Going Beyond the Resources Given:
A Structurationist View on Knowledge and Strategic Management

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Abstract

Current knowledge-based theories explain firms' competitive advantages through the use of dynamic resources. They cannot, however, explicate how knowledge-based resources are created and why they are reproducible and inimitable at the same time. We present a model of resource usage and creation, which is based on structuration theory, phenomenology and the concept of transactive knowledge systems. The recursive process of the simultaneous creation and use of knowledge-based resources is conceptualized as a process of structuration. We argue that the concept of transactive knowledge systems may account for firm-specific usages of unshared expertise as the basis for competitive advantages as well as for the inimitability of resources.

1 Introduction

Within the resource-based view of the firm it is widely acknowledged that knowledge is the main source of competitive advantages (Conner & Prahalad, 1996; Krogh & Roos, 1996). Correspondingly, the so-called knowledge-based view of the firm is gaining more and more acceptance within the overall framework of resource-based theorizing (cf. Kogut & Zander, 1992; Spender & Grant, 1996). Spender (1994, 1996a) argues from a knowledge-based perspective that organizational knowledge, understood as shared, or collective, tacit knowledge, is crucial for the generation of competitive advantages. The tacitness of knowledge brings about nonmarketability, nonsubstitutability, and inimitability, which are necessary qualities of resources that can provide sustained competitive advantages (Hoops & Postrel, 1999). Collective and tacit organizational knowledge, thus, is seen as the main source of economic rents in knowledge-based theories (Spender, 1994, 1996a; Collis, 1996). But the knowledge-based view of competitive advantages, first, fails to conceptualize the generation of knowledge (Gulati, Nohira, & Zaheer, 2000). Second, it cannot cope with the resources' paradoxical character as, on the one hand, tacit and unique and, on the other hand, reproducible at the same time.

Our paper focuses on a re-conceptualization of the knowledge-based perspective on the sources of competitive advantages. We start from Penrose's (1995) proposition that not resources *per se* but the services generated by the use of these resources account for competitive advantages. Our line of reasoning is based on the structurationist theory of organizations (Giddens, 1984), a phenomenological conceptualization of the emergence and reproduction of knowledge (Schütz, 1982; cf. Duschek, 2001), and the concept of transactive knowledge systems (Brauner, in prep.; Brauner & Becker, 2001, under review). We argue that the generation of knowledge as resource may be seen, first, as part of the process of using

context-free resources in a unique and context-bound way as modalities of structuration. Second, the differentiation between object-level knowledge and metaknowledge, that is knowledge about knowledge, in the concept of transactive knowledge systems provides a more in-depth understanding of the use and generation of knowledge. It is the interplay of unshared expertise and partly shared, or mutual, metaknowledge which can account for the inimitability of knowledge-based resources of competitive advantages.

In the following section of the paper we will, first, demonstrate the knowledge-based view's problems in explaining the origin of knowledge and, thus, of competitive advantages. Then, we will show the paradoxical character of resources. In the last two parts of section 2 we develop a concept of knowledge-based resources and their use based on structuration theory and phenomenology. Section 3 presents our application of the concept of transactive knowledge systems to the use and generation of knowledge-based resources.

2 Knowledge and Sustained Competitive Advantages

2.1 The Unclear Origin of Knowledge

Knowledge-based competitive advantages has initially been analyzed within the framework of Ricardian rents (Peteraf, 1993; Schulze, 1994). The focus of resource-based approaches is on valuable knowledge that is rare, immobile, and nonsubstitutable. Beyond this, Ricardian knowledge-based resources have to be in fixed or inelastic supply in the long run (cf. Varian, 1999) As a result, the sources of Ricardian rents are conceptualized as exogenous to the firm (Spender, 1996b), the origins of competitive advantages cannot be explained within the boundaries of this approach. Resources may only be treated as given; they are “intrinsically heterogeneous factors” (Collis, 1996: 140). The task of strategic management, then, is limited to the *discovery* of nonmarketable, nonsubstitutable, and inimitable knowledge among the

firm's entire stocks of knowledge (Barney, 1986, 1991). The *generation* of (new) knowledge as a source of competitive advantages is beyond its scope.

