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Performance-oriented Systems as a Strategy

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Shareconomy - Performance-oriented Systems as a Strategy

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Abstract
Within this paper we examine the strategic perspective of the emerging phenomenon of performance-oriented systems (e.g. car-sharing, cloud computing). Based on twenty-seven system examples from four industries, we derive six founding propositions that delineate their strategic characteristics and identify initial enabling factors. Our research qualifies recent work on superior architectural knowledge and provides managerial guidance for system development.

Keywords
Strategy, Innovation Management, System Development, Architectural Knowledge

1. Introduction

In recent years, several industries experienced a technological transformation. For example, the emergence of car-sharing is altering the prior settled structure of the mobility industry. The IT industry is influenced by cloud computing. The appearance of chemical management systems and power purchase agreements in the chemical and energy industry are further cases for these transformations. Although the examples derive from industries with very diverse characteristics, they delineate the same phenomenon: Firms that are selling their products or services on determined conditions are confronted with novel competition from firms that are implementing a system-platform offering the performance of these products for shared use on flexible conditions. The observed phenomenon of these performance-oriented systems is not only based on the activity of entrepreneurial companies but also considerably adopted among incumbent firms. In the mobility industry for example, nearly all major car manufacturers and car rental companies are engaged in car-sharing besides entrepreneurial firms, totaling in 130 providers in 309 cities and municipalities solely in Germany [BVCS, 2012].

The aforementioned, changing context conditions raise the question whether the phenomenon is a contemporary experiment or a viable strategy to gain competitive advantage? Why should a car manufacturer (partially) transform towards providing numerous users one vehicle on a minute or kilometer basis for shared use instead of selling each single user one vehicle?

When reviewing the existent literature it becomes apparent that different areas of expertise have already acknowledged the phenomenon of performance-oriented systems, ranging from the industrial economics [Baines et al., 2007] and environmental sciences [White et al., 1999] towards the engineering and design literature [Meier et al., 2010] as well as the computational sciences [Marston et al., 2011]. The literature is fragmented and not yet synthesized. The emphasis of these contributions resides on the operational level and a coherent strategic management perspective in excess of single assumptions [Mont, 2002; Tukker, 2004] is absent. The second theoretical conversation within this work, the strategic innovation management literature, complements this deficiency. The comparatively broad theory of dynamic capabilities [Teece and Pisano, 1994; Teece et al., 1997] plays a decisive role in this strand. A complementing and more applied approach to gain a strategic advantage without industry dominance is superior architectural knowledge of a technological system [Baldwin, 2010; Baldwin and Clark, 1997]. To our knowledge, the theory has its heritage in the computer industry and has not been applied to other including the observed phenomenon.

Our research seeks to close the identified research gap and explain the recent emphasis on performance-oriented systems from a strategic innovation management perspective in greater detail. We attempt to synthesize the literature of performance-oriented systems and link this strand to the conversation of strategic innovation management research. We selected an interpretative approach based on the methodological foundation of Grounded Theory [Glaser and Strauss, 1967; Strauss and Corbin, 1994]. Our findings are based on semi-structured, qualitative interviews with executives from twenty-seven system examples from four industries. Items from the substantive concept of dynamic capabilities and the strategy of superior architectural knowledge have been used for interpretation. Albeit our research was conducted iteratively, the presentation of our study is oriented at the positivist paradigm and framed sequentially for the sake of advance clarity [Suddaby, 2006]. Nevertheless, the reader has to keep in mind that the introduction and the theoretical overviews already use concepts that emerged from our study along with consultations of relevant literature. Hence, the remainder of this work is structured in the following. The second chapter illustrates the phenomenon, followed by the introduction to the existing scientific literature. The third part comprises the selected research approach. The findings of our research are presented and discussed in the fourth section. The work closes with the conclusions and implications in chapter five.

2. Theoretical Background of Performance-oriented Systems

2.1. The Phenomenon of Performance-oriented Systems

The phenomenon of performance-oriented system innovations imposing a competitive threat to established firms can be observed in diverse industries with different characteristics. The following excerpts illustrate four examples from the mobility, IT, chemical and energy industries. These system examples are based on the innovation activities of three incumbents and an entrepreneurial firm.

