TOWARDS A SIMULATION MODEL OF PARTNER-SPECIFIC
ABSORPTIVE CAPACITY AS A PATH DEPENDENT SELF-REINFORCING
MECHANISM IN B2B RELATIONSHIPS

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KEYWORDS
Path dependence, self-reinforcing mechanism, lock-in, partner-specific absorptive capacity, business-to-business relationships, modeling

ABSTRACT
This study explores the influence of partner-specific absorptive capacity as a self-reinforcing mechanism in the context of the theory of path dependence. For this purpose, theoretical foundations of path dependence and absorptive capacity are reviewed. Following, a path model of partner-specific absorptive capacity for business-to-business relationships is developed. While this paper concentrates on the theoretical foundations of an integrated path model for partner-specific absorptive capacity, the results can be used as a starting point for simulation research in the future. In that sense, this paper shows an early stage simulation research project.

INTRODUCTION
A better understanding of the phenomenon of path-dependent processes is in the interests of academia and real-world practice (Sydow et al. 2009). Efforts to concretize the theory of path dependence have motivated various research approaches since the theory first originated about thirty years ago. In the process, vivid examples have been presented so far, and different attempts have been made to arrive at a general definition.

A promising development is also apparent in the concept of absorptive capacity. The relevant literature on the ability to absorb knowledge repeatedly points to this construct’s path-dependent character, but does not examine it in further detail. This reveals an exciting and largely unresearched overlap between the two concepts, an area that requires more in-depth analysis (e.g. Mallach 2012). Although many scholars argue that the concepts of path dependence and absorptive capacity are somehow linked, an integrated model that combines the prominent features of both processes has yet not been developed.

To be able to observe knowledge transfer from one organization to the other, the business-to-business marketing context is an interesting area for our investigation. Business relationships between buying and selling firms can be generally defined as a non-accidental sequence of market transactions between independent market actors (Kleinaltenkamp and Ehret 2006).

Restricting business relationships between a selling and a buying firm solely to the exchange of market transactions does however seem shortsighted. Often, information sharing plays a central role in market transactions. This includes areas as knowledge of technical details or knowledge about reciprocal net benefits (Brennan et al. 2007). In many cases know-how related to problem solving is also exchanged within the dyadic partnerships (Kleinaltenkamp 1997).

For Van den Bosch et al. (1999) flows of knowledge with regard to products, services, production processes, and market characteristics are important. In addition, Von Hippel (1988) found that knowledge transfer between customers and providers is an outstanding source for innovative ideas. Moreover, Plinke (2000) emphasizes that information sharing enables the supplier to create superior products and/or services for its customers. In the dyadic business relationship, the partners’ ability to absorb and share new knowledge is the main driver in learning processes. Furthermore, partners can leverage what they have learned to identify ways to improve the quality, reliability, and speed of knowledge transfer in the future (Chen et al. 2009).

Also, inter-organizational learning has a positive effect on the performance of those involved (Gulati and Sytch 2007) while also allowing them to remain competitive (Dyer and Nobeoka 2000).

The ability of business firms to absorb and process external knowledge from its partner is therefore of great importance. We argue that a partner-specific capacity is crucial for these processes. Understanding how mechanisms of absorptive capacity work and how these mechanisms are connected to path dependence is at the heart of this paper. We will build a theoretical model that can be used for formal modeling and simulation research in the future.

The remainder of the paper is structured as follows: In Section 2, we present the theoretical framework by reviewing the literature on path dependence and absorptive capacity. Then we show the connection
between path dependence and absorptive capacity. In Sections 3, we develop a path model of partner-specific absorptive capacity in business-to-business relationships. The last section discusses results and future research directions towards formal modeling and simulation research.

LITERATURE REVIEW

Path Dependence Theory: How History Determines Our Future

The notion of path dependence basically highlights a historical process: initial decisions increasingly restrain present and future choices thereby challenging the a-historical rational choice view. David (1985) initiated the discussion on path dependence from an economic perspective. Within his historical studies he explored the puzzling persistence of the QWERTY keyboard technology and tried to answer the question why an inferior standard was maintained although superior technological innovations were available at different points in time. His exploration surfaced underlying self-reinforcing processes which increasingly rigidified the technological standard (David 1985). Arthur (1989) has formalized the theory of path-dependent processes highlighting the critical role of increasing returns.

