

**MANAGING PATH DEPENDENT PROCESSES?
TOWARDS A TYPOLOGY OF RESPONSE STRATEGIES**

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Johann Fortwengel¹, Freie Universität Berlin.

School of Business & Economics, Garystr. 21, 14195 Berlin, Germany.

Email: johann.fortwengel@fu-berlin.de. Phone: +49-30-83857184. Fax: +49-30-83857186.

Arne Keller, Freie Universität Berlin.

School of Business & Economics, Garystr. 21, 14195 Berlin, Germany.

Email: arne.keller@fu-berlin.de. Phone: +49-30-83857184. Fax: +49-30-83857186.

¹ Corresponding author. Both authors have contributed equally to this paper, which is why the author's names are ordered alphabetically.

Abstract

Path dependent processes internal and external to an organization can constrain its business activities to a significant degree, and potentially inhibit its capacity to respond to changes in the environment. Traditionally, scholars have emphasized the inability of organizations to strategically respond to and actively impact path dependent processes. In contrast, this paper highlights the role of strategic agency by asking the research question of how organizations can skillfully manage the path dependent processes they are subject to. Looking at two successful cases of path divergent behavior in a comparative case study design, we find that firms have at least two strategies available to them to manage path dependence: path shielding and path breaking. Further, we hypothesize that these two different strategies may be most effective under certain conditions, depending on whether the locus of path dependence is internal or external to the organization. With this we extend knowledge on path dependence in and of organizations and contribute to a theory of strategic agency within a path dependence framework.

Keywords: path dependence; strategic agency; path shielding; path breaking; self-reinforcing mechanisms.

1. Introduction

We know that processes of path dependence set in at a critical juncture, triggering self-reinforcing mechanisms which reduce the scope for action of a particular organization over time, ultimately leading into a lock-in which is strategically inefficient as the organization loses its capacity to respond to changes in the environment (Sydow, Schreyögg, & Koch, 2009). We also know that path dependent processes can be external to a particular organization and can constrain its business activities to a significant extent (North, 1990). Most extant research has focused on understanding and explaining these puzzling persistencies. Much less attention has been paid to examining how firms can strategically respond to, more actively manage, and creatively engage with the path dependent processes they are subject to. This is a relevant research gap as addressing these questions promises to yield important insights into the capacity of firms to regain and reshape their room for maneuver—an issue of high interest from a managerial perspective.

In order to help filling this research gap, we study two cases in a comparative case study research design: one is a case of a company that has successfully coped with external path dependence, and the other is a case of a company which has successfully overcome its internal path dependence. For one, we study *EnergyCorp*², which is a case of a company which faced a particular institutional path which did not fit its aimed business strategy. In response to this external constraint, it developed a strategy to isolate itself from the broader path mechanisms operating in its environment. The second case is *CameraCorp*, which is a case of a company which was characterized by internal path dependence which became dysfunctional in light of a major technological shift. To overcome this internal path dependence, the company first attacked

² For anonymity and privacy reasons, we are using pseudonyms throughout the paper to describe our firm-level cases.

existing path dependence processes with the help of an external actor, before then slowly forming a new strategic vector more appropriate for the new environment.

Studying these two cases, we suggest that companies can effectively manage and strategically respond to internal and external path dependence by addressing the very self-reinforcing mechanisms that are driving the particular path dependent process. In other words, we claim that self-reinforcing mechanism cannot easily be stopped; rather, actors need to engage with them using special techniques and strategies. In contrast to most extant literature on path dependence (Arthur, 1994; David, 2007), we thus highlight the role of strategic agency in path dependent processes. We further contribute to existing knowledge by exploring types of response strategies available to firms facing path dependence. With this, we hope to contribute to the growing body of literature focusing potentials of and constraints on agency in organization studies (Battilana, Leca, & Boxenbaum, 2009).

In developing these arguments, the paper is structured as follows. In the next section, we briefly revisit some of the core ideas of the theory of path dependence and pay special attention to the self-reinforcing mechanisms that are said to drive and govern processes of path dependence. We identify path management as relevant research problem within this broader literature. In the methods section, we present our research design and discuss case selection as well as data gathering and analysis. Both selected cases are cases of firms that have somehow managed to either shield themselves from the influences of external path mechanisms (Case 1), or even succeeded in breaking a path internal to the organization (Case 2). Studying these two cases, we develop a typology of effective response strategies depending on the locus of the particular path dependent process. With this, we contribute to the vibrant debate on how organizations can deal with restricting constraints internal and external to their core business activities.

2. Theoretical framework

Theory of path dependence

There are a number of theories and concepts that have been developed to understand and explain puzzling stability and rigidity of, in, and among organizations, such as imprinting, organizational inertia, and commitment (Ghemawat, 1991; Hannan & Freeman, 1984; Stinchcombe, 1965). What these concepts usually lack, however, is a process perspective linking certain behavioral patterns to stability as outcome. This is what the theory of path dependence contributes to the debate on stability in organization theory and strategic management literature. From a process perspective, it puts emphasis on the self-reinforcing mechanisms that drive a path dependent process through different stages (Sydow & Schreyögg, 2013; Sydow et al., 2009). This may be internal to an organization, as is the case with cognitive frames, inert routines, or maladapted capabilities (Gilbert, 2005; Tripsas & Gavetti, 2000). It may also be a process external to the organization, though, as is the case with institutionalized structures, practices, or comparative advantages (DiMaggio & Powell, 1983). More generally, this refers to the dependence of organizations on their environment for managing resources (Pfeffer & Salancik, 1978) and being provided with collective inputs (Hall & Soskice, 2001) and legitimacy (Meyer & Rowan, 1977).

