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Aligning the Mindset and Capabilities within a Business Network for Successful Adoption of Smart Services

Pekka Töytäri , Taija Turunen, Maximilian Klein, Ville Eloranta, Sebastian Biehl and Risto Rajala

This paper explores the synchronized change of mindset and capability within a business network that is driven by the adoption and provision of smart services. The research is implemented as an empirical multi-case study, and the primary data include interviews and observations in seven globally operating firms. The findings identify two categories of barriers and three categories of alignment needs to successful adoption of smart services. The study combines the institutional theory and dynamic capability perspectives to make three main contributions to the research of service innovation for an improved understanding of the determinants of successful field-level adoption of smart services. The results show that firms need to align the change of logic and capabilities within the organization and the business network to succeed in the adoption of smart services.

Practitioner Points

- The study shows that focusing on the firm level change only does not lead to success. Managers need to influence both the business mindset and capability development of their peers in the business network for successful network-level adoption of smart services.
- Existing organizational structures, management models, and incentives do not support the internally and externally networked value creation by smart services.
- Smart services often lead to outcome-based agreements.
- The study provides a comprehensive checklist of potential obstacles for successful launch of smart services.

Introduction

Digital transformation enhances inter-organizational exchange and creates exciting new opportunities for value creation (cf. Brynjolfsson and McAfee, 2012). Specifically, digital transformation enables smart services (Allmendinger

and Lombreglia, 2005; Kagermann, Wahlster, and Helbig, 2013) to denote value offerings enabled by information that is generated, processed, stored, and transmitted through digital technologies that improve business performance by, for example, analysis, optimization, prediction, and integration. The introduction of smart services provides a unique context to study the business network level adoption of service innovations. Smart services represent novel innovative offerings that initially have a low established demand, require explicit demonstration of value to all stakeholders, and bring focus to the often overlooked question of how value is created in the first place (Adner and Kapoor, 2010). Hence, smart services bring a rather fundamental change to what value is created, how value is created, and how value is shared within business ecosystems.

Prior research has studied organizational adaptation to opportunities and pressures from several perspectives, including institutional factors that drive or obstruct change (Thornton, Ocasio, and Lounsbury, 2012) and purposive renewal of organizational resources and capabilities through application of dynamic capabilities (Teece, 2007). Institutional logics are socially and historically constructed symbolic and material organizing principles that guide behaviors and decision-making (Thornton et al., 2012). Firms' adopted beliefs, norms, and rules direct their actions, asset selection, and capability development, and they generally set boundaries on how business is conducted (e.g., Oliver, 1997). Institutional logics emerge, diffuse, and compete for dominance (Ertimur and Coskuner-Balli,

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2015; Reay and Hinings, 2009). How institutional logics change, however, is not so well understood (Nigam and Ocasio, 2010). In a recent study, Ertimur and Coskuner-Balli (2015, p. 40) conclude that extant market research has not addressed the processes through which multiple logics are created and sustained in markets. The literature on dynamic capability (e.g., Helfat et al., 2009; Teece, 2007) explains how firms change by renewing their routines, capabilities, and assets. However, this literature does not consider the cognitive, normative,

or regulative boundaries manifested as organizational beliefs and external influences that limit and guide the application of dynamic capabilities. Implicitly, the dynamic capabilities literature abstracts away the limitations in the managerial agency in modifying a firm's resource and capability base for competitiveness (Oliver, 1997; Schilke, 2014). Supporting our view, Helfat and Peteraf (2015) recently concluded that the cognitive underpinnings of dynamic capabilities are largely unexplored. Further, the literature mostly describes organizational change as adaptation to given environmental demands (Schilke, 2014). However, service-based value creation requires resource integration of two or more ecosystem members (Cusumano, Kahl, and Suarez, 2014), which implies that change is best described as a concurrent and synchronized co-adaptation to emerging opportunities. Hence, focusing on the resource and capability change of a single firm renders an incomplete picture. Instead, a holistic consideration of integrated and distributed network change is needed. In line with this observation, Schilke, Hu, and Helfat (2018, p. 392) invite research "to pay greater attention to the role of dynamic capabilities in shaping markets and ecosystems."

Clearly (1) the shared beliefs, norms, and rules that guide and restrict organizational adaptation and (2) the dynamic capabilities to renew a firm's resource and capability base are connected, but the internal and external dynamics of the connection are not sufficiently understood. Exploring the dynamics of change is also well motivated: Service transformation-specific studies have illustrated how companies often fail in their service transformation attempts (e.g., Benedettini, Neely, and Swink, 2015). However, few studies have explored organizational change from the combined institutional and capability perspectives (the few exceptions include Oliver, 1997). Hence, an inductive multi-case study to explore *how the mindset and capabilities co-evolve and interact during adoption of smart services* was conducted among seven globally operating industrial firms that have made significant and recent investments in smart services.