In conclusion path dependence has been described as self-reinforcing processes characterized by non-predictability, nonergodicity, inflexibility, and potential inefficiency (Arthur 1989; David 2001; Pierson 2000). More precisely, path dependence is not predictable at the beginning; various alternatives are possible. At a later stage due to self-reinforcing effects the scope of action increasingly narrows and finally leads into a dysfunctional trap, inhibiting the organization to deviate from it. Accordingly, the state of path dependence can be conceptualized as the outcome of a dynamic process that is driven by at least one self-reinforcing mechanism. It proved useful to differentiate this process into three distinct phases for characterizing the sequence of varying regimes: preformation phase, formation phase, and lock-in phase (Sydow et al. 2009). Figure 1 illustrates all three stages.

Over time a path constitutes a restriction of choice for a decision-making system. While choice is not restricted at the beginning, the situation gets more and more restricted in the process, the emerging solution at the critical juncture amounts to a path which increasingly binds subsequent decision making. To put it differently, the emergent solution gets reproduced again and again; when other solutions become unavailable the system state is called lock-in. Different regimes characterize the three phases:

Phase I is characterized by contingency and choice is unrestricted. Nonetheless, foregoing developments may have a slight narrowing impact, illustrating that history always matters (Teece et al. 1997; David 1994). Often a small event favours one of the possible solutions. If this solution enjoys positive feedback, a self-reinforcing dynamic may take place.

In phase II, these self-reinforcing mechanisms increasingly limit the scope of choice and thereby facilitate the evolvement of an organizational path (Sydow et al. 2009; Stieglitz and Heine 2007; North 1990). In this context Arthur (1996) highlights the importance of increasing returns. Agents get (consciously or unconsciously) involved in a logic of repetition; they earn increasing returns through repetition as it is the case for example with economies of scale or network externalities. In a way they enjoy a rave of feedback and by doing so they unintentionally commit to path-building. The diminishing variety and the rising limitations of choices are collateral side effects of this process (Sydow et al. 2009).

With transition to phase III, the diminishing window of opportunity finally closes, leaving the organization strategically trapped in an unalterable state. The decision makers in the system are locked-in (Sydow et al. 2009). Empirical path dependence research has hallmarkd the crucial elements that drive path emerging processes and finally lead to a potentially inefficient lock-in situation in phase III. At least four major types of self-reinforcing mechanisms can be distinguished: (1) coordination effects, (2) complementary effects, (3) learning effects, and (4) adaptive expectation effects (Sydow et al. 2009).

Since we are interested in path-dependent mechanisms in business-to-business relationships, we will concentrate on learning in and between organizations. Beyond, we aim to connect the often discussed and cited concept of absorptive capacity to path dependence theory.

Absorptive Capacity: Status Quo of the Seminal Conceptualizations

The transfer of knowledge is one of the main research areas in organizational learning and knowledge management (Easterby-Smith et al. 2008). Within this field the concept of absorptive capacity has gained wide attention describing the capability to incorporate and process valuable information (Cohen and Levinthal 1990). This capability is crucial for many organizations
in order maintain a high level of performance (Inkpen and Dinur 1998; Lane et al. 2006). Also a purposeful use of knowledge facilitates to achieve competitive advantages (Inkpen and Dinur 1998). For these reasons Lane et al. (2006) argue that the concept of absorptive capacity is “one of the most important constructs to emerge in organizational research in recent decades” (Lane et al. 2006: 833).

Regarding to Van den Bosch et al. (2003) absorptive capacity is a versatile concept, which can be applied to different theoretical and empirical problems and disciplines. The concept has been widely applied on different levels of analysis such as the organizational level (Cohen and Levinthal 1990; Boynton et al. 1994; Szulanski 1996; Veugelers 1997; Kim 1998), the inter-organizational level (Lane and Lubatkin 1998; Dyer and Singh 1998) and even the country level (Mowery and Oxley 1995; Keller 1996; Liu and White 1997). As our literature review reveals only little research has so far focused on the inter-organizational perspective. As one of the few authors in this field Lane and Lubatkin (1998) show that relatively similar knowledge bases and knowledge management systems within a dyadic alliance have a positive impact on the absorptive capacity of the partners. They should therefore be considered as important characteristics in inter-organizational learning.

We will proceed with summarizing the classical concept of absorptive capacity brought forward by Cohen and Levinthal (1990) as well as recent reconceptualizations with specific emphasis on inter-organizational and partner-specific absorptive capacity.

The Cohen and Levinthal (1990) model of absorptive capacity

A widely acknowledged definition of absorptive capacity was introduced by Cohen and Levinthal (1990). In their study, the authors examine businesses’ ability to innovate and define absorptive capacity as “an ability to recognize the value of new information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal 1990: 128). Under this definition, absorptive capacity can be thought of as the ability to absorb new knowledge and is characterized by three key elements: (1) recognizing and assessing valuable new information, (2) assimilation of information classified as useful, and (3) use of this information for commercial purposes. The authors also point out that absorptive capacity arguably arises as a byproduct of a firm’s R&D investments (Cohen and Levinthal 1989; Cohen and Levinthal 1990; Cohen and Levinthal 1994).