The theory of path dependence goes back to the seminal works of Brian Arthur and Paul David (Arthur, 1989; David, 1985). Both argue that increasing returns can lead to path dependence, as David (1985) illustrates on the basis of the case of the QWERTY keyboard which he argues became standard technology even though it was the inferior solution. Arthur (1989) builds on this conceptual idea and models the effects of increasing returns on the diffusion of technological innovation. This basic idea was later applied to a wide range of fields, including economic development (or rather the lack thereof) from an institutional economics perspective

(North, 1990), political processes more general (Pierson, 2000), and regional economies (Grabher, 1993; Martin & Sunley, 2006), amongst others. While these are all external pressures impacting on organizations, research has also shown that organizations themselves can become path dependent (Schreyögg & Sydow, 2011; Sydow et al., 2009).

A useful framework has been developed by Sydow et al. (2009), who introduced a three-stage model of path dependence as process through which the scope for action is reduced over time. While in the preformation phase, a wide range of options to choose from are available, a small—or big, if it is a strategic decision—event at a critical juncture can over time reduce the scope for action significantly. Once triggered, this process is driven by positive feedback or self-reinforcing mechanisms (Arthur, 1994; Dobusch & Schüßler, 2013), which lead the particular system further down the path until it is locked-in, which describes the third and latest stage of path dependence. Lock-in describes a situation where the scope for action is extremely reduced; behavioral patterns are reproduced leading to hyper-stability which is inefficient, at least in a strategic sense, as the system has lost its capacity to change and adapt (Sydow et al., 2009). Path dependence here is understood as a process through which a particular action pattern becomes stabilized and rigidified over time, driven by self-reinforcing mechanisms.

Importantly, path dependence can be both external and internal to a particular organization. For example, we know that companies often fail in their attempt to reproduce their successful business strategies due to persistence in the host environment (Khanna & Palepu, 2006). Walmart's failure in Germany is a good case in point. One key building block of Walmart's strategy is rather antagonistic capital-labor relations, which did not fit Germany's path in the industrial relations system very well, which we know to be more collaborative in nature (Hall & Soskice, 2001). An example for an internal path would be Polaroid, which was stuck to its formerly successful razor-blade business model in the face of a digital revolution (Tripsas &

Gavetti, 2000). More specifically, Polaroid was subject to a cognitive lock-in which prevented the organization to adapt to technological changes. The theory of path dependence helps theorize these empirical observations by highlighting self-reinforcing mechanisms driving these otherwise puzzling processes of hyper-stability internal and external to an organization (Sydow & Schreyögg, 2013).

Self-reinforcing mechanisms of path dependence

Positive feedback or self-reinforcing mechanisms are at the core of path dependence theory (Dobusch & Schüßler, 2013; Sydow et al., 2009). Already in the seminal works of David (1985) and Arthur (1994), increasing returns were described as defining feature of path dependent phenomena. This idea was further developed by Sydow et al. (2009) who move beyond increasing returns to identify four types of self-reinforcing social mechanisms: coordination effects, complementary effects, learning effects, and adaptive expectations. *Coordination effects* are those types of effects that set in as a result of rule-guided behavior (North, 1990). Rules within an organization or a broader institutional environment enable to anticipate the behavior of individual actors, which leads to an increase in overall efficiency of inter-subjective action patterns. *Complementarity effects* kick in if synergies exist between two products, practices, capabilities or strategies. Complementarities have been shown to exist at the organizational level in the sense that different routines or practices together form complex and distinct bundles of practices (MacDuffie, 1995) and core competencies (Prahalad & Hamel, 1990); they are also relevant in institutional settings, in the sense that different institutional domains may be complementary to each other and form configurations of institutional frameworks (Hall & Gingerich, 2009). A third type of self-reinforcing mechanisms described by Sydow et al. (2009) are *learning effects* (Argote, 1996, 1999). Learning is a well-known process occurring in organizations; for example, it is known that over time exploitative learning tends to

crowd out explorative learning (Levinthal & March, 1993; March, 1991; Miller, 1993). We also know that learning occurs in relation to the rules of the game external to organizations (North, 1990). The fourth and final type of self-reinforcing mechanisms are *adaptive expectation effects* which “relate to the interactive building of preferences” (Sydow et al., 2009: 700) for certain choices. These can be operative at the organizational level, as is the case in best practice adoption, as well as at the institutional level, when one particular option is chosen because it is perceived as being expected by others (Fligstein, 1985).

These four kinds of self-reinforcing mechanisms are claimed to be “at the heart of organizational path dependence” (Sydow et al., 2009: 698). This then raises the question, however, how path-deviant behavior and the active management of path processes could be possible and theoretically accounted for. Self-reinforcing mechanisms are often conceptualized as mechanisms evolving behind the back of actors, or as unintended consequences of purposeful actions. While the theory of path dependence starts with a strong notion of agency in the sense that agents and their activities trigger a path dependent process—either willingly or unwillingly (Garud, Kumaraswamy, & Karnoe, 2010; Sydow, Lerch, & Staber, 2010)—, agents occupy an increasingly marginalized position as the path dependent process further unfolds. In the case of external paths, it is commonly assumed that organizations fail to have the willingness or capacity to impact these broader paths at the macro level. For example, organizations are typically viewed as taking certain practices for granted. Alternatively, even if they are aware of other options, they might be dependent on the legitimacy provided by the institutional environment for certain dominant forms and strategies (Meyer & Rowan, 1977). And in the case of internal paths, organizations are typically viewed as unable to sense and seize alternative courses of action. For example, lacking absorptive capacity might prevent an organization to perceive of relevant changes and dynamics in their respective business environments (Cohen & Levinthal, 1990).