In the mobility industry, 'Car2Go' is a free-floating carsharing system by the German automobile manufacturer Daimler AG. Instead of selling a vehicle, Car2Go offers the performance of the products, 'mobility', to their users. The vehicles of the system are not station-based but widely distributed in a specified inner-city area. Available vehicles in the vicinity can be located online, via phone application or visually on the street. The user unlocks and activates the car with the help of a membership card, a personal identification number and the key inside the vehicle. The cost for mobility is calculated on a minute, hourly or daily basis and includes the gas, insurance, mileage coverage, taxes, maintenance and parking fees on designated areas [Daimler AG, 2010]. Car2Go started in Ulm, Germany, in 2008 [Daimler AG, 2008]. In 2013 Car2Go has expanded into 19 cities in Europe and North America operating around 5.500 vehicles [Car2Go, 2013].

The phenomenon also altered the IT industry with an abundant number of transformation cases in recent years [cp. Larry Ellison, cited in Farber, 2008]. Exemplary, the firm Aqilla provides an online accounting software solution to its users through a 'Software-as-a-Service'-system instead of selling software products that rely on expansive client server infrastructures. The 'accounting performance' is delivered through a platform via the internet on-demand,

anywhere and at any time to the user. System implementation, upgrade, security, maintenance and advancements are included in Aqilla's offering. The UK-based entrepreneurial firm started business in 2006 [Aqilla, 2013].
In the chemical industry, the firm Cabot Specialty Fluids is offering a high-value drilling fluid for offshore oil-well operations as a performance-oriented system. Cabot charges their users on a daily or monthly fee for the performance of the fluid as well as inadvertent losses. The offering is integrated in a systemic architecture, as production, distribution and withdrawal of fluids as well as their reclamation lies within the stewardship of the firm. Additionally, a range of technical services (e.g. operator training, engineering support) complement their offering. Cabot Specialty Fluids has serviced over 250 oil-well operations since starting operations in 1998 in Texas, USA [Cabot Specialty Fluids, 2013].
A fourth example from the energy industry is provided by Lakeland Electric offering a system named 'Solar Hot Water Program' since 1998 in Florida, USA [Lakeland Electric, 2013]. Users are charged for 'thermal heat' generated on a fixed monthly basis instead of purchasing solar-technologies for home use. The providing firm installs, operates and maintains the technological system, whereas the users solely host the necessary components at their properties and utilize their performance over a determined period.

2.2. Existing Scientific Conversations

When reviewing the existent literature, it becomes apparent that several scholars have already acknowledged the phenomenon of performance-oriented systems ranging from the industrial economics and environmental sciences towards the engineering and design literature as well as the computational sciences. The authors have identified a variety of characteristics with regards to their field of expertise which are presented in the following.
The concept of 'product-service-systems', e.g. [Goedkoop, 1999], [Mont, 2002], [Manzini and Vezzoli, 2003], and its related notions ('product utility services', e.g. [White et al., 1999]; 'product of service', e.g. [McDonough and Braungart, 2009]; 'industrial product-service-systems', e.g. [Meier et al., 2010]; 'hybrid products', e.g. [Berkovich et al., 2009]) put an emphasis on the operational level, analyzing specifically the different components of the system and their contribution to the value proposition. The research in this field highlights the importance of ecological benefits of the systemic approach, e.g. [Manzini et al., 2001]. Unfortunately, the concepts fall short of a common understanding what phenomenon the terms should embrace and which to exclude, e.g. [Tukker, 2004] vs. [Zaring et al., 2001], thus limiting the coherence of findings. Nevertheless, this strand of literature provides initial evidence that the detected phenomenon is a well-defined sub-system within the respective industry with full life-cycle responsibility of the operating firm for the included components [Brezet et al., 2001]. These components may be physical and/ or non-physical [Tietze et al., 2011], with a central service component [Kowalkowski, 2010]. The last aspect specifies the need for a reconfiguration of the firm`s business model. Existing reviews in this research area conclude that the literature base is still shallow and further research needed [Baines et al., 2007].
The computational sciences precisely recognized the detected phenomenon within their emerging research on 'cloud computing' and 'software-as-a-service' while not providing universal evidence for all cases included in this work. The contributing authors attempt to characterize the physical and non-physical resources of the systems as precise as possible without consensus, ranging from technology-oriented, e.g. [Buyya et al., 2009], [Wang et al., 2010], towards more economic-driven definitions, e.g. [Takai, 2012], [Marston et al., 2011]. This strand of literature is confronted with similar problems regarding a clear definition of system components and system boundary. The detected phenomenon is more than a simple product bundle or an in-house development strategy but less than an industrial platform or