The concept of Penrose rents, which is favored by the knowledge-based approaches of strategic management, explains competitive advantages with dynamic factors endogenous to the firm. Already in 1959, Penrose (1995, first published 1959) argued that competitive advantages are generated not by resources *per se* but by services, that is by firm-specific uses of resources (Dierickx & Cool, 1989; Mahoney & Pandian, 1992; Teece, Pisano, & Shuen, 1997; Kor & Mahoney, 2000). These unique services are termed, for instance „core competencies" (Prahalad & Hamel, 1990), „core capabilities" (Leonard-Barton, 1992, 1995), „combinatorial capacities" (Kogut & Zander, 1992), „strategic assets" (cf. Amit & Schoemaker, 1993), or „dynamic capabilities" (Teece *et al*., 1997) within the (modern) resource-based and knowledge-based literatures. Achieving competitive advantages, in this view, is an evolutionary process of cumulative growth of knowledge in the specific context of a firm (Penrose, 1995). Hence, this dynamic knowledge-based view is going undoubtedly beyond *„resources given"*. Quite explicitly, it claims to analyze the generation of resources, namely collective knowledge.

But taking a closer look at the literature reveals that the knowledge-based view either is basically taxonomic in character (Spender, 1996a, b; Nonaka & Takeuchi, 1995; see for a critical illustration Tsoukas, 1996) or deals with the process of resource generation rather sketchily (Moran & Goshal, 1999; Tsoukas & Valdimirou, 2001). Thus, Gulati, Nohira, and Zaheer (2000: 207) conclude that even the dynamic knowledge-based view of the firm either takes the resources as given or assumes "that firms 'somehow' develop such resources". The origin of knowledge, that is the value generating process of building knowledge-based competitive advantages, remains unclear as we will explain in more detail in the following section.

2.2 The Paradoxical Character of Resources

The knowledge-based view's difficulties to explain the origin of knowledge as a resource stems from two closely related sources: First, proponents of this view conceptualize the notion of knowledge in a somewhat unclear way (Grant, 1996; Tsoukas & Vladimirou, 2001) and, second, they cannot deal with the resources' paradoxical character (Duschek, 2001; Ortmann & Sydow, 2001). Organizational knowledge and specifically knowledge that may form the basis for competitive advantages is seen as shared, or collective, and tacit knowledge (Penrose, 1959; Spender, 1996a, b; Hoops & Postrel, 1999). The shared and tacit character of knowledge shall account for the causal ambiguity of knowledge as resource (Collis, 1996), that is the unclear causal link between knowledge and competitive advantages (Reed & DeFillippi, 1990). Causal ambiguity is seen as a main barrier to imitation of resources.

This argument raises a main issue about *sustained* competitive advantages as the tacitness and causal ambiguity of resources contain the seed of the self-destruction of competitive advantages (Collis, 1996). On the one hand, the continuance of the existing dynamic patterns of productive activities must be a repeated process (Amit & Shoemaker, 1993). To produce competitive advantages of the firm it has to stretch beyond the boundaries of single strategic business units (Prahald & Hamel, 1990). Furthermore, the unique way of resource usage must be systematically monitored, that is the firm must know that the services can provide a "template for the creation of new patterns or routines" (Krogh & Roos, 1996: 35). The tacitness and causal ambiguity, on the other hand, obstructs the possibility of systematic observation, intended reproduction, and management of resource usage and knowledge because tacitness implies the inability to explicitly reflect on knowledge (Reber, 1993; Polanyi, 1966). Thus, there is a paradox in the knowledge-based view's conceptualization of unique resources as basis for sustained competitive advantages: The uniqueness implies opacity and tacitness of knowledge, the sustained character requires (at

least partial) transparency and explicitness to allow for the reproduction of the resource, that is knowledge (Duschek, 2001).

In our view, there are two aspect of the knowledge-based view's conceptualizations of knowledge which are debatable in this context. First, though proponents of the knowledge-based view in part acknowledge the importance of individual and unshared expertise they insist that, to be useful in terms of a firm-specific advantages, this knowledge has to be shared. But the idea that only shared knowledge may be strategically valuable contradicts the fact that it is often unshared knowledge derived from the division of labor and expertise which accounts for firms' success (Hayek, 1945; Crozier & Friedberg, 1980; Tsoukas, 1996).