Also, we know from change management literature that change initiatives often face highly resistant barriers (Weick & Quinn, 1999), which might be the result of the underlying mechanisms of hyper-stability. It has been argued that “the conditions that are conducive to path dependence and possible ways of unlocking paths await further exploration” (Sydow et al., 2009: 705). We agree and feel that internal and external stabilities open up an exciting research frontier concerning the possibilities of and limits to purposeful management of path dependent processes.

Path management as research problems

The theory of path dependence is a theory that explains cases of puzzling persistence and inertia. As any other theory as well, it thus has a confined space of empirical phenomena it intends to understand and explain. Path-deviant behavioral patterns and strong notions of agency are typically not part of this property space.³ Accordingly, Dobusch and Schüßler (2013) state that path dependence “deliberately decentralizes agency by referring to a system logic of self-reinforcing processes triggered by contingent events” (2013: 618). However, there have been a number of attempts to highlight the role of agency in path dependent processes. For example, notions of path creation aim to explain why and how agents might purposefully engage in activities for the purpose of creating a path and becoming path dependent, in order to benefit from the increasing returns that would then kick in (Garud & Karnoe, 2001; Sydow et al., 2010), or to defend their competitive advantages more generally (Dierickx & Cool, 1989). Another promising yet undertheorized concept is that of path breaking. Theoretically speaking, path breaking induces the creation of a novel and superior option, thereby increasing the scope for action and creating the opportunity to depart from a potentially dysfunctional path (Burgelman,

³ Agents and their actions do play a role in the theory of path dependence, but their actions are often said to have unintended consequences and evolve behind the back of actors. For this reason, some argue that path dependence and path creation have different ontologies (Garud et al., 2010). More generally, there is an in-built tension between the notion of self-reinforcing mechanisms as unintended consequences of agency on the one hand, and ideas of agency in the sense of purposeful action on the other.

1994; Gilbert, 2006). However, since mechanisms are conceptualized as *self-reinforcing*, it follows that deliberate management from within the path dependent process is rather inconceivable, either because members of the organization are not aware of the mechanisms driving path dependence, or are unable to address these. While Polaroid, for example, tried to depart from its established business strategy in the face of the digital revolution in photography, it failed to do so due to powerful path mechanisms (Tripsas & Gavetti, 2000). Also, in the case of path dependent processes external to a particular organization, one would expect that the organization is either unwilling or unable to impact the external path. Coming back to the example of Walmart mentioned earlier, we can assume that Walmart had a strong incentive to influence the institutional path in the environment, but lacked the capacity to do so and subsequently failed in this particular internationalization project.

Previous studies thus have shown that management in light of path dependent processes internal and external to the focal organization is extremely difficult (Danneels, 2011; Koch, 2008; Porac, Thomas, & Badenfuller, 1989). Therefore, exploring and understanding successful cases of path management and effective response strategies to path dependence constitute a highly relevant research frontier. Our study aims to contribute to filling this important research gap by asking the following research question: *How can organizations skillfully manage the path dependent processes they are subject to?*

3. Method

Research design and case selection

As we still know little about effective response strategies to path dependent processes, we decided to employ an explorative and qualitative research design (Miles & Huberman, 1984). We know that case studies are suitable to address *how* and *why* questions and thus are particularly useful to elaborate and build on existing theories (Eisenhardt & Graebner, 2007; Yin, 2009). As

path dependence is a time-based concept, we further chose a longitudinal process perspective (Langley, 1999; Pettigrew, 1997; Sydow, Windeler, Müller-Seitz, & Lange, 2012).

Since activity-constraining path dependent developments can differ in their respective reference point, namely they can either be located in the external environment of the focal organization, or they can be internal, that is within the particular organization, we selected two cases, each representing one of these two types. Through purposeful sampling (Seawright & Gerring, 2008; Siggelkow, 2007), we selected two cases to include in our comparative case study. Importantly, both are cases of organizations that have been successful in coping with path dependent processes. However, these path dependent processes differ in locus as well as in its main structural domains. Contrasting and comparing these two success cases, we hoped to gain relevant insights into the potential of more active forms of path management.

EnergyCorp is a case of an organization that has successfully managed external path dependence. EnergyCorp is a very large German company with more than 350,000 employees globally and a revenue of almost 80 billion Euro in fiscal year 2012. In 2010, it underwent drastic growth in the U.S. market, which raised the issue of recruiting and training skilled production workers at one of its key facilities. To deal with this massive growth occurring in a very short time period, EnergyCorp decided to transfer its apprenticeship approach from Germany to the United States. In this process, EnergyCorp faced significant barriers in the external environment of the host economy, which were related to the institutional path of the vocational training regime in the U.S. (Thelen, 2004). As will be discussed at greater length below, it succeeded to deal with these barriers by joining an existing inter-organizational network formed for the purpose of implementing apprenticeships in the U.S.

Our second case—CameraCorp—is a highly specialized premium camera manufacturer from Germany. It has a little less than 2,000 employees globally and revenue of almost 300

million Euros in fiscal year 2012. As traditional analog camera manufacturer, the firm struggled a lot to adapt to the new digital imaging technology, as its long-time way of doing business became dysfunctional in light of radical technological shifts in the industry. In fact, there is ample evidence to suggest that this was due to organizational path dependence, which put CameraCorp's survival at serious risk. Interestingly, however, it succeeded to overcome its organizational path dependence by relying on an external intervention by a new strategic investor.

Whereas EnergyCorp thus is a case of an organization that managed to respond to an existing path in the *external* institutional environment, CameraCorp is a case of an organization that managed to deviate from its long-term practiced strategic vector and its endogenously created *internal* path. Both are thus cases of organizations which successfully managed path dependence, albeit paths located at different levels, and thus potentially asking for different response strategies.