Our findings demonstrate how the change of mindset and capabilities lead to internal and external need for alignment at three organizational interfaces for successful implementation of smart services. These findings lead to three contributions. First, the study provides a framework for understanding and analyzing the change of mindset and capabilities during

BIOGRAPHICAL SKETCHES

Dr. Pekka Töytäri is a postdoctoral researcher and research program manager at Aalto University. He received his PhD from Aalto University in 2015. His recent research is focused on value-based strategies in industrial markets, including customer value, service-based value creation, value-based selling and sales management, business model innovation, and digital transformation. His research has been published in journals such as *Journal of Product Innovation Management*, *Industrial Marketing Management*, *Journal of Business Research*, and in practitioner-oriented books.

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adoption of service innovation by integrating the institutional theory and the dynamic capability theory for a model of the synchronized change of the mindset and capabilities. Second, the study empirically illustrates how smart services drive a change of business logic from “cost logic” to “value logic.” Third, the results extend the dynamic capabilities theory to a synchronized application of dynamic capabilities within a business network to meet the needs of integrating and matching capability portfolios across connected firms. Hence, the results show that the comprehensive and successful implementation of a service innovation requires the synchronized change of the organizational *mindset* (beliefs, norms, rules, values) and *capabilities* (skills, routines, assets) within firms, and often within the connected business ecosystem.

This paper is structured as follows. First, the two theoretical lenses of the study are introduced: institutional and dynamic capability perspectives. Then the multiple case study design is described, the context of the study explained, findings presented, contributions discussed, and the implications for theory and practice reported.

Change in Organizations

Change of Institutional Logic

Organizations build and adopt beliefs, norms, practices, strategies, and structures for internal efficiency and external legitimacy. Different regulative, normative, cognitive, and social influences (e.g., Scott, 2013) shape organizations and lead to shared understandings and socially conforming ways of conducting business. Institutional logics serve as the interpretation frame for organizational actors, guiding their beliefs, attitudes, decisions, and actions (Thornton et al., 2012). Institutional logics are built of nested domains of beliefs, norms, and values at the individual level, organizational culture and politics at the organizational level, and regulation and industry-wide norms at the field level (Oliver, 1997).

Institutional literature argues that organizational fields operate under a dominant logic (Reay and Hinings, 2009; Townley, 2002), and that institutional change is effectuated by a change in the dominant logic. Nigam and Ocasio (2010) suggest that new field-level logics emerge from context-specific situations (such as service transformation driven by digitalization) and generate new organizing principles

and shared beliefs about proper ways of doing business. Previous literature has explored the change of logics in diverse industries (Ertimur and Coskuner-Balli, 2015; Reay and Hinings, 2009; Thornton, 2002), but not the change of logics associated with service transformation. However, service marketing literature suggests that service may require different thinking than the established product-based exchange (e.g., Grönroos and Voima, 2013).

Inter-organizational business relationships often build on the logic of transactional efficiency (e.g., Williamson, 1985). Purchasing has been greatly impacted by the Kraljic portfolio model (Caniëls and Gelderman, 2005) that suggests different purchasing strategies based on the profit impact and supply risk of the purchased commodities, and by issues such as dependency (buyer-dependent vs. supplier-dependent), distribution of power (buyer-dominated vs. supplier-dominated; Caniëls and Gelderman, 2005), and expectations for relationship continuity (Heide and Stump, 1995). Industrial purchasing often features transactional exchange, arm’s-length relationships, and focus on cost minimization by building and exercising negotiation power. Industrial buyers seek to decompose offerings into comparable entities, products, and components, and to focus on trading solution constituents instead of complete solutions (e.g., Vitasek et al., 2012). Pricing is frequently cost-based (Hinterhuber and Liozu, 2012). The business context is typically a mature market phase, where offerings are standardized and buyers have many alternatives, and therefore much power to impose their rules on suppliers. The logic characterized by these observations is labeled as “cost logic.” This approach, while popular, has its limitations. The primary focus is often short-term cost-efficiency that not necessarily maximizes the longer term value created during the relationship life cycle, or even less the business network-level value creation. Value creation opportunities are evaluated based on a narrow set of decision variables, often leaving much of the value creation potential unused.

