aware of its benefits they are also more likely to adopt it (Ferneley and Sobreprez, 2006; Hwang and Thron, 1999). And this is what happened at Facebook: In the phase of knowledge assimilation, Facebook put a lot of effort into informing the users of the benefits of Instagram for uploading photos on their personal pages. However, having the users adopt the technology is not an automatic process (Easterby-Smith, 2008). In fact, while tasks such as the Marketing department promoting innovation can be relatively straightforward, the actual adoption of technology requires more complex elaboration of external knowledge (Elbanna, 2006) that, as we argue in this chapter, requires in-context practice. This means that it is not just that the users need to be aware that some new functionality is available; they must be able to incorporate the novelty into their current routines. So, basic processes such as taking a picture with the IPhone and uploading it using the “photos” functionality available in the IPhone–Facebook “app” is replaced with taking the picture and using the “Instagram” functionality (still available as an iPhone app). Initially, moving from a familiar photo-editing and upload system to a more innovative system will be perceived as a more complex way to have photos on one’s personal page; users need to become familiar with a different way to process pictures and this can take time and needs practice. The driver that makes the change happen is the user’s belief that a process, which seems relatively complex, will be more “productive” in the long term (i.e., it is more powerful and adds new functionalities such as for-dummies image editing features).

Moreover, the new knowledge (again, Instagram) is shared among groups within social networks, based on virtual word-of-mouth (Gruhl et al., 2004). The way the Facebook portal is designed allows
others to see which application was used to create a photo that was shared, stimulating people’s curiosity and creating the willingness to try a new, potentially interesting service. Users are then able to evaluate the new “tool” through practicing it. For users, moving to Instagram does not imply that they have to use it every time they want to upload a photo. Therefore, users may perceive that it is worth trying the tool. Online discussions can be seen as virtual communities of practice (Dube’ et al., 2005) where new external knowledge is collectively combined in an online forum of practice.

Knowledge exploitation is the capability that allows organizations to actually apply the previously transformed knowledge for commercial purposes (Cohen and Levinthal, 1990); successful knowledge exploitation includes refinement, extension, and leverage of existing competences and creation of new ones by incorporating external knowledge into existing organizational processes and procedures (Tiemessen et al., 1997).

The successful knowledge exploitation at Facebook occurred when new users started to use Instagram. Knowledge exploitation can take time; in fact, as previously highlighted, Facebook users needed to practice the new tool for a while before deciding that it was better than the old system to upload photos. Moreover, at the time of writing, knowledge exploitation processes are still ongoing at Facebook.

Nevertheless, some conclusions can be drawn: First, effective knowledge exploration can lead to successful knowledge exploitation. Even if we do not argue that knowledge acquisition, assimilation, transformation, and exploitation can be represented as a linear series of processes, it is evident that only the acquisition of relevant knowledge can lead to its assimilation (because the firm has the skills to implement it into existing routines and processes; Zahra and George, 2002). Moreover, only effective assimilation (i.e., knowledge integration) leads people to (try to) practice new external knowledge with the aim to translate it and, consequently, to exploit it for commercial use (Cohen and Levinthal, 1990).

The preceding text suggests that during transformation and exploitation processes, knowledge should be collectively “practiced.” Consequently, an epistemology of practice should be used to investigate realized absorptive capacity. Moreover, in the case of knowledge transformation, knowledge-sharing boundaries are pragmatic: As indicated in Carlile (2004), shared artifacts and methods play an important role in achieving the capacity to negotiate interests and transform knowledge. This is particularly evident in the Facebook example where the users have the possibility to see others’ activities (i.e., somebody who was an early adopter of Instagram) and send positive feedback (“I like it” or “I don’t like it”) through the online portal (Facebook).

17.5.5 Issues Associated with Knowledge Transformation and Exploitation (Realized Absorptive Capacity)

Although effective knowledge identification and assimilation can lead to successful knowledge transformation and exploitation, realized absorptive capacity can encounter problems. In the following text, we list common issues related to the effective transformation and exploitation of new external knowledge.