Cohen and Levinthal (1990) also emphasize that the development of absorptive capacity depends on the amount of knowledge absorbed beforehand. In this context, the compatibility of old and new knowledge is important. Accordingly, absorptive capacity does not develop without any preconditions; instead, it is informed by earlier decisions. In addition, the formation of expectations and the behavior during future periods are also affected by historical developments. Figure 2 summarizes the Cohen and Levinthal (1990) model of absorptive capacity.

![Figure 2: Model of Absorptive Capacity According to Cohen and Levinthal (1990)](image)

In a later study, Cohen and Levinthal (1994) redefine absorptive capacity as a cluster of related abilities: “The capacity to ‘exploit’ outside knowledge is comprised of the set of closely related abilities to evaluate the technological and commercial potential of knowledge in a particular domain, assimilate it, and apply it to commercial ends. These abilities collectively constitute what we have termed a firm’s ‘absorptive capacity’” (Cohen and Levinthal 1994: 227).

The Zahra and George (2002) model of absorptive capacity

Zahra and George (2002) reconceptualize the construct of absorptive capacity as a dynamic capability (for a detailed discussion, see Teece et al. 1997), thereby defining the ability to absorb knowledge as a “set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability” (Zahra and George 2002: 186). The authors consequently assume that the abilities to acquire, assimilate, transform, and exploit knowledge build on one another and have a positive impact on the development of further capabilities. Table 1 defines the critical abilities within the scope of absorptive capacity.
Hence, Jansen et al. (2005) show empirically that a model based on these four separate factors is superior to models with fewer factors. In line with this conclusion, Todorova and Durisin (2007) recommend that researchers should choose models with four factors in future studies in order to use variables with high construct validity when testing their hypotheses.

The Todorova and Durisin (2007) model of absorptive capacity

Todorova and Durisin (2007) call for a systematic return to the key elements identified in the seminal article by Cohen and Levinthal (1990). First, they emphasize that ‘recognize the value’ should be seen as a central element. This component seems especially important as businesses often fail simply by not recognizing potentially relevant knowledge. Accordingly, new information is not grasped automatically. Rather, appreciation of new information is shaped in advance by existing structures. Consequently, absorptive capacity can be thought of as a necessary prerequisite for recognizing relevant new information.

Second, transformation of new information should be understood as an alternative process to assimilation and not as a process step following assimilation. Todorova and Durisin (2007) assume that external knowledge moves back and forth in a two-way process between the elements of assimilation and transformation before it can be successfully adopted and exploited within existing structures. In making this case, the authors draw on findings from learning theory: If external information is already largely in line with cognitive structures, new knowledge requires only minor changes before it is integrated into the knowledge base (assimilation). If there is no connection between the cognitive structures, those structures first have to be transformed in order to absorb new knowledge.

In their model the two-way process of assimilation and transformation is formulated in the sense that external information can be absorbed even though it has no connection with the prior cognitive structures. For this to happen, however, the organization has to adapt its knowledge structures in the process. This is in line with Cohen and Levinthal’s original model, in which absorption of new information depends on the amount or level of knowledge that has previously been absorbed. Finally, Todorova and Durisin incorporate positive feedback loops into their model, highlighting the dynamic character. This gives the largely one-dimensional model strength and mobility. At the same time, the authors point to feedback loops as a way of expanding the knowledge base during future periods. Figure 3 shows the dynamic model of absorptive capacity according to Todorova and Durisin (2007).

Figure 3: Model of Absorptive Capacity According to Todorova and Durisin (2007)

The Connection Between Absorptive Capacity and Path Dependence Theory

Lane et al. (2006) emphasize that the possibilities of the concept of absorptive capacity have not yet been fully exhausted and the concept still offers lots of potential for further research. This section aims to examine the connection between partner-specific absorptive capacity and the theory of path dependence.

As early as in their seminal article on absorptive capacity, Cohen and Levinthal point to the path-dependent character of this concept: “[...] the development of absorptive capacity, and, in turn, innovative performance are history- or path-dependent” (Cohen and Levinthal 1990: 128). The authors state that the path-dependent development of absorptive capacity depends on the existing knowledge base, pointing to findings from cognitive research and emphasizing that fully formed cognitive structures facilitate absorption of similar knowledge. Consequently, knowledge that has already been absorbed affects absorption of new knowledge while also affecting the formation of expectations in a self-reinforcing way.