Second, the knowledge-based view usually sees the organization as the entity which generates, stores and uses knowledge (Nelson & Winter, 1982; Nonaka & Takeuchi, 1995; Spender, 1996c). This view obscures how knowledge is linked to action. It cannot account for the organizational processes through which individual actors utilize this strategically significant knowledge in their action (Grant, 1996; Tsoukas & Vladimirou, 2001). Even if the individual's knowledge and influence is explicitly acknowledged, as for instance, by Spender (1996a), organizational knowledge is conceptualized in a Durkheimian (1982) way as social fact, that is, it is assumed that its functioning is detached from the individuals' use of it (cf. Baer, 1998). Such an understanding of organizational processes and organizational stocks of knowledge exhibits reifying and deterministic tendencies and is, thus, at odds with Penrose's (1995) concept of organizational resource usage: Conceptualizing resources as produced and reproduced in the process of resource usage affords a notion of active, reflexive, and knowledgeable agents. In the following sections we will propose a reconceptualization of Penrose's concept of services based on structuration theory (Giddens, 1984) and phenomenology (Schütz, 1982).

2.3 Resources and the Duality of Structure

Penrose (1995) argues that it is not the resources themselves but the services derived from the use of the resources which account for a firm's specific competitive advantage. She defines resources as a bundle of potential services that is mostly independent from their use, while services may only be described referring to the underlying resources: services generated by resources are a function of the way the resources are used. Thus, Penrose (1995) conceptualizes resources as context-free, or generalizable, and services as the context-bound use of these context-free resources. The essential value-generating process of resource usage is characterized by the interplay of context-free resources and context-specific processes, or, more specifically, by the context-specific use of context-free resources in organizational practices performed by knowledgeable organizational actors. Neither Penrose (1995), nor other proponents of the resource-based and knowledge-based views of the firm deal with this process in detail. Recent contributions usually do not recognize the constitutive role of context-independent resources in the value-generating process, or they do not acknowledge their fundamental contribution to an understanding of dynamic capabilities (cf. Spender, 1996a).

This recursive relationship between resources and resource usage, or services, may be conceptualized within the concept of duality of structure, which forms the core of the theory of structuration (Giddens, 1984). In structuration theory, structure is understood as rules and resources recursively implied in social practices. Agents draw on sets of rules and resources, that is they use “generalizable procedures” (Giddens, 1984) in social practices, and reproduce them simultaneously. Rules and resources are generalizable because they may be applied over a range of contexts, and they are procedures because they allow for the methodical continuity of interaction. Structure exists only in memory traces, or agents' stocks of knowledge, and as instantiated in action. It is medium and outcome of action and has not only constraining but

also enabling features. Resources in the sense of Penrose (1995) may thus be seen as exhibiting structural properties. They are context-free means of action applied by knowledgeable organizational agents in performing context-specific services. In the process of use they are in the same stance reproduced.

The conceptual link between structure and action in structuration theory is provided by the concept of modalities of structuration (Giddens, 1984). This concept denotes the mediation between context free structural properties of social systems - rules of signification and legitimation, and resources of domination - and the corresponding context-bound aspects of interaction, communication, sanctioning, and power (see Figure S1). This mediation is called structuration. In structuration theory, resources are understood as means of action used for the control of people (authoritative resources) or material objects (allocative resources; Giddens, 1984). In this view, knowledge as well as technologies, physical artifacts, or money may count as resources. Resources may be intangible or tangible. The context-free resources are drawn upon in specific contexts by knowledgeable agents and are, thus, constituted as modalities of structuration. We will discuss this process in more detail, because this is necessary to understand the process of resource generation, particularly the generation of knowledge as resource. Although in principle all three dimensions depicted in Figure 1 are involved, we concentrate mainly on the dimension of signification, communication, and interpretative schemes because the recursively connected processes of knowledge generation and knowledge use may best be spelled out along these lines. Moreover, it allows us to refer to some insights of phenomenological sociology, which are helpful to elucidate the rather vague concept of modalities (Giddens, 1984; cf. Duschek, 2001).