Issue 1: Barriers to knowledge sharing. Knowledge transformation and exploitation are negatively affected by (potential) barriers to knowledge sharing. Since knowledge transformation happens through practice, people can benefit from the possibility of interacting with and discussing the new knowledge. It is important that users’ experiences are shared among other users so that social processes of knowledge reproduction take place. Moreover, knowledge exploitation is the collective effort of implementing novelty into organizational routines so that the whole organization benefits from external knowledge (Zahra and George, 2002). Therefore, cross-unit barriers need to be overcome and clear common objectives identified. Pragmatic boundaries can make this difficult.

Issue 2: Long-term processes. Knowledge transformation and exploitation often require long-term practice (Lane et al., 2001) for the external knowledge to be recreated in the form of working knowledge. It is arguable that transformation capabilities are achieved in particular organizational settings such as communities of practice where frequent member interactions (as happens between Facebook members, Ellison et al., 2007; Wilson et al., 2009) allow both the appropriation of the new knowledge and
the creation of new knowledge using ideas from external inputs. However, short-term objectives and the rush to transform inputs (i.e., external knowledge) into tangible outputs (i.e., innovation, therefore performance) do not always promote knowledge transformation processes.

**Issue 3: Power.** Power affects knowledge transformation and exploitation. Given that both capabilities should be developed through practice, Nicolini (2011) points to the importance of addressing power issues. Moreover, Newell et al. (2009) noted that, although ideally organizational actors will channel their efforts to successfully share (and eventually transform) knowledge, this is quite a simplistic view of organizations. Assuming that common goals are always clear to employees is a very functionalist view of organizations (Burrell and Morgan, 1979). On the contrary, empirical results (Perez-Bustamante, 1992; Wagner et al., 2002) indicate that very often encouraging employees to surrender their knowledge for the benefit of the organization has the result of disempowering them. This is one reason why individuals might choose to “hoard” rather than share knowledge. Knowledge exploration too can be (often negatively) affected by reflecting interests of powerful groups. For instance, in large-scale projects of ERP implementation, it is not infrequent that decisions of powerful coalitions on how to exploit external knowledge result in a failure of the overall implementation of the external knowledge (the ERP system) (Kholeif et al., 2007; Yusuf et al., 2004).

As with potential absorptive capacity, then, realized absorptive capacity also presents issues because although effective knowledge exploration can lead to successful knowledge exploitation, this is not necessarily a straightforward process. Realized absorptive capacity requires practice for external knowledge to be transformed, and this practice is likely to throw up various problems because it can conflict with previous ways of doing things. This indicates that power issues may emerge during this period of transformation. Power relationships, thus, affect both potential and realized absorptive capacity. Our examples indicate that while power and successful potential absorptive capacity are mediated by the skills and experience of powerful decision makers (i.e., Mr. Zuckerberg), for realized absorptive capacity, the transformation and application phases are less likely to be fully controlled by dominant coalitions. Instead, emergent interactions among users (in this case, Facebook users) take place, which influence whether and how the knowledge is transformed and exploited. This is also consistent with the unpredictable nature of knowledge, spelled out by scholars who theorize from the practice perspective (Chia, 2003; Feldman and Orlikowski, 2011; Sandberg and Tsoukas, 2011).

In conclusion, we believe that the absorptive capacity construct is appropriate to provide a theoretical lens to clearly identify processes of knowledge exploration and exploitation. We acknowledge that absorptive capacity depicts these processes as being very linear: knowledge exploration, therefore, knowledge exploitation. This might not be what actually happens in organizations when they try to deal with processes of transformation of external knowledge into innovation. For example, the literature on innovation shows that a number of iterations, failures, and lessons learned might be needed (Dougherty and Dunne, 2011). However, we argue that the absorptive capacity construct is useful to graphically represent some knowledge processes that might occur when organizations strive to pursue innovation. Drawing from the Facebook example, we propose a synthesis of these processes in light of absorptive capacity, which are depicted in Figure 17.1.