Data collection and data analysis

The primary data source of our comparative case study is interviews. We conducted 36 interviews altogether; 19 interviews for case study 1 and 17 interviews for case study 2 (see appendix). The interviews were conducted in the period between March 2012 and August 2013, and they lasted between 20 minutes and almost three hours. In total, a little more than 37 hours of interview data was gathered. Unless interview respondents wished otherwise, interviews were tape recorded and transcribed in verbatim. They were semi-structured in the sense that we used a rough interview guideline, including questions aiming to understand how the organizations developed their strategic responses to persistencies over time. For example, we asked about the various facilitating factors and barriers to more agency-based activities aimed at overcoming rigidities. With this, we hoped to gain insights into the relationship between path dependence as

structure and more micro-level strategies and activities aimed to overcome these and manage path dependence.

While interview data is an excellent source of rich information, it is known to suffer from certain weaknesses, perhaps most importantly the danger that interview accounts are retrospective sense making (Eisenhardt & Graebner, 2007). In order to correct for these, additional data sources were consulted in order to triangulate. Most importantly, a large database of archival information was created based on various kinds of documents, such as internal presentations, meeting minutes, and business figures provided by the organizations. In addition, we included publicly available documents and videos, such as annual reports, industry studies, company chronicles, newspaper articles, public speeches and statements given by managers. This enabled us not only to check our interview data for accuracy—thereby reducing the risk of ex-post rationalization—but also provided relevant additional information, most importantly on the effects of agency-based activities on the path dependent process. We also conducted stints of non-participant observation at the organizations. For example, at EnergyCorp we observed how the apprenticeship practice is being implemented on the ground at the shop floor, and at CameraCorp we spent a considerable amount of time observing the production process and the day-to-day activities of the company more generally, which helped us gain insights into its organizational culture and decision processes.

Analyzing data was a multi-step and iterative process involving three major steps. After having migrated all transcripts into a software program which is a tool for qualitative data analysis, we first coded the data. Coding was an iterative process, in which we constantly moved from raw data to emerging categories and back. In a second step, we developed broader themes mostly relating to the self-reinforcing mechanisms driving the respective path dependent processes as well as the activities and strategies employed by EnergyCorp and CameraCorp to

manage these. We continued with data analysis until theoretical saturation was reached. We applied a similar model for analysis to examine our archival information. Thirdly, we compared and contrasted the findings of our two cases. Looking for cross-case patterns and searching “for similarity in a seemingly different pair also can lead to more sophisticated understanding. The result of these forced comparisons can be new categories and concepts which the investigators did not anticipate” (Eisenhardt, 1989: 541). On the basis of this cross-case analysis, we developed a typology of effective response strategies vis-à-vis path dependence. The following sections present our findings. We first show our empirical findings for each case study individually before then engaging in a broader cross-case comparison.

4. Case study 1: Shielding from a path together: Networks as strategic tool?

The relevance of institutional paths

We know that there are institutional paths which influence organizational structures, strategies, and practices (Berthod & Sydow, 2013; North, 1990). These institutional paths often operate at the nation-state level (Hall & Soskice, 2001) and have direct effects on organizational behavior in the sense that they are providing certain kinds of collective inputs as well as legitimacy for some behavioral patterns (and not others). Importantly, the existence of institutional paths is not problematic from a management perspective as long as there is a fit between institutional environment and organizational behavior (Pfeffer & Salancik, 1978). For example, we know that the U.S. environment with its short-termism approach, the abundance of venture capital, and flexible labor markets provides a seed ground for entrepreneurial activity and radical innovation patterns, which result in competitive advantages in certain kinds of industries, such as IT and biotech. More generally, U.S. firms are known to invest in general and easily transferable assets—a kind of behavior that nicely matches their institutional environment. One institutional domain where this can be seen is the vocational education and training (VET)

sphere. U.S. firms typically rely on flexible forms of on-the-job training. Other options, such as apprenticeships, have become marginalized over time. Extant literature shows that whereas apprenticeships used to be a viable alternative in the area of training in the early 1900s, the decision of firms in the 1920s to invest in skill-minimizing technology as opposed to training constitute a big event at a critical juncture triggering a set of self-reinforcing mechanisms driving the vocational training system further down this path (Hansen, 1997; Thelen, 2004).

Two self-reinforcing mechanisms have been particularly important in this case of institutional path dependence. First, we know that institutions are effective means to solve coordination problems, which suggests strong *coordination effects* (North, 1990). For example, firms over time have adapted to the reality of increasingly marginal apprenticeships by hiring skilled workers off the market and then training them in very flexible arrangements on-the-job. Alternative approaches were increasingly unfeasible due to the risk of poaching, which describes a classic collective action problem in which a company investing in training cannot compete with rival firms which are able to lure skilled employees by paying them a wage premium. We also know that institutions provide legitimacy to certain kinds of behavior and not to others. This highlights the importance of *adaptive expectation effects*, which describe a situation in which actors' perceptions and preferences converge, thereby marginalizing other options in the process. Again, while apprenticeships used to be a viable training pathway in the early 1900s, this became increasingly less so as flexible on-the-job training became the dominant and taken-for-granted training approach.

In essence, the U.S. VET system is a case of institutional path dependence external to the focal unit which is driven by coordination effects and adaptive expectation effects. It is important to remember that the existence of this institutional path is not problematic for domestic companies which have adapted their production strategies to fit this kind of environment

(Jackson & Deeg, 2008). However, there might be a relevant misfit between the approaches of foreign firms and the U.S. institutional environment (Geppert, Williams, & Matten, 2003). This might be true in particular for German companies, as previous research has shown that Germany and the U.S. have almost polar opposite training regimes (Hall & Soskice, 2001). This raises the important question of how foreign companies have strategically responded to this institutional path dependence in the host environment?