FIGURE 1 ABOUT HERE

2.4 The Use and Generation of Resources: A Structurationist View on Knowledge

Interpretative schemes are at the core of mutual knowledge, through which a universe of shared meaning is produced and sustained in interaction (Giddens, 1984). They are typifications included in actor's stocks of knowledge and applied reflexively in interaction and communication. Mutual knowledge, therefore, is fundamental to any interaction. But, contrary to Spender's (1996a) view cited above, interpretative schemes and mutual knowledge are not social facts in the Durkheimian (1982) sense because they may not be detached from individual knowledge. Agents are depicted as knowledgeable, actively interpreting their own actions and the actions of others against shared interpretative schemes and their idiosyncratic unshared knowledge. The interpretative schemes are, on the one hand, context-free schemes of interpretation, explanation and expression which are contextualized through interaction (Schütz & Luckmann, 1991). Applying mutual and individual interpretative schemes in action, on the other hand, lead to the development and change of actors' frames of reference ("Bezugsrahmen"; Schütz, 1974). These frames of reference encompass actors' cognitive schemes against which actual experiences are interpreted. A frame of reference is not merely an individual construct but also socially constructed because the interpretative schemes are, as elements of social structures, shared among many individuals. Schütz (1982) describes the process of the constitution of knowledge as a process of fulfilling and supplementing ("Erfüllung") partly empty forms like fitting in pieces into a jigsaw puzzles. This can be done individually or collectively. The integration or interpretation of experience into typified schemes is, thus, system-specific and individual at the same time.

Knowledge as resource encompasses expertise and skills in utilizing tangible and intangible resources. For instance, superior performance in product development may be based on expertise in engineering and science and on skills in constructing prototypes. These tangible and intangible resources are used in organizational processes through contextualizing

them in interaction. Expertise and skills are applied and reproduced in specific contexts, for instance, in the development of automobiles in a company. But the same resources applied in the same manner in the context of another automobile company or a automobile company in another country may fail to generate superior performance and thus may be not reproduced as resources. That means, resources *per se* as *potential* means of action (cf. Penrose, 1995) are drawn upon *as resources* by knowledgeable organizational actors in the course of resource usage in specific contexts. Knowledge as well as other resources are constituted in the same process of fulfilling and supplementing context-free modes of resource usage. Moreover, all knowledge is knowledge about resources. That is to say, the development of knowledge is tied to its application to processes of resource usage.

Rather than solely referring to mutual, or shared, knowledge we have to acknowledge that organizational processes in general, and processes of resource use in particular, are based on shared as well as unshared knowledge. There are different levels of expertise in an organization. They may be characterized by James' (1950) distinction between "knowledge of acquaintance" and "knowledge about"; Schütz (1971, Vol. 1) speaks about different levels of specificity ("Bestimmtheitsgrade") of knowledge. Some organizational actors or small groups may possess idiosyncratic expertise in a certain area not shared by others. Collective organizational action, the collective use of resources is achieved via the interplay of unshared expertise and mutual knowledge. Thus, to adequately conceptualize knowledge as resource we will have to take a more in-depth view on shared and unshared knowledge.

3 Resources, Practices, and Transactive Knowledge Systems

3.1 Resources, Knowledge, and Metaknowledge

Organizations or firms, as social systems, may be understood as patterns of reproduced social practices (Giddens, 1984). As these social practices are brought forth by knowledgeable agents it is only those agents who may have knowledge; organizations cannot "know" anything. Referring to cognitive psychology knowledge may be defined as propositions about properties ascribed to objects (Klix, 1988). These may take the form of cognitive schemes about objects or scripts about procedures. This roughly equals the phenomenological and structurationist concept of interpretative schemes. Knowledge is an individual construct derived from experience or inferences (Seel, 1991). It is the result of absorbing, processing, and storing information in individual memory. Knowledge may be seen as contextualized information (cf. Brauner & Becker, under review).

To comprehensively describe the involvement of knowledge in the constitution of resources we have to introduce two distinctions of types of knowledge: declarative vs. procedural knowledge and object-level knowledge vs. metaknowledge (for an overview see Table 1). The declarative/procedural distinction relates to the distinction between "knowing that" and "knowing how" (Ryle, 1969). Declarative knowledge is knowledge a person has about the things, people, and ideas, and procedural knowledge is knowledge about procedures (Anderson, 1995). It is only the interplay of declarative and procedural knowledge which enables an actor to perform tasks. To develop a strategic plan, for example, a planner on the one hand must have declarative knowledge about the required data like market structures or cost figures etc. On the other hand, he or she must have procedural knowledge about planning procedures, that is knowledge about how to combine the items of declarative knowledge.