Figure 17.1 highlights that there are different types of external knowledge and that the knowledge that is identified is likely to be similar to the knowledge that organizations already know (recognition capability); once some specific knowledge is identified as “potential,” the organization needs to (quickly) implement it into existing routines. Firstly, technical implementation occurs (assimilation), and secondly, organizational actors (the “users” of the new knowledge) need to actually adopt the innovation and, we argue, this happens through practice (transformation); practicing the new knowledge might result in the creation of new “working” knowledge which is, eventually, fully exploited (i.e., the new knowledge becomes part of daily routines).

The absorptive capacity construct and, in particular, the tension between potential and realized absorptive capacity is also linked to other knowledge “elements” and metaphors that were discussed previously in this chapter (i.e., the repository view vs. the network view). Therefore, the aim of the next
section is to synthesize the aforementioned and to suggest a comprehensive framework of knowledge that highlights the tension between exploration and exploitation under the umbrella of the epistemology of possession and the epistemology of practice.

### 17.5.6 Combining Potential and Realized Absorptive Capacity: The Mutual Constitution View

It is now clear that both exploration and exploitation processes coexist within a firm. Interpreting knowledge exploration and exploitation with the lens of absorptive capacity also suggests that while potential absorptive capacity can be interpreted with the lens of the epistemology of possession (emphasis on individual decision makers who own knowledge and emphasis on knowledge that is transferrable), realized absorptive capacity is better interpreted with the lens of the epistemology of practice. On the one hand, the epistemology of possession suggests that knowledge is owned by individuals and can be easily transferrable using ICT artifacts such as centralized databases and electronic archives (repository view); this is particularly true for potential absorptive capacity, as per our examples where the processes of knowledge recognition and assimilation were straightforward because syntactic and semantic boundaries can be easily overcome. On the other hand, the epistemology of practice indicates that some knowledge is also embedded in everyday practices; the main consequence is that it might not be sufficient to “store” knowledge in some repository to have it transferred to others. Instead, in this second case (practice perspective), knowledge is equated to practice (Nicolini, 2011) and, therefore, knowledge is transformed through negotiations (pragmatic boundaries) in order for the knowledge to be fully exploited. The network view and the realized absorptive capacity are, therefore, more appropriate concepts to represent these processes.
Table 17.3 synthesizes the earlier theorizing and examples that are collapsed into a comprehensive framework of knowledge that considers epistemologies, views, ways of sharing it, and absorptive capacity capabilities.

From Table 17.3, it emerges that knowledge can be seen both as a possession (knowledge can be “moved about” within and between organizations) and as a practice. This is in line with the mutual constitution view that was illustrated in the first part of this chapter.

Interestingly, the mutual constitution view requires multilevel analyses. The possession view discusses both individual and organizational knowledge. For instance, Nonaka’s (1994) SECI (Socialization, Externalization, Combination, and Internalization) process of knowledge conversion (from tacit to explicit) discusses the individual as well as the organizational level. However, the underlying assumption is that knowledge is “exchanged” among organizational actors (using socialization processes) and, therefore, the very nature of knowledge lies in individuals. The practice view discusses both individual and organizational knowledge. In fact, even if the emphasis is on collective knowledge that originates with practice, individuals can affect knowledge processes (being part of a community of practice, if we adopt the containment view, or being “actors that act in practice” (D’Adderio, 2006) if we adopt the radical view). This is highlighted by concepts such as consequentiality (Feldman and Orlikowski, 2011): An action is considered to be a practice when it is consequential for the development of the activity. Therefore, it is implicitly acknowledged that individuals can “actively” affect practices. Another concept from the practice view that highlights the role of individuals is the “nexus of practices,” which indicates that a link between (individual) actions exists and that some actions might “matter more” than other actions (i.e., power relationships play a role in action). However, although these two examples highlight that the practice epistemology of knowledge considers individuals, the main focus of this epistemology is on collective processes. Thus, even while individuals matter from the practice epistemology, knowledge does not lie in an individual’s mind but rather in their practices, which are always undertaken in conjunction with other actors (whether human and/or material actors). In conclusion, combining the epistemology of possession and the epistemology of practice is helpful for exploring knowledge processes from a multilevel perspective which, in turn, is helpful for fully exploring knowledge management dynamics (Hannah and Lester, 2009).