Cohen and Levinthal (1990) also argue that the absorptive capacity that has grown historically in a certain area allows for more-efficient accumulation during subsequent periods. We can conclude that the following self-reinforcing process takes place: “absorptive capacity → learning → new absorptive
capacity” (Lane et al. 2006: 845). The corresponding absorptive capacity increases through repeated feedback loops, and increases the future capacity to absorb new related knowledge. Van den Bosch et al. (1999) also speak of “path dependency of absorptive capacity” (Van den Bosch et al. 1999: 554) and of a “path-dependence phenomenon of absorptive capacity” (Van den Bosch et al. 1999: 558). The self-reinforcing effect of absorptive capacity can thus be seen as a central feature of a path-dependent development (Cohen and Levinthal 1990; Van den Bosch et al. 1999). Therefore, the frequently mentioned link between absorptive capacity and its path dependent character seems not surprising (Todorova and Durisin 2007; Lane et al. 2006; Zahra and George 2002; Lavie and Rosenkopf 2006; Lichtenthaler 2009).

Continuous investments in absorptive capacity also strengthen the ability to absorb knowledge, while at the same time shaping the path-like process. On the other hand, there is a risk that if investments are not made in other areas, critical fields of knowledge will be sidelined and not updated, creating a lock-out situation (Cohen and Levinthal 1990).

The publications on absorptive capacity reviewed above hint at its path-dependent character. This is also in line with recent findings presented by Mallach (2012). It is apparent that consistent development and expansion of absorptive capacity shapes its specific form and has a path-forming effect over time due to self-reinforcing feedback loops. The outcome is a learning path shaped by history (Van den Bosch et al. 1999). In the next section we will combine various arguments reviewed so far and proposes an integrated path model of partner-specific absorptive capacity.

**MODEL DEVELOPMENT: A PATH MODEL OF PARTNER-SPECIFIC ABSORPTIVE CAPACITY IN BUSINESS-TO-BUSINESS RELATIONSHIPS**

Plinke (1997) points out that in business-to-business markets a seller firm increasingly focus on a single buyer firm and the specific buying firm’s perspective with regard to solving problems. This means that a seller firm faces the challenge of recognizing valuable knowledge held by its partner, assimilating that knowledge, and then utilizing it (Lane and Lubatkin 1998). One crucial factor here is partner-specific absorptive capacity, with the student-teacher concept being applied (Lane and Lubatkin 1998).

Subsequently, the influence of partner-specific absorptive capacity as a self-reinforcing mechanism is considered within the framework of the theory of path dependence. Also the question arises, whether working with a certain buyer firm for a longer period improves the seller firm’s partner-specific ability to absorb knowledge in this regard. From the perspective of path theory, it is especially interesting to consider whether, in these circumstances, bonding forces within the dyadic business relationship can result in lasting persistence or even a lock-in situation.

**Conceiving of a Path Model of Partner-Specific Absorptive Capacity**

For the development of a unifying path model, the three-phase model of path-dependent processes proposed by Sydow et al. (2009) serves as a reference system. The process of working through the three subsequent phases is a particular interest. After a description of the initial situation (phase I) the focus lies on the phase in which paths are formed (phase II). The dyadic buyer-seller relationship is conceptualized as a student-teacher relationship, with the seller firm in the position of the student and the buyer firm in that of the teacher. To reduce complexity, one-sided transfer of knowledge from the buyer (the teacher) to the seller (the student) is considered (Lane and Lubatkin 1998; Lane et al. 2006).

In the process, the focus turns to the argument put forward by Plinke (1997) that the seller firm increasingly concentrates on a single business customer’s problem-solving perspective. This paper also aims to show that business partners are over time subject to mechanisms that affect partner-specific absorptive capacity while also reinforcing it. It will be argued that established mechanisms of path theory such as coordination effects, complementary effects and adaptive expectation effects (Sydow et al. 2009) further reinforce the spiraling solidification of partner-specific absorptive capacity. As a result a learning path focusing on the specific relationship is formed by the student firm.

After many studies on absorptive capacity have mainly focused on success-oriented effects (e.g. Cohen and Levinthal 1990; Cohen and Levinthal 1994; Lichtenthaler 2009; Todorova and Durisin 2007; Zahra and George 2002), this paper takes a different approach, considering the potential dark side of learning processes. Thus far, this perspective is underrepresented in the literature.

**Phase I: A Large Number of Potential Business Relationships and Learning Opportunities**

The first phase is characterized by a large number of potential business partners with individual learning opportunities for the student firm. At this time, it is more or less unclear which companies will engage into a business relationship. It is likewise unclear for which partner the student firm will develop specific absorptive capacity abilities, and which knowledge will be absorbed in the future. Thus, the various possibilities are still largely unaligned and contingent.