TABLE 1 ABOUT HERE

The second important distinction refers to (object-level) knowledge and metaknowledge. Metaknowledge may be defined as a person's knowledge about his or her knowledge (Nelson, 1999). Both knowledge and metaknowledge may be declarative or procedural knowledge. Analogous to the distinction of declarative and procedural object-level knowledge depicted above, declarative metaknowledge refers to knowledge about separate items of knowledge while procedural metaknowledge refers to cognitive procedures. Declarative metaknowledge comprises, first, knowledge about the content and quality of knowledge and, second, about the location of knowledge, that is who knows what or where are certain items of knowledge stored. Procedural metaknowledge may be viewed as, first, knowledge about strategies for the acquisition of knowledge and, second, knowledge about strategies for the evaluation of knowledge (Brauner, in prep.; Brauner & Becker, under review).

In performing social practices, organizational actors in reflexively monitoring and controlling their action not only draw on knowledge, as discussed in sections 2.3 and 2.4 above, but also on metaknowledge. For example, in every interaction an actor employs knowledge about what the other normally would know, that is he or she draws on a typified concept of the other which clearly contains (typified) metaknowledge about the knowledge of others. That is to say, any typification is rooted in declarative metaknowledge. In the same stance the actor monitors the process of interaction for correspondence with his or her typified script of interaction, that is he or she uses strategies to evaluate his or her own knowledge and to acquire new knowledge. Actors, thus, also use procedural metaknowledge in every act of maintaining interaction. The act of fulfilling and supplementing interpretative schemes of sequences of interaction (Schütz, 1982) is inseparably tied up with the application of declarative and procedural metaknowledge.

3.2 Transactive Knowledge Systems and Organizational Knowledge

The performance of social practices is based on, and at the same time brings forth, systems of knowledge and metaknowledge. Brauner (in prep.; cf. Brauner & Becker, 2001, under review) calls these systems transactive knowledge systems. This concept is derived from Wegner's (1987, 1995) concept of transactive memory. The latter was originally developed to describe the distribution of knowledge and the creation of knowledge about other people's knowledge in close relationships like couples. It has been transferred to groups (Moreland, Argote, & Krishnan, 1996, 1998), work groups in organizations (Moreland, 1999), and to organizations (Anand, Manz, & Glick, 1998).

Figure 2 depicts a simplified model of Wegner's computer model of a transactive memory (Wegner, 1995). Each person possesses, first, a memory that contains object-level knowledge about the things, people, and ideas. Second, each person has a directory of his or her own knowledge, that is metaknowledge about the own knowledge. Third, there is a directory about the knowledge of the other person which contains metaknowledge about person B's knowledge. These stocks of metaknowledge come into being through interaction. In interaction people not only acquire object-level knowledge about, for instance, their own tasks but also metaknowledge about what their coworkers know and about the quality of their knowledge. Although Wegner (1987, 1995) does not distinguish between declarative and procedural metaknowledge he seems only to refer to declarative metaknowledge, that is knowledge about the location and quality of knowledge.

FIGURE 2 ABOUT HERE

Brauner's (in prep.) model of transactive knowledge systems emphasizes knowledge rather than memory as in the transactive memory model. Additionally, she explicitly refers to

the distinction between declarative and procedural metaknowledge. Hence, in interaction people acquire knowledge about what their partners know and how useful their knowledge is (declarative metaknowledge). Furthermore, people actively employ strategies of knowledge acquisition and knowledge evaluation, that is they use procedural metaknowledge. In budgeting, for instance, accountants make use of planning schedules and reporting forms to regulate the flow of data from the operating departments or employ different forms of strategic interaction in meetings to test the validity of information (Ahrens, 1999; Brauner & Becker, under review).