### 17.6 Future of Knowledge Management

Some have argued that KM is a fad, just like there have been many other fads related to ICT adoption in organizations (Swan et al., 1999). We would argue that while the term KM may not survive, the focus on improving ways to explore and exploit knowledge in organizations will not diminish. Indeed, while traditionally organizations were either designed to maximize efficiency or flexibility (Thompson, 1967), today organizations are exhorted to be “ambidextrous” (Adler et al., 1999; Newell et al., 2003; O’Reilly and Tushman, 2007; Tushman and O’Reilly, 1996). Being ambidextrous requires a focus on both exploitation (to constantly increase efficiency of what the organization is currently doing) and exploration (to increase flexibility through innovating in products, services, or organizational processes). In the past, as we have seen, much KM effort has been on the exploitation aspect, with organizations introducing document management systems, searchable databases, and intranets so that people can more effectively share
and so exploit the knowledge that already exists within an organization. In the future, we anticipate that a similar level of effort will be placed on exploration, using social networking and other multimedia technologies that can help to connect people. Such social network-based online platforms (Facebook-like technologies for use within an organization) that focus on collaboration and cross-fertilization among different business units can help organizations develop informal ways to share information and knowledge to promote innovation. These types of KMS can help to stimulate the development of (virtual) communities of practice that bring together people from different locations, and so take advantage, potentially, of talent that is globally distributed (Dube’ et al., 2006).

It has been demonstrated that innovation leads to long-term competitive advantage and that interactions (i.e., knowledge exchanges) among people with different backgrounds and skills can help to promote innovative and disruptive ideas (Desrochers, 2001; Hanna and Walsh, 2002). Therefore, in the past, a lot of attention was given to organizational design, structuring processes so that departments would communicate at least for specific initiatives, for example, product innovation involving marketing, sales, and R&D, and cross-unit process innovation involving different business units (Hansen and Birkinshaw, 2007; Martin and Eisenhardt, 2010). Moreover, strategic links between organizational actors such as project managers, process managers, product managers, and so on were put in place. Nowadays, organizations are less bureaucratic and more network-based (Borgatti and Foster, 2003; Capaldo, 2007), that is, they do not try and undertake all activities but rather work with other organizations that may be better placed to provide particular types of service, as with outsourced IT service provision. This network will typically be globally distributed and rely heavily on ICT for information and knowledge sharing. Along with dealing with syntactic and semantic boundaries (i.e., different languages and therefore difficulties in communicating to exchange basic information; time change differences; cultural and background differences), overcoming pragmatic boundaries are likely to be the most challenging issue KM (and KMS) face. That is, worldwide dispersed units of a networked organization need to be able to collaborate online and create synergies that are typical of localized communities of practice. While, from a technical point of view, effective online platforms that allow video meetings/conference calls already exist, people are now learning how to use ICT as a substitute for face-to-face relationships. While such virtual relationships can be very seductive (as evidenced by the amount of time people spend on sites such as Facebook and Twitter, as well as in online gaming sites), questions remain about differences between online and face-to-face relationships and their respective impact on our social world.

17.7 Conclusions and Implications

In this chapter, we aimed to provide an overview of knowledge and its exploratory and exploitative nature (What is knowledge?) with respect to two different epistemologies that relate to different approaches to managing knowledge: the epistemology of possession (repository view) and the epistemology of practice (network view). We then highlighted that, today, technology plays a role in supporting knowledge processes (technology for support of KM processes), and we suggested that the absorptive capacity construct could be adopted to highlight knowledge exploration and exploitation processes (knowledge exploration and exploitation).

We concluded arguing that the mutual constitution view (a “generative dance,” Cook and Brown, 1999) is an effective representation of KM processes and can be linked to potential and realized absorptive capacity. Moreover, we noted that adopting a mutual constitution view allows multilevel analysis: Individuals possess knowledge generated by engaging and investing in (collective) practices. Finally, adopting the mutual constitution view of knowledge has implications for technology: For instance, while the possession perspective indicates that data sharing and centralization (e.g., using ERP architectures) has several advantages for creating an organizational memory (Vandaie, 2008), the practice perspective highlights that technology can be fully exploited only if the “users” actually adopt and use IT artifacts in their practices (Feldman and Orlikowski, 2011).
References