Networks as strategic tool to manage external path dependence

EnergyCorp is a German company with a foreign subsidiary in the U.S. South which has undergone tremendous growth in the past few years. In this process, the number of its skilled workers—in particular machinists—has more than doubled in a very short time period. In its attempt to recruit and train these many skilled workers, EnergyCorp faced the existing path in the institutional environment involving flexible on-the-job training as dominant behavioral pattern. Importantly, they realized that the U.S. vocational training system does not provide them with a sufficient number of highly skilled employees which they rely on for their high-quality production process (Streeck, 1991). For example, the HR director of the subsidiary said the following: “The demands of what we knew our requirements were or our anticipated requirements, we knew that we were not going to be able to go out and find experienced machine operators that would be able to come on as an instant on” (Interview 8).

EnergyCorp thus is a case of a company that experienced a significant misfit between its envisioned strategy and what was enabled by the U.S. VET system. As it was inconceivable to influence the existing institutional path at the national level, EnergyCorp decided to disconnect itself to some extent from this broader path and instead chose to implement an apprenticeship-based training approach as used at its locations back in Germany at its U.S. facility. Apprenticeships is a form of initial training comprising both theoretical instruction and practical

training, and as such differs markedly from the established way of flexible on-the-job training as prevalent in the U.S.

Extant literature shows that institutions comprise three interrelated pillars (Scott, 2008): cognitive, normative, and regulative elements. In the case of institutional path dependence, these pillars are driven and maintained by self-reinforcing mechanisms (Berthod & Sydow, 2013). In this case, we assume coordination effects and adaptive expectations to be the dominant types of self-reinforcing mechanisms which result in a very high degree of institutional stability. In order to decouple from the broader institutional path, EnergyCorp had to engage with these individual pillars and thereby manage path dependence. They realized, however, that this rather active strategic response to the existing institutional path (Oliver, 1991) was very difficult to follow on its own. As a result, they looked for adequate partners for support.

They decided to participate in an inter-organizational network in the region involving eight companies—all of them in high-tech manufacturing industries—which had been formed to offer apprenticeships collectively. As part of this network, EnergyCorp was successful in influencing existing cognitive, normative, and regulative pillars and replacing them with new cognitions, norms, and regulations at the network-level. For example, they created a new cognition involving apprenticeships as viable training option: “So we have worked to change their [the student’s] thinking, to get them even interested in the program. Now, we’ll say that this year, [the network] had a record turnout of kids who showed an interest” (Interview 11). They also created and maintained facilitating norms and values. For example, the network guidelines posit that member companies do not compete for “associates, customers, product design or other related business issues” (Guidelines for Partners). Finally, they created new kinds of rules and regulations for support, for example by developing a new apprenticeable occupation (Department of Labor bulletin).

Importantly, the network approach enabled EnergyCorp to decouple from the two main self-reinforcing mechanisms in the institutional environment. For one, the network form enabled member companies including EnergyCorp to solve a number of coordination problems internally, within the confined space of a social network. For example, they agreed not to poach from each other any apprentices and skilled employees. Also, they cooperate in recruiting new apprentices and in developing curricula and training plans. Through these forms of strategic coordination, EnergyCorp in collaboration with the network was able to invest in more relationship-specific assets and shield themselves from broader coordination effects in the institutional environment. Importantly, the success of new kinds of rules coordinating behavior hinges upon the belief that others will follow these rules as well. This again suggests the important role of inter-organizational networks as social spheres in which more trust-based relationships can be built up and sustained.

Impacting on existing adaptive expectation effects required a different kind of behavior though, in the sense that EnergyCorp and its network partners had to engage with high schools and colleges to change relevant expectations, at least to some extent. For example, they frequently visit high schools to market their apprenticeship program. Also, they are using the existing and highly legitimate training path of college education as reference point to signal similarities to their own program, albeit adapting this institution to new ends along the way. This way, the novel practice of apprenticeships is framed in old and familiar parlors, for example when it is referred to as “the other four-year degree” (State Department of Labor presentation slides).

In sum, by relying on a network approach, EnergyCorp was able to shield itself from the institutional path suggesting investments in transferable and general skills, instead investing in more relationship-specific assets. This was an important precondition to implement the envisioned training strategy in light of high growth levels. There is evidence to suggest that

EnergyCorp's attempt was successful, as can be seen from the growing institutionalization of apprenticeship-based training at the U.S. subsidiary and the fact that this approach is now being discussed as benchmark for other plants in the global production network: "We picked up the ball and ran with it, because of our situation. And it is getting noticed, so others were saying, 'hey, maybe we can do this broader.' [...] We just picked it up, started to get some traction with it [...]" (Interview 6).

5. Case study 2: Overcoming organizational path dependence: The investor as savior?

Organizational paths as management challenge

Many empirical studies show that firms oftentimes have great difficulties to adapt to new conditions in their business environment (Hannan & Freeman, 1984). In this study, we take a path dependence perspective which highlights the mechanisms responsible for the narrowing of scope for action over time, ultimately leading to a strategic lock-in (Burgelman, 2002; Koch, 2011; Sydow et al., 2009). This process is problematic in the sense that companies may lose the capacity to sense and seize opportunities, threats, and more general perceive of broader dynamics in their environment (Cohen & Levinthal, 1990; Teece, 2007). Oftentimes, these processes evolve behind the back of the actors, who might not realize that the environmental changes have resulted in a problematic misfit between business environment and organizational strategy. Because of this, the dark side of organizational path dependence tends to become visible in light of abrupt environmental changes. In other words, former strengths flip into barriers preventing flexibility and adaptability, which binds the organization to the established behavioral patterns (Leonard-Barton, 1992). For example, many organizations have not been able to adapt to the technological shift from typewriters to computer technology (Danneels, 2011). Similarly, the digital imaging revolution has eradicated many formerly successful poster childs of the industry, such as Kodak (Lucas Jr & Goh, 2009) or Polaroid (Tripsas & Gavetti, 2000). As we

are interested in the possibility of effective response strategies to processes of organizational path dependence, we chose to study CameraCorp as case of a company that has managed these disruptive technological developments surprisingly well.