Still, it is conceivable that a formative influence already exists during this early phase. Industry affiliation and standards or relevant market trends determine the field of action, for example, and select possible business partners.

If a business relationship ultimately forms based on a series of market transactions between a selling and a buying firm, specific knowledge is exchanged. We can...
presume that the student firm has an interest in absorbing important knowledge quickly in order to recognize the teacher firm’s needs in the best possible way and perform as desired. Development of partner-specific absorptive capacity is therefore desirable. Following this, a partner-oriented capability to absorb and process knowledge is concentrated in the student firm, while at the same time the effect of bonding with the teacher firm is intensified. This consciously or unconsciously solidifies the available space for new knowledge within the student firm, and a partner-related learning path evolves. This point in time can be viewed as a critical juncture, and thus as the transition to the second phase (Vergne and Durand 2010).

**Phase II: Formation of a Learning Path Through Partner-Specific Absorptive Capacity**

Phase II is the phase during which a path-dependent process is formed. Now that the student firm’s focus is on the teacher firm’s characteristic knowledge and the development of partner-specific absorptive capacity has begun, the development of a learning path featuring positive feedback arises within the student firm. Since new knowledge can only be absorbed on the basis of existing knowledge, the knowledge that has been previously absorbed determines the development of absorptive capacity. This means that the existing knowledge base serves as the foundation for further knowledge, reinforcing itself step by step. This process makes it clear that absorptive capacity is, at bottom, a learning effect such as those described in path theory. In a study conducted by Mallach (2012), the author finds empirical support for the relationship between partner-specific absorptive capacity and learning effects and its path-dependent character in business-to-business relationships.

Next, we turn to interactions between the traditional self-reinforcing mechanisms of path theory and partner-specific absorptive capacity. While absorptive capacity is viewed as a special form of learning effects, its interactions with the other mechanisms involved, such as coordination effects, complementarity effects, and adaptive expectation effects (Sydow et al 2009) are of interest in terms of arriving at an integrated model. Sydow et al. (2009) already point out that several of these mechanisms are often at work at the same time. This paper will argue that coordination effects, complementarity effects, and adaptive expectation effects further enhance the self-reinforcing character of absorptive capacity.

*Coordination effects and partner-specific absorptive capacity*

Processes of coordination between interacting partners lie at the heart of the matter. The more actors within a system view rules as productive or adapt to accommodate routines or practices, the easier and more effective their interaction processes within the overall system become (David 1994). As a result, a rule’s overall attractiveness increases the more that rule is disseminated. In her study on organizational routines, Knott (2003) points to the importance of routines as a mechanism for coordination. In this view, routines support the disruption-free progress of coordinated behavior. Dyer and Nobeoka (2000) similarly point out the importance of such coordination principles.

In their study of successful cooperation within strategic alliances, Dyer et al. (2001) propose that a dedicated strategic alliance function is responsible for success in these settings. The central tasks of this kind of function include optimized knowledge management, which in turn encompasses processes related to the articulation, documentation, and codification of knowledge, along with joint use of knowledge. In this way, the individual processes exert a direct influence on the expansion of the knowledge base. Tools, instruments, and templates that have been developed are also conducive to the further formation, definition, and solidification of routines of interaction (Dyer et al. 2001).

Dyer and Nobeoka (2000) also point out that shared knowledge transfer routines between interaction partners have a positive effect on inter-organizational learning. Consequently, interaction practices that are used regularly not only improve the transfer of knowledge between the interested parties, but also the formation of specialized knowledge. Routines relating to knowledge transfer also make it possible to store knowledge systematically and use it during subsequent periods (Dyer and Singh 1998; Dyer and Nobeoka 2000).

Van den Bosch et al. (1999) emphasize, in their analysis of absorptive capacity, that the ability to coordinate between group members has a positive effect on the absorption and processing of new knowledge. This includes deliberately constructed or indirectly developed processes of interaction between the involved parties at an organizational or inter-organizational level (Van den Bosch et al. 1999).

According to Dyer and Singh (1998), interaction routines between organizations promote recognition of important knowledge within the relationship. In this view, these routines have a direct influence on partner-specific absorptive capacity, supporting its development. Chang and Gotcher (2010) take a similar view. According to them, the functioning of partner-specific absorptive capacity can be improved by establishing routines related to interactions within the buyer-seller relationship.