The transactive knowledge systems people bring forth in groups and organizations contain the knowledge and metaknowledge available within these social systems. Transactive knowledge systems form the basis of the social integration of unshared stocks of expertise. It is accomplished through metaknowledge. Unshared expertise may be accessed and thus organizationally used because organizational actors know that certain individuals have specialized expertise without having the expertise themselves. Some experts' knowledge on taxation, for instance, may be organizationally utilized because the experts are known to be experts on taxation. As a consequence, accountants do not have to be specialists on taxation but they have to know where in the organization the required expertise is located and whether it is reliable. Referring to Schütz (1971, Vol. 1) and Schütz & Luckmann (1991), there are different levels of specificity of knowledge on taxation. A high degree of mutual, or complementary, metaknowledge denotes a well-developed transactive knowledge system. The development of transactive knowledge systems is accomplished in part quasi-automatically and in part through the application of procedural metaknowledge, that is through strategies for knowledge acquisition and evaluation.

Depending on the level of analysis it may not be useful to treat the whole organization, especially a large one, as a single transactive knowledge system. Instead, we may have to distinguish several transactive knowledge systems in the organizations. These may comprise,

for example, departments or project groups. The differentiation of transactive knowledge systems, on the one hand, depends on the focus of the analysis and, on the other hand, on the intensity of interaction between actors and groups of actors. Hence, within a research and development department there may evolve different transactive knowledge systems around different projects even if there is no corresponding formal structure. An organization may then be described as a network of interrelated transactive knowledge systems (cf. Figure 3). The connection between them is mainly based on declarative metaknowledge, that is on actors' knowledge about the expertise located in other transactive knowledge systems. The integration of transactive knowledge systems and thus the accessibility of unshared expertise from different transactive knowledge systems are dependent on the amount of mutual metaknowledge between transactive knowledge systems.

FIGURE 3 ABOUT HERE

The concept of transactive knowledge systems allows for a conceptualization of organizational knowledge that does not assume organizational knowledge to be necessarily shared knowledge. We may define organizational knowledge as individual knowledge socially embedded in organizational transactive knowledge systems (cf. Brauner und Becker, under review). Idiosyncratic unshared stocks of individual knowledge are interconnected through at least partially mutual metaknowledge or one-sided metaknowledge. Shared, or mutual, knowledge, however, is essential for the genesis and functioning of transactive knowledge systems, respectively organizations. For instance, shared knowledge about language and organizational culture are required to enable communication and interaction.

3.3 Transactive Knowledge Systems and the Constitution of Resources

Potential means of action are constituted as resources, as stated above, through their use in social practice. Based on the concept of transactive knowledge systems we can draw a more elaborate picture of the role knowledge plays in the constitution of resources than both the knowledge-based view and structuration theory do. The use of resources is based on, and brings forth, knowledge and metaknowledge. Thus, both object-level and metaknowledge figure as resources. Declarative (object-level) knowledge comprises expertise of organizational actors and their knowledge about resources other than knowledge or information, for instance a certain technology. Procedural knowledge as resource, correspondingly, encompasses skills and knowledge about the use of these resources. Declarative and procedural metaknowledge may figure as resources, too (cf. Table 2).

TABLE 2 ABOUT HERE

Organizational actors must have knowledge about context-free resources (declarative object-level and metaknowledge) as well as knowledge about the modes of resource usages (procedural object-level knowledge) to actually use them to create value-generating services. Only if knowledge about resources - material objects, technologies, skills, and expertise - is socially embedded in transactive knowledge systems it is organizationally accessible. Declarative metaknowledge about the expertise and skills available in the organization, and about who knows what about material resources and technologies is required. A web of declarative metaknowledge connects stocks of knowledge and competencies. Procedural metaknowledge enables organizational actors to systematically acquire knowledge and metaknowledge about the distribution and quality of knowledge. A high degree of differentiation and interconnectedness of the organizational transactive knowledge systems is

likely to provide a dense web of metaknowledge and thus a high degree of accessability to expertise.

Connecting structuration theory (Giddens, 1984) and the concept of transactive knowledge systems (Brauner, in prep.) may provide an explanation for the actual usage of resources and for the emergence of new resources or new modes of resource usage. Transactive knowledge systems, on the one hand, account for the capacity of an organization to mobilize idiosyncratic expertise without sharing it (and, thus, without exceeding the cognitive capacities of individuals; cf. Simon, 1951) through the interplay of mostly unshared expertise and at least partially shared, or mutual, metaknowledge. Structuration theory, on the other hand, describes the mechanism of the constitution of resources in organizational practice performed by knowledgeable agents drawing on knowledge and metaknowledge. During use and reproduction of resources through practices transactive knowledge systems are simultaneously reproduced.