CameraCorp was known to be a highly specialized and very successful manufacturer of analog cameras, with a strong emphasis on precision-mechanical and fine-optical features. It was one of the pioneers in the development of the celluloid film-based imaging and built one of the first small-scale 35 mm cameras. Triggered by the tremendous success of its camera products, CameraCorp further invested in the development of its opto-mechanical capability set. Technical features and related competencies that would not fit these established ways of doing business, such as electronic auto focus, were rejected and not integrated into the firm's product and capability portfolio. In consequence, CameraCorp's competency set developed along a narrow trajectory with strong increasing returns resulting in great success of its business. For example, it had a worldwide reputation of outstanding quality in opto-mechanical technology and products.

We find that two self-reinforcing mechanisms in particular drove this process: For one, there were strong synergetic *complementarities* between the sets of activities and the components of the product architecture (Henderson & Clark, 1990), including the compatibility of optical lenses across CameraCorp's various products, which led the organization further down its internal competence-based path. Secondly, since CameraCorp constantly engaged in activities further exploiting their existing competence in optics and mechanics, while neglecting more explorative and experimental research and development activities, strong *learning* effects ensued (Levinthal & March, 1993). For example, they invested millions of Euros in exploring aspheric optical lens technology, which further contributed to its opto-mechanical competency set: "The concentration on our core competencies, optics, mechanics, and product aesthetics, and with that the bundling of the available resources is a major factor. [...] The systematic further development

of these strengths is the basis of the action of the company [...]. The aspiration of the company [...] to set new standards in both optics and mechanics represents a continuous challenge” (Annual Report).

With the digital imaging revolution picking up steam in the late 1990s, CameraCorp’s existing competencies lost much of its business value and the organization was pressured to develop new kinds of capabilities in the area of micro-electronics and software technology. In that sense, this was a competence-destroying environmental change (Tushman & Anderson, 1986). One key response to this disruptive environmental shift was that CameraCorp created an independent business unit to explore digital imaging technology (Christensen & Bower, 1996). However, it proved unable to integrate and absorb (Cohen & Levinthal, 1990) the gained knowledge and competence set as developed in this unit, and in fact in the process closed this unit down. Instead, they stuck to what they perceived as their key strength and further pursued an analog-retro strategy, failing to see that their former core competencies had by now turned into core rigidities (Leonard-Barton, 1992). We interpret these strategic decisions as powerful illustrations of organizational path dependence with regard to their cognitive and resource-based lock-in which prevented them to explore new strategies beyond the beaten track. More specifically, the organization was unable to deconstruct its rigidified action pattern and restore a new choice set, including a solution that would better fit the radically new business environment. As a result, the organization was on the brink to bankruptcy in the early 2000s. Overall, this case raises the important question of how an endogenously created path can potentially be broken by an organization?

Breaking internal paths through external intervention

In the early 2000s, CameraCorp’s business situation became ever more dire, and in fiscal year 2003/2004 the organization was very close to bankruptcy. Still, top management continued

to believe in the long-term prospects of its established strategy: “Our core competence was and is optics. (...) On the other hand, the digital revolution has created the impression that the traditional photography is dead. (...) The digital technology is only an intermezzo. Twenty years from now at the latest, we will certainly take pictures with other technologies than today, but we will still have the traditional photo film” (Newspaper article).

In the mid-2000s, a strategic investor showed interest in CameraCorp and decided to buy the majority of the shares. He quickly decided that CameraCorp had to change to digital technology in order to survive and prosper in this new business environment. For this purpose, however, both self-reinforcing mechanisms of CameraCorp’s cognitive and resource-based lock-in had to be addressed—complementarities and learning effects. To overcome these rigidities was quite a challenge: “At CameraCorp, we stuck too much to established ways of doing and nurtured these. And in fact, mechanics and optics are domains which had been pushed for a very, very long time from a Human Resource perspective and product specifications. [...] And the reason being, well the power structures—most of the top management, but also the middle managers who didn’t want to change” (Interview 4). The investor engaged in two main activities to break the organizational path: First, the organization purposefully decided to give up the now dysfunctional complementary effects, thereby accepting to take the additional burden of significant misfit costs. For example, it decided to integrate a smaller digital sensor even though this was not perfectly compatible with the optical lenses. Secondly, the strategic investor decided to invest heavily in R&D activities aimed at developing digital and electronics technology. For example, the investor decided to revive the independent research unit, and also invested in the development of a new single lens reflex camera. This latter project required a very different capability set and did cost more than 25 million Euros alone—more than a quarter of the revenue at the time. We know from previous research on path dependence that learning cannot be

reversed; instead, to overcome path dependence due to learning effects, an organization needs to rather build up a *new kind* of learning trajectory. We also know that “creating an effective alternative for the restoration of choice requires an extra effort—a (possibly costly) subsidy to help the new alternative catch up with the existing one” (Sydow et al., 2009: 703). This is precisely what the strategic investor did in the case of CameraCorp.

In sum, these external interventions from the strategic investor seem to have been very effective in breaking the path dependence at the competency-level of the organization—an internal path dependence which the organization by itself was unable to overcome. There are a couple of indicators for this. For example, after years of losses in the mid-2000s, in the past few years CameraCorp had an ebit margin of roughly 20 per cent. More generally, it is today widely acknowledged that CameraCorp has succeeded in catching up technologically with its competitors. A strong indicator for this is that current cameras include features such as high definition filming, live view, and auto focus—features that require the very competencies and capabilities pushed with the help of the external intervention.