standard [Cusumano, 2010; Cusumano and Gawer, 2002]. Commonly, the authors emphasize the role of a platform for interconnecting the single components and providing a central utility-like service. The business model is altered towards an on-demand, self-service model that is independent of device or location. The dominant service is remunerated as an operational expense requiring any initial capital investments. Last, the systemic approach allows elasticity and a lower risk in resource provisioning [Armbrust et al., 2010]. Cloud computing also allows for green computing [Marston et al., 2011].
It becomes apparent that all examined notions reflect to a certain extent on potential environmental aspects of the systemic approach. Recently, a general literature review on environmental innovations revealed that it is a fuzzy concept based on relative constructs [Schiederig et al., 2012]. A precise distinction between 'green' and 'non-green' innovations request a thorough analysis of all resources for the complete life-cycle; an extensive task to perform. The ascending complexity of performance-oriented systems in comparison to a single product even deepens the challenge of an accurate impact assessment. Subsequently, the evaluation of ecological benefits implied in a systemic approach comprises the weaknesses of general green innovation research and remains on a conceptual level. The central theme of dematerialization [Baines et al., 2007], i.e. the possibility to decouple economic success from material consumption, is sparsely supported by scientific evidence. The majority of single constructs or effects are based on the insight that economic-driven resource efficiency has ecological side effects [cp. Porter and van der Linde, 1995]. Drawing on prior studies, Tietze et al. [2011] attempt to structure the identified constructs in system inherent [Loose, 2008] and system independent [McDonough and Braungart, 2009] ecological benefits. Profound evidence for ecological advantages of performance-oriented systems based on a detailed resource analysis is scarce and further investigation needed [cp. Firnkorn and Müller, 2011].
To summarize, the existent literature is fragmented and not yet synthesized into a larger perspective. None of the above-mentioned notions describes the detected phenomenon from a strategic management perspective. Therefore, we derived the notion of performance-oriented systems for this purpose which integrates the central aspects of related prior research. We conclude in our definition that:

*A **performance-oriented system** is a well-defined **sub-system in the respective industry combining different resources, e.g. physical and non-physical components, for shared use.** The single resources are **organized through an integrating module**, often referred to as platform. This module provides the **performance of the integrated components** on **flexible usage-based conditions** and does not request partial **ownership of any resources by the user**. Hence, a performance-oriented system features maximum **elasticity of resource deployment** for the user. The recombination of the components within the system in comparison to existing alternatives results in an increased **resource efficiency**.*

Resembling bundles of components, e.g. renting, leasing or pooling services are not included under the notion performance-oriented system due to different characteristics that result in a reduced elasticity, i.e. inflexible contractual conditions or the partial ownership of system-components by the user (cp. Figure 1). To clarify this aspect, as no consistent definitions across industry sectors for the differing notions are existent and intersections are blurred, performance-oriented systems always 'bang the right corner' in terms of elasticity of resource deployment relative to existent offerings. They are optimized towards performance (i.e. 'work done over time') and its related costs. Likewise, it is neither an industrial standard nor platform that provides the core for complementing firm`s offerings because of the system governance by a single firm and its limited adoption within the industry. Ecological characteristics are not included in the definition of performance-oriented systems due to the underlying challenges in precise assessment. The resource efficiency is solely based on economies of scale and scope [cp. Henderson and Gälweiler, 1984; Hirschmann, 1964].