A change of organizational competencies through a change of resources and resource usage may also be explained. On the one hand, reproduction as understood by structuration theory implies change as the execution of practices slightly varies from situation to situation (Giddens, 1976). Thus, some change in resources and resource usage should necessarily occur. On the other hand, metaknowledge allows actors to integrate formerly not related or completely new items of knowledge. Metaknowledge enables actors to know that there are possibly compatible stocks of knowledge in different parts of the organization, that is it contains knowledge about the location and quality of knowledge. Furthermore, as transactive knowledge systems, like social systems, may cross the formal boundary of an organization, metaknowledge enables organizational actors to bring in information from outside the organization.

3.4 Barriers To Imitation of Resources

Our approach may also shed new light on barriers to imitation of resources as explanation of competitive advantages (cf. Reed & DeFillippi, 1990). As argued above, the concepts of causal ambiguity and social complexity, which shall account for the inimitability of a firm's resources, lack clarity. Against the backdrop of structuration theory and the concept of transactive knowledge systems we can propose a viable explanation of the idiosyncratic character of a firm's constellation of resources and resource usages. Resources are constituted as (valuable) resources in organizational practice. This organizational practice is highly idiosyncratic as it depends on distinct sets of interactions and institutionalizations. The resources may, therefore, not be separated from the modalities of their use in a specific organization and under specific temporal and spatial circumstances.

Moreover, the usage of resources is based on particular constellations of knowledge and metaknowledge in an organizational network of transactive knowledge systems. As these transactive knowledge systems emerge historically in interaction they may, as they are the layer of knowledge in social systems, not be separated from the idiosyncratic organizational practice of resource usage and constitution described above. To conclude, the inimitability of resources understood as prerequisite of competitive advantages is inseparably tied to an organization's transactive knowledge systems, patterns of practices, and thus history. This is the real barrier to imitation.

4 Conclusions

Competitive advantages do not stem from resources *per se* but from services (Penrose, 1995), that is from modes of resource usage. In the same stance, resources are produced and reproduced in the processes of their use. Accordingly, knowledge as a resource is not a source

of competitive advantages in its own right, but only through its use in organizational value-generating practices. In this paper, we described the use and generation of knowledge through organizational practices. Referring to structuration theory (Giddens, 1984) and phenomenological sociology (Schütz, 1971, Vol. 1, 1982), we re-conceptualized and clarified Penrose's (1995) concept and thus were able to spell out the process of knowledge use and knowledge generation in applying resources. Integrating the structurationist approach with the concept of transactive knowledge systems (Brauner, in prep.) allows for a further elaboration of the processes of use and generation of knowledge. This contributes to a further clarification of the concept of organizational knowledge. Specifically, the differentiation between object-level knowledge and metaknowledge enables us to, first, explain organizations' access to unshared expertise in value-generating activities. Second, the use of metaknowledge provides an explanation for the development and change of knowledge.

Our conception has three significant implications for the knowledge-based perspective on competitive advantages. First, it directs attention to the constitutive role of knowledgeable agents in creating competitive advantages. Transactive knowledge systems, knowledge-based resources, and modes of resource usage, that is services, are recursively produced and reproduced through interaction. As a consequence, the role of the social organization of knowledge and knowledge management in organizations is emphasized against the dominating technocratic orientation (cf. Brauner & Becker, under review). Second, our approach allows for a consistent conceptualization of the inimitability of resources. We may elucidate the knowledge base of a current pattern of resource usage in an organization and at the same time explain why it is not imitable: It is a firm-specific mode of resource usage which is based on idiosyncratic patterns of interaction and on idiosyncratic transactive knowledge systems which, by definition, may not be copied. We can thus avoid the pitfalls of the conceptual retreat into a self-destructing and opaque conceptualization of valuable knowledge as tacit and collective, and therefore reflexively inaccessible.

Third, the highly context-specific character of transactive knowledge systems and resource usage has severe consequences for theorizing about competitive advantages through (the use of) knowledge. In our view, it is not possible to provide a formula for developing "good" transactive knowledge systems, metaknowledge and knowledge. Ironically, the same phenomenon that allows us to explain the inimitability of resources as sources for competitive advantages hinders us to give straightforward directions for "correct" development of value-generating resources and services.