6. Case comparison: Exploring response strategies to path dependence

Comparing two cases of path dependence

This comparative case study has examined two cases of organizations which have successfully managed the particular kind of path dependence they were subject to. Case 1, EnergyCorp, is a case of a company that succeeded in coping with path dependence at the institutional level; whereas case 2, CameraCorp, is a case of a company that has successfully overcome path dependence internally, at the level of its competency set.

While both cases thus are very similar in their outcome—managing path dependence—, they differ in some relevant dimensions and processes. Perhaps most importantly, the particular path dependent processes we are examining differ in level and focal point: In the case of

EnergyCorp, the path is external to the focal unit of analysis, whereas it is internal in the case of CameraCorp. Accordingly, we also find the main structural dimensions and the key self-reinforcing mechanisms of path dependence to differ in these two cases: EnergyCorp faced institutional path dependence materializing in regulative, normative, and cognitive dimensions and being driven mostly by coordination effects and adaptive expectations; CameraCorp, in contrast, had largely to deal with cognitive and resource-based strategic persistencies, which were driven mostly by complementarities and learning effects. We find that these stabilities and stabilizing mechanisms were addressed with the help of an inter-organizational network by EnergyCorp, while CameraCorp depended on an external investor as strategic actor to overcome its internally located path dependence. These two change agents also used different sets of main activities to target the particular self-reinforcing mechanisms and stop them from working on them: EnergyCorp used an inter-organizational network to solve collective action problems in a collaborative manner and also influence the existing paradigm in the issue-specific domain of training. Through these activities, EnergyCorp was able to decouple from the broader institutional environment and neutralize the influence of path mechanisms. In particular, the network approach provided EnergyCorp with a confined social sphere in which new cognitive templates could be developed, facilitating norms and values created and sustained, and new forms of rules and regulations established. CameraCorp's strategic investor, in comparison, intentionally let some existing complementarities in the product architecture of the firm fade out, while simultaneously engaging in activities in investing in developing and learning new knowledge domains. Through these activities, CameraCorp was able to create and develop new forms of competencies and knowledge that would better fit the changed environmental conditions. We interpret EnergyCorp's response to institutional path dependence as *path shielding* strategy. In comparison, we categorize CameraCorp's response strategy as *path*

breaking. These different response strategies have distinct implications for the path dependent process under scrutiny. In the case of EnergyCorp, the institutional path at the level of the U.S. VET system is still intact, but EnergyCorp’s path shielding approach has isolated it from its effects. In the case of CameraCorp, the organizational path was broken in the sense that its dysfunctional effects were overcome. Table 1 below summarizes the findings of our comparative case study. With these findings, we contribute to existing knowledge on processes of (organizational) path dependence, which we discuss next.

Table 1: Strategies against path dependence.

	Case 1: <i>EnergyCorp</i>	Case 2: <i>CameraCorp</i>
Level of path dependence	Institution	Organizational competence
Focal point of path dependence	Path <i>external</i> to the focal organization	Path <i>internal</i> to the focal organization
Structural dimension of path dependence	- Regulative pillar - Normative pillar - Cognitive pillar	- Cognitive - Resource-based
Targeted path mechanisms	- Coordination effects - Adaptive expectations	- Complementarities - Learning
Targeting agent	Network	External actor/investor
Agent activities	- Joining forces to solve collective action problems together - Collaborating on trying to change existing cognitive-normative paradigm	- Purposefully letting some of the existing competencies based on complementarities fade out - Starting a new learning and capability-building trajectory in digital imaging/electronics
Response strategies	Path shielding	Path breaking
Implication for path	Intact, but low impact on organization	Broken, no dysfunctional effects on the organization

7. Discussion

This study looks at two cases of companies that have successfully managed or engaged with path dependence. Path dependence is a somewhat puzzling but highly relevant empirical phenomenon increasingly discussed in scholarly discourse (Kay, 2013; Schreyögg & Sydow,

2011; Vergne & Durand, 2010). Importantly, path dependence research has somewhat neglected the capacity of firms to impact and more actively manage path dependent processes internal and external to their organization (Schreyögg, Sydow, & Holtmann, 2011; Sydow et al., 2009). Except for few notable contributions on concepts such as path creation and path extension (Garud & Karnoe, 2001; Sydow, Windeler, Schubert, & Möllering, 2012), most literature on path dependence has a rather pessimistic view on the role of management in path dependent processes. This refers to the inability to intentionally create paths, purposeful deviate from them, as well as to effectively respond to path dependent processes more generally (Oliver, 1991). Our study makes a meaningful contribution to this research gap by examining two cases of companies which have managed to either shield themselves from a broader institutional path by relying on a network approach, or to break an internal path with the help of an external strategic investor. More specifically, we highlight the role of strategic agency in processes of (organizational) path dependence.

Based on our empirical findings, Table 2 below proposes a typology of effective response strategies to path dependent processes in dependence on whether these are located either within or beyond the focal organization. We identify two major strategic responses to path dependence: *path shielding* and *path breaking*. Whereas path shielding involves activities aimed at decoupling and isolating the organization from broader influences, path breaking describes a situation where an organization engages in activities aimed to actively break an existing path. While we generally account for the possibility that these two basic strategic responses can occur in both situations, i.e. internal and external path dependence, we hypothesize that path shielding is probably more effective when the path dependent process is located beyond the organization. This may be the case when there is a broader institutional path, as is the case with EnergyCorp, for example. Similarly, path shielding might be a useful strategy to manage path dependence in regional

economies or networks, for example (Grabher, 1993; Kim, Oh, & Swaminathan, 2006). In contrast, we assume path shielding to be less effective in dealing with internal path dependence. While we know that organizations sometimes succeed in creating independent units shielded from their core business activities (Christensen & Bower, 1996; Gilbert, 2006), we also know that firms typically fail in re-integrating these units into their organizational structure. Similarly, we have found in our case study of CameraCorp that existing self-reinforcing mechanisms worked against re-integrating the R&D subunit created to develop digital imaging capabilities.