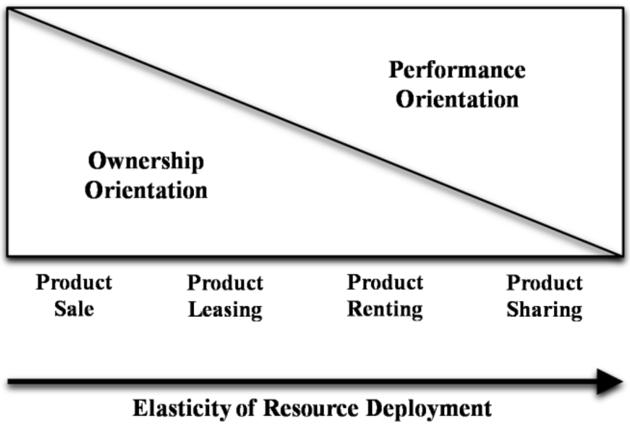

Figure 1: Performance-oriented Systems in Comparison to existing Alternatives

2.3. Strategic Innovation Management

Research regarding the strategic management of the firm is characterized by a long history but little progress [Eschenbach et al., 2008]. Modern strategic management concepts constantly refined the two-step approach of an analysis of the firm`s environment (external factors) and the adaption of the firm (internal factors) for value creation and value appropriation. Early concepts, e.g. [Ansoff, 1969], put an equal emphasis on the internal and external factors but remain on a static level. Subsequent frameworks concentrated on the relevance of the external factors, e.g. [Porter, 1980], or the internal factors, e.g. [Barney, 1991] and increasingly considered dynamic market environments into their concepts, e.g. [Porter, 1996] or [Teece and Pisano, 1994]. The underlying research approach from these authors is the conversion from a theoretical or conceptual towards an applied level.

A central framework in strategic innovation management research is the theory of dynamic capabilities [Teece and Pisano, 1994; Teece et al., 1997; Eisenhardt and Martin, 2000]. It highlights the importance of new opportunity identification and efficient organization for economic firm success rather than concentrating solely on external competitive forces. Thus, the dynamic capabilities of a firm are interpreted as a constant analysis of the changing environment and the coordinated response to attain and sustain value. It is foremost a behavioral orientation embedded in processes that is in constant pursuit of reconfiguration [Wang and Ahmed, 2007]. The constant adaption incorporates the firm`s resources, i.e. the physical assets, and its intangible competences, i.e. the ability to deploy resources to attain a goal. The theory of dynamic capabilities is an aggregated multidimensional construct. The operationalization of the single dimensions as well as their interrelations remains one of weaknesses and requests further research [Barreto, 2010]. Some studies in the past circumnavigated this disadvantage by using qualitative case studies, e.g. [Galunic and Eisenhardt, 2001].

The theory of dynamic capabilities is closely connected to the strategy of superior architectural knowledge due to their correlating founding literature, e.g. [Henderson and Clark, 1990], [Henderson and Cockburn, 1994]. It is a comparatively narrow concept with a heritage in the computer industry and is based on insights from simple technological products which have been recently up-scaled as concept for industry analysis and firm adaption [Baldwin, 2010; Baldwin and Clark, 1997]. Prior research already showed the strong connection between the architecture of the industry and the architecture of the respective technology or product [Henderson and Clark, 1990; Christensen, 1997]. Baldwin [2010] defines architectural knowledge as *"knowledge about the components of a complex system and how they are related"*, whereas *"industry architectures characterize the nature and degree of specialization of industry players (or 'organizational boundaries') and the structure of the relationships between those players"* [Pisano and Teece, 2007]. The contributing authors propose analyzing the existing technology or established market, dividing the existing system architecture into modules and identifying weaknesses, so called 'bottlenecks'. These bottleneck-modules constrain the performance of the system, e.g. [Ethiraj, 2007]. In pursuing the strategy of concentrating on and supplying superior 'bottleneck'-modules as well as outsourcing non-crucial modules, an (entrepreneurial) firm may gain a competitive advantage [Baldwin, 2010]. In contrast, an established firm that seeks to exercise this strategy is constrained by its current position in the system which often diverges with the bottleneck location. The re-composition of the offering, modular diversification or co-specialization as well as the promotion of competition within complement modules are feasible instruments for incumbents to alter the industry architecture and relocate the bottleneck within the realm of the firm for value creation. Subsequent modular innovations of the bottleneck are a natural barrier for value appropriation that supplements external legal mechanisms [Jacobides et al., 2006] [Merges, 2004].