*Complementary effects and partner-specific absorptive capacity*

Complementarity effects can be best described as synergistic effects. Synergies arise through repeated, mutually supportive interactions between separate but related resources, rules, and/or practices (Petermann 2010). Repeated interaction can give rise to utility that is greater overall than the sum of its parts (David 1994,
Petermann et al. (2012). Formation of core competencies is one possible consequence (for a detailed discussion, see Prahalad and Hamel 1990). In the buyer-seller relationship, synergies can arise when student firms and teacher firms make deliberate efforts to share complementary knowledge. When the student firm’s knowledge base grows, the company becomes able to recognize and absorb relevant new knowledge faster in subsequent periods. Partner-specific absorptive capacity increases as a result, influencing the future form and development of the characteristic learning path within the student firm.

Adaptive expectation effects and partner-specific absorptive capacity

Adaptive expectations confirm themselves step by step as part of a reciprocal process, thereby having a self-reinforcing effect. Preferences are not set from the start, instead forming as a result of the actors’ expectations. The desire to belong socially or to be among the winners is a possible reason for adaptation. The more the actors’ expectations associated with a certain behavior or an established approach are, the more attractive it is to adapt to accommodate these practices. Moreover, the behavior gains legitimacy as more and more actors align themselves to it. The reproduction and solidification of best practices is a good example (Sydow et al. 2009).

The Dacin et al. (2007) study on strategic alliances from an institutional perspective also refers to the role of legitimacy as a self-reinforcing mechanism. From the authors’ standpoint, it is legitimate for individuals within an organization to copy stable structures and processes. The result, however, means that organizations can potentially become inflexible and unable to adapt rapidly enough to changing environmental influences (Dacin et al. 2007). We assume that the business partners expect to share certain areas of their knowledge when they enter into a business relationship. It is also conceivable that after a series of transactions, certain practices of knowledge sharing (best practices) become established, and the interested parties might even no longer question these practices. Likewise, it is legitimate for the student firm in the buyer-seller relationship to absorb and process knowledge. Accordingly, development of partner-specific absorptive capacity is promoted.

Plinker (1997) points out that partners in a business relationship amass experience as a result of market transactions, and that new expectations form based on that experience. This process continues step by step, thereby reinforcing itself.

Phase III: Manifestation of a Potentially Inefficient Competency Trap Through One-Sided Absorption of Knowledge

The student firm’s partner-specific absorptive capacity has reinforced itself and solidified during phase II as a result of repeated market transactions taking place within the buyer-seller relationship. On the positive side, the student firm is now, in phase III, able to absorb new knowledge faster, provide innovative solutions for the teacher firm (e.g. Cohen and Levinthal 1990; Cohen and Levinthal 1994; Lichtenthaler 2009), and possibly even generate a competitive advantage for itself and its partner (e.g. Todorova and Durisin 2007; Zahra and George 2002).

The phase of path dependence (phase III) can be perceived as a one-sided learning path, which may be manifested in a potentially inefficient lock-in situation. Levinthal and March (1993) point to the shortsightedness of learning processes as being responsible for this potential inefficiency. When a longer-term perspective is neglected during the learning process, there is often the risk of a tendency to overlook failures. In this context, Zahra and George (2002) point out that path-dependent development of absorptive capacity determines not only an organization’s success, but also its failure; they speak of a potential competency trap within learning paths. This paper will take up this approach and discuss the possibility of a learning or competency trap.

Abrupt changes in the external environment often challenge even established business firms. In dynamic environments, a dark side to partner-specific absorptive capacity may emerge. In that case necessary adaptation can — if at all possible — only take place gradually, and the risk of an inefficient competency or learning trap increases. In extreme cases, the risk of one-sided knowledge and the associated frame of reference, might result in neglecting more-efficient alternatives (Sydow et al. 2009; Levinthal and March 1993; Lei et al. 1996). Miller (1993) describes this development as “converting a formula for success into a path towards failure” (Miller 1993: 116).

If rigidity is so embedded that flexible realignment is no longer possible, the competency trap springs shut, manifesting itself in a potentially inefficient lock-in situation. Consequently, the direction in which the learning path has previously set out may be responsible for the potential failure of the student firm. Leonard-Barton (1992) describes this phenomenon as a capability-rigidity paradox, stating: “Core rigidities are the flip side of core capabilities” (Leonard-Barton 1992: 118).