In cases of internal path dependence, we assume path breaking to be a much more promising and effective type of strategic response. Importantly, this involves a more active and drastic approach directly addressing the self-reinforcing mechanisms that are driving the particular path dependent process (as opposed to shielding from them). While we found that in the case of CameraCorp this was achieved by an external investor, we do not intend to rule out the possibility that even agents within a particular organization can take a semi-external position. This relates to concepts such as monitoring, second-order observer, or knowledgeable agents (Schreyögg & Kliesch-Eberl, 2007; Sydow et al., 2009). The breaking of paths external to the focal organization is less effective or suitable, however; in particular, given the aggregate level of these processes, we hypothesize that it is rather unlikely that an organization has both willingness and capability to break these higher-order paths. For example, our case study of EnergyCorp shows that even a very large multinational corporation lacks the capacity to influence path dependent processes at the institutional level. However, we do not want to rule out this possibility. For example, we know that institutions can be more or less stable (Jepperson, 1991). In situations where institutions are not very stable and only weakly enforced (Levitsky & Murillo, 2009), this may indeed be a viable response strategy (Oliver, 1991).

Table 2: Typology of response strategies to path dependence.

	<i>Path shielding</i>	<i>Path breaking</i>
<i>Internal path dependence</i>	(I) Internal shielding strategy	(II) Internal breaking strategy <i>(E.g., CameraCorp)</i>
<i>External path dependence</i>	(III) External shielding strategy <i>(E.g., EnergyCorp)</i>	(IV) External breaking strategy

We feel that this opens up some exciting areas for further research. Based on the previous considerations, for example, we would expect to find only few cases in quadrant (I) but rather many cases in quadrant (II). Similarly, we expect future research to identify only few cases in quadrant (III) while many in quadrant (IV). This is related to our assumptions regarding varying levels of effectiveness of response strategies to path dependence in relation to locus. We encourage further research to inquire these expected relationships more closely. In particular, future studies could help overcoming the limitations of our study. Perhaps most importantly, our explorative case study design allows only limited generalizability (Eisenhardt, 1989). We feel that a large-N study could test our assumptions on the conditionality of effective response strategies to path dependence. More generally, we see great promise in examining further the relationship between context conditions, such as locus and level of path dependence, and effective response strategies for the purpose of managing path dependent processes. This refers to the context-specificity of agency. This can further contribute to research aiming to better integrate stronger notions of agency within a path dependence framework. Also, we discuss the role of self-reinforcing mechanisms with regard to our two success cases—we feel that there is great promise in looking at this more closely in future research. For example, one can imagine that path-deviant behavior is perhaps not so much about stopping existing self-reinforcing

mechanisms, but rather about decoupling from their influences or even laying the ground for the development of new behavioral patterns that may or may not evolve into new path dependencies. From this perspective, path-deviant behavior can be conceptualized as either requiring the interruption of an existing logic or accepting—but in a reflective manner—an existing path and developing viable responses to engage with its self-reinforcing mechanisms. Both of these broad strategies, however, first require understanding and reflecting on path dependence and what drives these processes. This suggests the promise of a more management-oriented perspective on path dependent processes, highlighting the role of strategic agency and different sets of activities constituting broader types of effective strategic responses, including but not limited to path shielding and path breaking. Our study has moved in this direction, and we encourage others to follow us on this path.

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APPENDIX

Table 3: Interview data on EnergyCorp.

Number	Interview respondent (function)	Length of interview (min)
1	<i>HR Lead</i>	60
2	<i>President and CEO</i>	21
3	<i>Senior VP Corporate HR</i>	36
4	<i>Former President</i>	37
5	<i>Former President (follow-up interview)</i>	56
6	<i>Director of Operations and VP</i>	35
7	<i>Director of Operations and V (follow-up interview)P</i>	39
8	<i>Director HR</i>	68
9	<i>Director HR (follow-up interview)</i>	105
10	<i>Director Product Line</i>	77
11	<i>Training Manager</i>	61
12	<i>Training Manager (follow-up interview)</i>	58
13	<i>Apprentices Mentor (CNC Machinist)</i>	43
16	<i>Director of Operations and Production Network Lead</i>	30
17	<i>Training and Development Manager</i>	110
18	<i>Head of Vocational Training – West</i>	58
19	<i>Head of Vocational Training – East</i>	113
20	<i>International Partnerships</i>	119
21	<i>International Partnerships (follow-up interview)</i>	56

Table 4: Interview data on CameraCorp.

Number	Interview respondent (function)	Length of interview (min)
1	<i>Head of Development & Engineering</i>	75
2	<i>Head of CameraCorp Museum</i>	56
3	<i>Head of Digital Imaging</i>	88
4	<i>Head of Electronic</i>	42
5	<i>Project & Product Manager</i>	64
6	<i>Head of Camera Development</i>	54
7	<i>Head of CameraCorp Academy</i>	46
8	<i>Head of Optical Development</i>	61
9	<i>Head of Marketing & Communication</i>	65
10	<i>Head of Product Management</i>	42
11	<i>Head of Workers Council</i>	57
12	<i>Head of Sales & Distribution</i>	43
13	<i>Current Chief Executive Officer</i>	48
14	<i>Head of Optical Manufacturing</i>	20
15	<i>Head of Optical-Lens Assembling</i>	27
16	<i>Head of Digital Imaging</i> <i>(follow-up interview)</i>	92
17	<i>Former Chief Executive Officer</i>	166