Recent publications discuss the interrelation between the former two concepts and if the comparatively narrow conception of superior architectural knowledge and its strategic use is in fact a dynamic capability of a firm, e.g. [Pisano and Teece, 2007]. Albeit some differing aspects, e.g. the evolution of co-specialization based on multilateral dependencies in complex systems [Jacobides et al., 2006], the discussion is still in progress. Nevertheless, the broad concept of dynamic capabilities appears qualified for a scientific starting point, because of its wide approval in the research community, whereas the strategic use of architectural knowledge will certainly provide insights that are more applied.

3. Research Approach

So far, we have introduced the recent trend on performance-oriented systems and presented the relevant conversations of performance-oriented systems and strategic innovation management that are not yet synthesized [cp. Grant and Pollock, 2011]. As performance-oriented systems are an emerging phenomenon with increasing relevance, e.g. [Millard-Ball, 2005], the incorporation of a strategic perspective should be of interest for practitioners and scholars alike. Therefore, we assume the strategic perspective will serve as guidance to management whether performance-oriented systems are a reasonable opportunity for implementation in the context of their business. In terms of scientific research, the results will contribute to applied knowledge that enhances the theoretical understanding of dynamic capabilities, the strategy of superior architectural knowledge as well as their interrelation. Last, our research strives to put the fragmented literature of performance-oriented systems into a more integrated perspective. Further, our research seeks to fill the identified research gap and explain the recent emphasis on performance-oriented systems from a strategic management perspective in greater detail. Therefore we derive the main research question:

RQ: Are performance-oriented systems a contemporary experiment or a strategy of a firm to gain competitive advantage?

This broad scope has to be operationalized into more precise sub-questions. All existent concepts refine the two step approach of environment analysis and firm adaption with the intention to create potentials for success and use of these potentials. Hence, if performance oriented systems are an explicit strategy our research first has to clarify whether an analysis and adaption has been executed in economic praxis.

Drawing on the insights from the strategic use of architectural knowledge our research has to clarify whether there has been an identification of any bottleneck within the environment of the firm prior to the development of the system. A direct investigation of this aspect could be difficult to assess due to its conceptual character. Therefore we addressed this facet in a more open, indirect manner, clarifying the reasons or the motivation for the development in general (e.g. 'What motivated the development of the performance-oriented system?')

The second aspect is concerning the adaption or reconfiguration of the firm respectively. Subsequently, our research has to focus on the differences in comparison to conventional or prior alternatives in terms of internal and external resources and competences (e.g. 'What is the difference between the performance-oriented system and conventional offerings?') The reconfiguration has to include innovations for value creation (e.g. architectural innovations) as well as value appropriation (e.g. modular innovation).

In addition to the former two aspects that verify whether performance-oriented systems incorporate the characteristics of a strategy, our research also seeks to provide initial enabling factors. As financial performance data on this emerging phenomenon is scarce, our research attempts to consolidate and align the theoretically developed enabling factors in the literature with our primary data.

We opted for a qualitative research to answer the questions considering the knowledge situation as being shallow and fragmented [Punch, 2005]. We selected an interpretative approach based on the methodological foundation of Grounded Theory [Glaser and Strauss, 1967] in compliance with [Strauss and Corbin, 1994]. Our research strategy follows the recommendations of [Suddaby, 2006], [Wimpenny and Gass, 2001] and [Johnson et al., 2006]. The design of the data sample is consistent with the requirements of 'theoretical sampling'. The sample includes system examples from four industries with diverse characteristics (i.e. mobility, energy, IT and chemical sector) accounting for the emergence of the phenomenon in B2B and B2C segments. For each industry we have compiled three different firm types (i.e. entrepreneurial firm, product- and service-based firm) resulting in twenty-seven system examples under examination. Primary data was collected through semi-structured telephone interviews with a key informant (e.g. the executive manager) of the specific system [Kumar et al., 1993]. The interview guidelines were based on items from the substantive concept of dynamic capabilities. The interviews ranged from 40-70 minutes, were recorded and written transcripts of all interviews were prepared. Primary data collection was supported by secondary sources (e.g. journals, reports, newspaper, etc.) to strengthen the accuracy of findings. The data analysis was structured according to the paradigm of 'constant comparison' in three rounds of conceptualization. A first round of open coding to develop relevant categories was followed by two rounds of theoretical coding to discover the interrelation between categories. Items from the substantive concept of dynamic capabilities and the strategy of superior architectural knowledge have been used for the latter interpretation. The software MaxQDA supported the data analysis.