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Table 1. Declarative and procedural knowledge and metaknowledge.

	Object-level knowledge Propositions about properties of objects	**Metaknowledge** Knowledge about knowledge
declarative	• Knowing that • Knowledge about objects like things, rules • Areas of expertise	• Knowing that • Knowledge about location and quality of knowledge • Knowledge about areas of expertise
procedural	• Knowing how • Knowledge about the usage of objects like things, rules • Procedural expertise	• Knowing how • Knowledge about strategies of knowledge acquisition and knowledge evaluation • Competencies for the acquisition of (meta-) knowledge

Table 2. Knowledge and metaknowledge in organizational resources.

		Knowledge and metaknowledge as resources
Object-level knowledge	**declarative**	• Knowledge about resources • Expertise • Knowing that
	procedural	• Knowledge about use of resources • Procedures, skills • Knowing how
Metaknowledge	**declarative**	• Knowledge about distribution and quality of knowledge
	procedural	• Knowledge about strategies of knowledge acquisition and evaluation

Figure 1. Duality of structure (Duschek, 2001; from Giddens, 1984, modified).

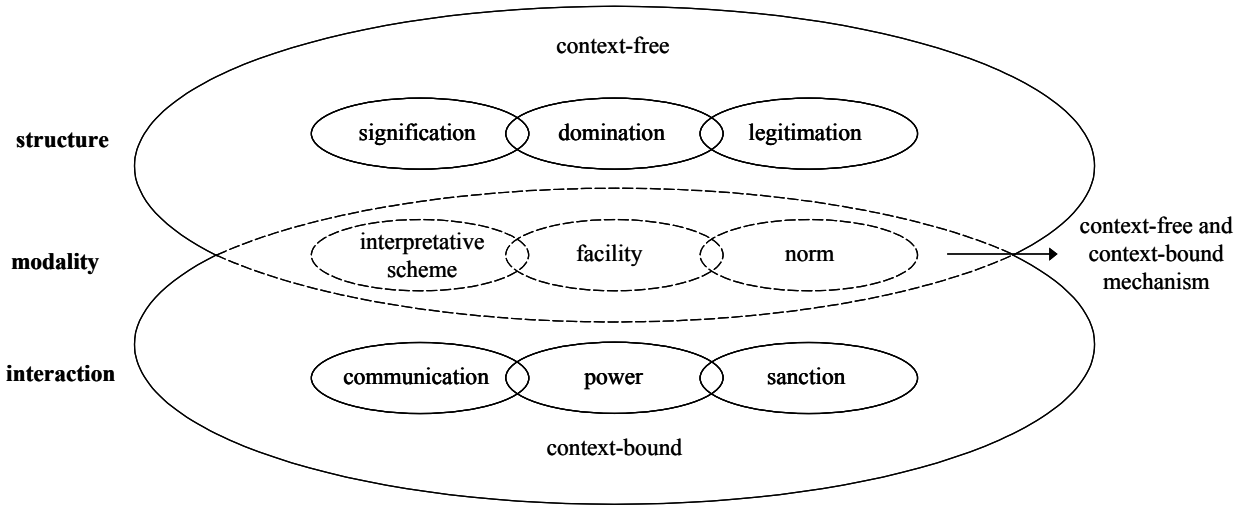

Figure 2. Wegner's (1995) model of transactive memory (modified).

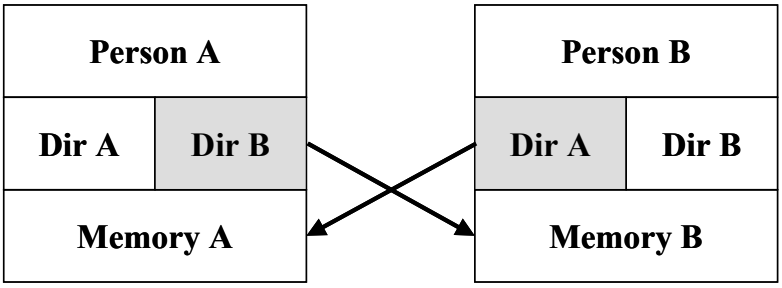

Figure 3. Interconnections of transactive knowledge systems in an organization (Brauner & Becker, under review).