The service marketing literature offers an alternative, competing logic—“value logic.” Value logic emphasizes value maximization over cost minimization, relationships over transactions, long-term gains over short-term gains, comprehensive solutions over constituents, cooperation and joint innovation over leveraging power, and value creation before value capture. Generally, value logic promotes holistic

creation of customer value within less restricting optimization boundaries. Drawing from previous research (e.g., Caniëls and Gelderman, 2005; Grönroos and Voima, 2013; Matthyssens and Vandenbempt, 2008; Ulaga and Reinartz, 2011), Table 1 illustrates the differences between cost logic and value logic along nine dimensions.

Many of the characteristics of these logics are mutually exclusive, complicating the transformation and making the blending of the logics unlikely (Besharov and Smith, 2014). As an example, one such incompatibility relates to pricing principles and more generally to value sharing. Smart services frequently require no physical or visible intervention by supplier personnel; nobody spends time delivering the service. Hence, the service delivery cost is an increasingly irrelevant basis for pricing, thereby shifting focus onto the value created by the services (Rajala, Töytäri, and Hervonen, 2015) and to performance-based contracting and value-based pricing of the services (Hypko, Tilebein, and Gleich, 2010). When an organization starts offering digitally enabled services, it needs to deepen its relationship with customers to understand the value that those customers expect to receive from the new services. The role of the enabling technology diminishes in decision-making, and the value-in-use becomes the focal point. Internally, the employees that used to take pride in their company's technological superiority need to start considering customer relationships, value for the customer, joint innovation, joint production, shared goals, and value sharing to succeed with the transformation (Matthyssens

and Vandenbempt, 2008). Intriguingly, the moral legitimacy of the new logic may become a challenge. Previous research (Töytäri, Rajala, and Brashear Alejandro, 2015) has found that pricing based on the value created by a smart service is difficult to accept not only for the customer, but also for the supplier's customer-facing staff. Many stakeholders may perceive value-based pricing as greedy and contravening established norms. Hence, many elements of the new logic are in severe conflict with institutionalized norms and beliefs. Smart services also potentially change customer-supplier relationships by redefining firm boundaries by service outsourcing, introducing new value sharing mechanisms, such as availability and performance-based agreements (e.g., Hypko et al., 2010), and often reorganizing firms' resource and capability base. These changes redefine the roles of the exchanging firms and tilt the power positions within the business network, and hence require acceptance from the connected firms.

Renewing the Asset and Capability Base of a Firm. Firms seek to maintain their competitiveness by purposeful modification of their resources and capabilities by exercising their dynamic capabilities (Teece, 2007). Dynamic capabilities are described as organizational routines (Eisenhardt and Martin, 2000) for sensing and seizing market demands and opportunities, and for re-configuring the firm's resource and capability base accordingly (Teece, 2007). By developing, replacing, and reconfiguring existing resources and capabilities, dynamic capabilities seek to create an improved match between a firm's resource and capability portfolios, and environmental conditions (Helfat et al., 2009). Literature describes the goal of dynamic capabilities to "match and even create market change" (Eisenhardt and Martin, 2000, p. 1107) or to "keep relevant the enterprise's unique asset base" (Teece, 2007, p. 1319). Even if the role of dynamic capabilities in influencing and shaping the environment (Schilke et al., 2018) is acknowledged, the focus is mainly on achieving and maintaining a fit between the firm and the market.

However, firms do not change in isolation. Service-based value creation integrates the resources and capabilities of multiple firms to achieve a common goal, and value creation requires a portfolio of complementary capabilities that are governed by different firms (Jacobides, Cennamo, and Gawer, 2018;

Table 1. Key Differences between Cost Logic and Value Logic along Nine Key Dimensions

Key Dimensions	Cost Logic	Value Logic
Exchange focus	Transaction	Relationship
Optimization focus	Value-in-exchange	Value-in-use
Exchange scope	Comparable solution constituents	Solution
Temporal focus	Short term	Long term
Relationship logic	Arm's-length, independence, power	Partnership
Primary exchange goal	Value capture	Value creation
Offering market cycle	Commodity	Innovation
Solution vision	Buyer's	Jointly created
Value sharing reference	Supplier cost	Customer value

Teece, 1986). The value of some resources or capabilities may be enhanced by other capabilities, or in some cases two capabilities are only useful if both are available. For instance, previous literature has shown how value-based selling is instrumental in helping customers to appreciate and evaluate the future business impact of a service innovation (Terho, Haas, Eggert, and Ulaga, 2012). The value of a service innovation may be dependent on an organizational capability to understand, communicate, and price value (Töytäri and Rajala, 2015). Extending beyond firm boundaries, one firm may possess digital data that another firm is best qualified to analyze and provide as a smart service. The dependencies between capabilities can be unidirectional, where the value of one capability is enhanced by another capability, or bi-directional, where capabilities are only valuable if both capabilities are exercised together (Jacobides et al., 2018; Teece, 1986).