4. Findings

The subsequent presentation of findings is structured according to the prevalent two-step approach of environment analysis and adaption of firm resources. The latter is divided into the two types of value creation and value protection. Each section comprises two central results derived from our qualitative research. The number of quotes to verify a finding is constantly declining to improve readability and sustain concision. Their quantity only has illustration purposes and no impact on the accuracy of the specific result.

Analysis of Firm Environment: Interviewing the key managers of performance-oriented systems about their motivation for system development, it becomes apparent that the dominant reason lies within changing user preferences. Exemplary, 'ICT 3' summarizes: *"So the main motivation was not to loose on this trend and opportunity where companies are looking for externalised solutions where they can focus on the use of a software but not on the maintenance and on the installation and on the running of the infrastructure."* This statement is supported by 'Energy 1', who asserts that *"[Company name]] main drivers to develop the [system name] model are to make solar heating technology more accessible for people, to remove financial barriers, and to eliminate the problem of customer's confidence."* The disadvantage of product acquisition and operation is reflected across all industries, e.g. 'Chemical 5': *"This product, [product name], is a very high-price product. [...] You need a lot of know-how in order to keep it running and to keep it in-use and to work with this chemical as long as possible."* This leads to our first finding:

> Finding 1: Changing user preferences in terms of skill, effort and cost for product acquisition and operation have facilitated the development of performance-oriented systems.

The existing literature indicates that there are also ecological reasons for system development. In contrast, most of our informants answer in this aspect quite frankly: *"Yes, yes. Environment benefit, you know, that is PR, that is public relations."*('Mobility 7'). Some at least acknowledge the existence of environmental benefits as a side effect, e.g. 'Energy 1': *"I mean, obviously, the technology has got a lot of environmental reasons, but the concept of [system name] is mainly to make it more accessible for the customers."* This leads to our second finding:

> Finding 2: The firm´s motivation to develop a performance-oriented system is predominantly economic driven; ecological benefits are regarded as a side effect.

To summarize, the first two findings indicate that the examined firms have detected a transformation in the economic environment of the firm. The change ('user preferences') concerns limited performance downstream in the value chain. Therefore we can conclude that there has been an analysis of the environment and an identification of a bottleneck prior to the development of the respective performance-oriented system.
Adaption of firm resources: In the second part of our interviews we investigated the reconfiguration of the firm's assets during the development of performance-oriented systems. Reviewing the results it becomes very clear that system development is accompanied by a major shift in perspective. Exemplary, 'Mobility 8' states that "*[...] in future is, from our point of view, the direction that a customer does not necessarily needs to purchase and buy a product, it is rather the he purchases mobility [...]"* This opinion is supported from informants across all industries, being compliant that "*[...] you are not selling the kilos of products, you are selling the performance."* ('Chemical 3'). This leads to our third finding:

> Finding 3: A firm is offering the performance of several joint resources on flexible conditions to the user, instead of selling a pure product or offering a service with determined conditions.

The reconfiguration of resources is influenced by the firm's prior position and knowledge base as well as necessary complements for system development. 'Mobility 9' well illustrates this aspect, asserting that *"[...] We knew how much money we were going to be spending, [...] of course we knew how to buy cars, and how to sell them and how to fix and how to manage a* *fleet. So that was very important"*. and further *"[...]we are still trying to improve the solution always and we are always looking for, you know, how can we do this? What kind of, should we hire someone to do this for us? Should we do it ourselves?"* This leads to our forth finding:

> Finding 4: A firm is transferring its existing resources from prior business as well as integrating complementary new resources to provide the performance.