Competency traps form as a result of various developments. In this context, Zahra and George (2002) mention three possible kinds of traps: the familiarity trap, the maturity trap, and the propinquity or nearness trap. A familiarity trap results from excessive focus on refining and improving existing knowledge. As experience is amassed, absorptive capacity grows, and turning toward other alternatives seems not to be worthwhile. The argument of positive feedback can be raised again, as it can be the factor responsible for the solidification of knowledge. Thus, not only is exploration of alternative sources of knowledge
prevented, but cognitive structures also remain limited. If an actor does not succeed in absorbing different types of knowledge from different sources, the path-like course promotes rigidity and may even prevent a necessary paradigm shift (Ahuja and Lampert 2001; Zahra and George 2002).

In the maturity trap, the focus is on the need for dependable and predictable outcomes. Tapping into different kinds of knowledge from different sources fades into the background. Use of existing knowledge is also legitimate, although superior performance would be possible if outside sources of knowledge were used (Ahuja and Lampert 2001; Zahra and George 2002). The propinquity or nearness trap describes a company’s tendency to accumulate further knowledge in long-familiar areas. The tendency to give preference to the familiar is once again key, with other relevant areas of knowledge being ignored. This kind of trap becomes especially critical for seller firms when environmental conditions change, requiring completely new knowledge (Ahuja and Lampert 2001; Zahra and George 2002).

Often, competency and learning traps are also discussed in connection with exploitation and exploration of knowledge (e.g. Lavie and Rosenkopf 2006; Levinthal and March 1993; March 1991). According to March (1991), exploitation means the utilization and refinement of existing knowledge, while exploration means tapping into new knowledge and experimenting with unfamiliar, risky alternatives. In the process, firms should take care not only to exploit their existing knowledge base and the associated sources of knowledge, but to continue to explore new knowledge. When environmental influences are stable, a strategy of exploitation is generally noncritical. But as positive experiences build on each other, the risk of path-dependent development also increases. While competence related to the existing activity rises, there is the risk that better alternatives are being neglected or not even perceived (March 1991). Long-term perspectives also might fade from view (Levinthal and March 1993). When environmental influences suddenly change, fresh knowledge is generally needed. If absorption of new knowledge does not take place, the benefits of an exploitation strategy can be reversed, suddenly turning into a competency trap (Koza and Lewin 1998; Lichtenhaler 2009).

A consistent alignment to the teacher firm’s knowledge base becomes problematic if it means that the student firm ignores innovative developments in the field in which it operates, for example, or if other environmental influences (abruptly) change. If new knowledge is needed, the competency or learning trap may spring shut as the student firm’s learning path becomes potentially inefficient. This is where the lock-in situation typical of paths is manifested, and there is a risk that the student firm will fail due to competition on the market (Zahra and George 2002). Because of the rather specific nature of the competency trap (the capacity of the student firm to recognize the value of new knowledge, acquire, assimilate, exploit and transform it in a relational context), we introduce the term ‘relational absorptive capacity trap’.

In summary, one-sided concentration by the student firm on partner-specific absorptive capacity, and simultaneously on the teacher firm’s knowledge base, pushes aside exploration of new areas of knowledge lying outside the business relationship. This leads to a potentially inefficient relational absorptive capacity trap within the student firm, a trap that may spring shut if environmental conditions change abruptly, manifesting itself in a lock-in situation. The student firm might face similar difficulties if the teacher firm disappears from the market. There is also the risk that the student firm cannot move off its existing learning path fast enough to realign itself on the market. The internal connection between the student firm and the teacher firm is also solidified by investments in partner-specific absorptive capacity. These relationship-oriented costs are also known as switching costs and lost when the partnership ends. Because of their highly specific character, these investments cannot be reused elsewhere (Geiger et al. 2012).

The bonding forces that arise in these situations make it seem that the further success of a student firm depends on its relationship with its teacher firm. According to Narasimhan et al. (2009), the lock-in situation in which the student firm finds itself is manifested here in the form of a dependent relationship. Therefore, we posit that one-sided concentration by the student firm on partner-specific absorptive capacity, and simultaneously on the teacher firm’s knowledge base, increases the forces binding the two companies. Also, it causes the student firm to be dependent on the teacher firm in order to continue to exist on the market.

Towards a Path Model of Partner-Specific Absorptive Capacity

The foregoing discussion has shown how partner-specific absorptive capacity can be viewed as a self-reinforcing mechanism within the framework of the theory of path dependence. To this end, the paper has argued based strictly on the reference system of the three-phase model of path-dependent processes put forward by Sydow et al. (2009). The content of the individual phases in this model was applied to the buyer-seller relationship in a business-to-business marketing context. This section will now summarize the insights gleaned through this process in the form of a path model showing the position of the seller respectively the student firm, as the case may be (see Figure 4). Particular attention is paid to ensuring that the perspective of time is taken into account across the entire model. This means, first, that the model accommodates a path-dependent process (Sydow et al. 2009); and second, the definition of a business-to-business relationship as a non-accidental sequence of market transactions (Kleinientenkamp and Ehret 2006).
Phase I shows a large number of potential business partners for the student firm, with individual learning opportunities. In general, the various possibilities are still unaligned and contingent at this point. After a series of market transactions, a business-to-business relationship ultimately forms, and specific knowledge is normally transferred from the teacher firm to the student firm. To absorb and process this knowledge, the student firm develops partner-specific absorptive capacity, and a characteristic learning path forms.