Hence, while smart services move the focus away from “value-in-exchange” to “value-in-use” (Grönroos and Voima, 2013), they potentially require a much higher level of coordination between firms than is the case with product-driven exchange (where the actual operational value creation is largely the customer’s responsibility). Therefore, the wider market success of smart services potentially involves persuading other business network members to implement complementary changes in their capability and asset base (Hoffmann, 2007; Taylor and Helfat, 2009; Teece, 1986) to enable joint value creation. All these activities require specific complementary specialized and co-specialized capabilities that are distributed across firms in a business network. Hence, many features of smart services classify them as a systemic innovation (e.g., Teece, 2010), and success may require a synchronized development of mindset, resources, and capabilities within the business network.

Methodology

Our research was conducted as a multi-case study among seven prominent, globally operating technology companies. The firms have expanded their scope of business by engaging in service transformation (Fang, Palmatier, and Steenkamp, 2008; Ulaga and Reinartz, 2011). The drivers behind the transition to provide smart services include commoditization

of existing business and the new business opportunities that digital services embody in their business relationships. While the transformation of technology and manufacturing firms toward service-based value creation is not new, it is still contemporary and evolving. Fang et al. (2008) found that on average, the share of service revenue among manufacturing firms grew almost fivefold from 8.9% in 1990 to 42.2% in 2005. Hence, the exploratory approach of our study is well justified (Eisenhardt and Graebner, 2007).

Case Selection

All the case firms in our sample are multinational and technology-oriented. The case companies operate in different industrial sectors and provide a wide range of offerings to their customers with varying degrees of service orientation. The sample firms represent a variety of industrial fields such as transportation systems, measurement engineering, machine industry, agricultural engineering, building infrastructure, and industry automation. The wide range of industries provides valuable insights on smart service transformation in different contexts. The sample size matches the recommendations for exploratory research (e.g., Yin, 2014) being more than four but not more than ten. The case companies were selected based on purposive sampling (Eisenhardt and Graebner, 2007); all the case companies have been implementing smart services. The details of the case companies are described in Table 2.

Data Collection

The empirical data of this study consist of in-depth interviews and workshops with experienced senior managers in the case organizations. The research team carried out 112 interviews and workshops between January 2015 and June 2016, each lasting from 40 to 180 minutes, totaling 371 hours. To facilitate communication, the informants’ anonymity was guaranteed through assurance that the results would be released without any identifying information. Each interview was recorded and then transcribed verbatim. Following purposive sampling when also selecting informants (Eisenhardt and Graebner, 2007), the interviewees were chosen based on their role and experience, thereby most of them were sales, product, and service managers. To avoid

Table 2. Case Firms

Firm	Industry	Sales \$M	Staff '000	Smart Service Offering
Beta	Measurement engineering	>350	>2	Commissioning, remote training, remote system upgrades
Gamma	Machine industry	>2400	>15	Remote condition diagnostics, predictive services, performance contracting, data-based benchmarking, data-based consulting services
Delta	Agricultural engineering	>3600	>60	Service platform, commissioning, remote training, remote data transfer, data warehousing, remote system upgrades, remote condition diagnostics, predictive services, performance contracting, managed services, data-based benchmarking, data-based consulting services
Epsilon	Building infrastructure	>9000	>50	Service platform, remote data transfer, visualization of data, data evaluation, automated data evaluation, remote condition diagnostics, predictive services
Zeta	Industrial products and services	>7500	>48	Wide range of services for analyzing production equipment, training, consulting, outsourcing, performance-based contracting, benchmarking based on smart services
Theta	Mechanical engineering	>4500	>5	Smart platform for preventive and predictive maintenance and other services to support production processes

single-respondent bias, at least three managers were interviewed at each firm.

After selecting the case companies and informants, semi-structured interviews with predefined themes were conducted; interview contents were continuously adapted on the basis of previous interviews (Silverman, 2012). The interviews consisted of open-ended questions, initially crafted based on the literature review, and then modified during the research process. All interviews were conducted face-to-face, and the transcribed data obtained from the interviews were analyzed continuously to include or exclude pre-defined themes that did not seem consistent with our initial interview structure. After each interview, the analysis of the interview was emailed to the informant with an invitation to correct any misunderstandings.