The former two findings indicate that performance-oriented systems integrate two generic innovation types for value creation. The first type concerns the redefinition of the firm boundary to provide a performance-oriented offering rather than a product- or serviced based one. This type fulfills the characteristics of an architectural innovation to integrate the identified bottleneck within the realm of the firm. The second type, concerning the transfer of valuable existing resources as well as co-specialization through integration of complementary resources summarized in finding four, comprises the characteristics of modular innovations.
Literature indicates that value appropriation is as important as value creation. Thus, we investigated how firms offering a performance-oriented system with diverse resources secure the rents of the system. The majority of informants identified the integrating module, or platform, as the key resource in this aspect. Exemplary, 'Mobility 7' points out: "*No, actually in Switzerland this is one of the key values of mobility, to run the system, to run the platform. And part of this platform is this technology of reservation, vehicle access and billing."* This leads to our fifth finding:

> Finding 5: The installation of a performance-oriented system requests the development of a dedicated module for integrating the different components. The development of the integrating module is done internally as it is the key component.

A complementary aspect of value protection results out of a changing innovation behavior, characterized by a high user integration and an iterative, discovery-based development, due to the responsibility of the firm for all system components. For example, 'Mobility 6' accentuates "*[…] what I am saying is that we see new business idea not coming from us, not top down, coming from us and we develop and we present it to the customers, but it is the customers suggesting an idea and us resourcing that and developing that with the customer*." This leads to our sixth finding:

> Finding 6: Close collaboration between user and firm allows discovery-based continuous development of the system rather than discrete innovation resulting in a higher innovation rate and speed.

The last two findings identified two relevant aspects for value appropriation within performance-oriented systems. The emphasis on the integrating module and on an efficient, user-oriented innovation behavior secures value protection. To summarize the former four findings, the implementation of a performance-oriented system requests the development of architectural and modular innovations for value creation and protection resulting in an adaption of firm resources.
Regarding the enabling factors of performance-oriented systems, our data suggest that location and constriction of the bottleneck [Ethiraj, 2007] as well as industry legislation [Jacobides et al., 2006] are influencing factors in the firm environment. Internal factors affecting value creation are existing competences [Henderson and Clark, 1990], the concentration on component integration [Pisano and Teece, 2007] and necessary outsourcing of non-crucial modules [Baldwin, 2010]. In terms of value protection, the discrepancy to

existent offerings [Henderson and Clark, 1990], the degree of user-collaboration [Christensen, 1997], co-specialization and decentralization [Pisano and Teece, 2007] play a crucial role.

5. Conclusion

Based on our findings we conclude, that performance-oriented systems incorporate the basic characteristics of a strategy, as their implementation comprises the identification of a bottleneck in the environment of the firm as well as the adaption of the firm's resources to integrate and protect the bottleneck. The optimization towards maximum elasticity of resource deployment for the user results in a distinctive position within the industry spectrum of alternatives. The strategy is particularly qualified for (mature) industries characterized by a bottleneck downstream in the value chain, i.e. changing user preferences for product acquisition and operation. The concentration on and supply of a superior bottleneck module, i.e the integrating module or platform respectively, are the central tasks to perform by the implementing firm. Additionally, we have identified initial enabling factors that are aligned with existent literature. Our findings are coherent with the conceptual strategy of superior architectural knowledge for entrepreneurial firms. Our results also reflect on the theory of dynamic capabilities as a constant mode of opportunity identification and pursuit of reconfiguration. Our research even broadens the juvenile insights from the former concept through the implementation of incumbent firms and qualifies it through evidence from twenty-seven applied examples and the connection with the established latter theory. Last, we have synthesized the fragmented literature that already perceived the phenomenon into the more integrated perspective of performance-oriented systems. In terms of managerial praxis, our results provide initial guidance for management for performance-oriented system implementation. Based on the founding insights presented above, our future research seeks to carve out more granular characteristics and precisely framed enabling factors as well as a consistent framework guiding system implementation.

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