Phase II shows the development of the partner-oriented learning path in the student firm, featuring positive feedback and is further enhanced by a series of feedback loops. The crucial point here is the self-reinforcing effect of partner-specific absorptive capacity. The relationship-oriented competency of knowledge absorption is concentrated within the student firm, and the effect of being bound to the teacher firm increases. This process is promoted by coordination effects, complementarity effects, and adaptive expectation effects.

The concept of partner-specific absorptive capacity as treated herein is oriented toward the dynamic model proposed by Todorova and Durisin (2007). This model was chosen because it has been empirically tested that a model with four separate factors (acquisition, assimilation, transformation, and exploitation) is preferable to one with only two factors (Jansen et al. 2005). Beyond that, this approach is interesting in that new knowledge moves back and forth within a two-way process of assimilation and transformation before it can be successfully used for commercial purposes (Todorova and Durisin 2007). The integration of the learning process-oriented perspective on absorptive capacity put forward by Lane et al. (2006) – with the learning steps of exploratory learning, transformative learning, and exploitative learning – represents a valuable addition. In the developed path model, exploratory learning is applied to the student-teacher concept and understood as absorption of new knowledge within the dyadic business-to-business partnership.

Phase III points to possible competency or learning traps in one-sided learning paths. Due to the rather specific nature of these traps, we introduced the term relational absorptive capacity trap. It should be assumed that in the case of changed environmental influences, for example, the relational absorptive capacity trap will spring shut, solidifying into a potentially inefficient learning path within the student firm. This marks the ambivalent nature of partner-specific absorptive capacity.

Based on our literature review and theoretical considerations, we suggest a path model of partner-specific absorptive capacity as presented in Figure 4.

![Figure 4: Path Model of Partner-Specific Absorptive Capacity in B2B Relationships](image)

FROM AN INTEGRATED PATH MODEL OF ABSORPTIVE CAPACITY IN B2B RELATIONSHIPS TOWARDS A SIMULATION MODEL

We suggest that partner-specific absorptive capacity lends itself to being thought of as a self-reinforcing mechanism within the framework of the theory of path dependence. Moreover, we argue that coordination effects, complementarity effects, and adaptive expectation effects reinforce the spiraling, self-reinforcing character of partner-specific absorptive capacity, and thus may contribute to the further development and definition of a characteristic learning path. This would increase the effect of binding the student firm to the teacher firm, and there is a risk of a potentially inefficient competency or learning trap that could spring shut under certain conditions. To specify the competency or learning trap, we introduced the term relational absorptive capacity trap. Accordingly, the path model developed here considers the often-disregarded dark side of learning processes.

The theoretical model we derived above offers potential for future simulation research. A computer simulation study could be conducted to further explore the model, understand the interdependencies and mechanisms at hand and identify the critical factors involved in the formation of a learning path (Vergne and Durand 2010). Computer simulations are nowadays a well established method in social sciences (Gilbert and Troitzsch 2005; Harrison et al. 2007) and scholars have found convincing answers to the arguments of critics of simulation modeling (Waldherr and Wijermans 2013). Also, computer simulations have recently been successfully applied in the field of marketing (e.g. Rand and Rust 2011) and organizational learning (Siggeeklow and Rivkin 2006). In the case of a byer-seller relationship we find several aspects that hint to an agent based model (ABM) for further investigation. First, we have a dyadic relationship that develops gradually between two or more actors. Second, we showed that the process unfolding over time is governed by one or more self-reinforcing mechanisms on different
levels. Such complex multi-level processes often cannot be captured by analytical means only and numeric approaches are needed to uncover the long-term behavior of the system (Petermann et al. 2012). To sum up: Simulation modeling is particularly fruitful when complex, longitudinal and multi-level processes are at hand (Davis et al. 2007). This is generally true for path-dependent processes (Schreyögg and Sydow 2011) and specifically for the relationships governed by partner-specific absorptive capacity. Agent based modeling and simulation research in this area have not been conducted yet and could contribute to shedding more light on the nature of path-dependent partner-specific absorptive capacity as an interesting phenomenon in the development of business-to-business relationships.

REFERENCES


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