Data Analysis

Our data analysis followed an abductive analysis process (Locke, Golden-Biddle, and Feldman, 2008), where the understanding of the phenomenon based on the literature laid the foundation for early interviews, which then used evolving themes to track important issues as the interviews progressed and our understanding of smart services in a real-life setting increased (Dubois and Gadde, 2014). Prior literature described the generic barriers to novel services (Baines, Lightfoot, Benedettini, and Kay, 2009), and the interviews explored how these or other emerging barriers were manifested in the case companies.

While prior literature guided the initial analysis, the analysis did not employ preconceived codes, but rather relied on open coding, which used in-vivo labeling and described the emerging concepts based on the actual language used by informants (Corbin and Strauss, 2015). Two of the research team members independently built the thematic coding structure. Data were organized into consistent thematic blocks that described the different types of barriers that the interviewed managers experienced (Corbin and Strauss, 2015). Data analysis started from early observations (Gummesson, 2000), by which the researchers looked for themes associated with change and barriers to change. During the process, the preliminary theory-based ideas of meaningful categories of data were constantly revised with empirically grounded insights into the barriers that impede the realization of smart services. Altogether, 75 attributions of barriers were coded.

Two categories of barriers to change and three categories of alignment needs were identified. First, the case companies are forerunners in implementing smart services, responding to competitive pressures. While a visionary management is driving the change, prevailing beliefs, legitimacy of the new services, and many other elements of the prevailing logic of beliefs, norms, and rules are actively maintaining the status quo. Second, the case companies frequently lack (at least some of) the (operational) resources and capabilities to implement the new services, while actively maintaining capabilities that potentially prohibit and exclude the new required capabilities. Our research

Table 3. Coding Rules Applied to the Categorization of Barriers

Category	Attribution
Internal mindset barriers	Internal barriers against change of beliefs, norms, and rules
Internal capability barriers	Internal resources and capability related barriers that impede the implementation and delivery of smart services
Internal imbalance between mindset and capability	Internal imbalance between mindset and capability
Inter-organizational misalignment of mindset	External misalignment between mindsets within a business relationship
Inter-organizational mismatch of capability	External mismatch of smart service related complementary resources and capabilities within a business relationship

discovered barriers to the development and acquisition of the resources and capabilities required to implement the new logic. Third, the analysis of the data indicated three sources of mismatch involving mindset and capabilities to implement within the focal organization and within the business ecosystem. The first mismatch involves internal, firm-level imbalance of mindset and capabilities. Progressive managers are sometimes quick to adopt a new logic, but may fail to appreciate the need to renew the firm's resource and capability base. The second mismatch relates to the misaligned mindsets within business relationships. Again, progressive managers may have adopted new thinking, while their customers have not. Finally, firms may have renewed their resource and capability base to sell and deliver smart services, while their customers may lack the corresponding resources and capabilities to buy and participate in value creation by smart services. Hence, our findings were coded as internal mindset barriers, internal capability barriers, and three types of alignment needs, as explained in Table 3.

The emerging findings were constantly reflected and revised between and within the research team and the informants at the case firms. The frequent exposition of emergent results to both managerial and academic audiences ensured that sufficient understanding of the research phenomenon was reached and captured the breadth and depth of how managers experienced the barriers in their own social reality (Gioia, 2003; Järvensivu and Törnroos, 2010). A variety of tactics were also used to improve the quality of the research and the trustworthiness of the findings. First, theoretical sampling was used and revelatory case logics to identify and gain access to empirical data that would provide theoretically and contextually rich insights in terms of focal phenomenon. Second, three forms of triangulation were used (theory, researcher, and data) to increase the credibility and validity of the study.

The analysis combined the institutional theory and dynamic capabilities theory as our analytical lenses, used multiple researchers as co-interpreters, and then drew empirical insights from several key informants and different sources of data. Third, frequent member checks were conducted and peer debriefing was performed to reduce researcher bias and increase the objectivity of the study. Finally, by providing a rich set of direct interview quotations to demonstrate interpretations, the analysis supports the transparency and conformability of the findings. Next, our findings are presented in line with our coding rules.

Findings

While firms may encounter barriers in service transformation in any order, firms often face the internal mindset barriers first. Not all internal stakeholder groups agree with the new logic. Once (and if) these barriers have been overcome, the internal imbalance between mindset and capabilities potentially captures attention. A successful resolution of the imbalance leads to a discovery of the internal capability barriers. The firm lacks capability to implement the new vision. They need to renew their portfolios of resources and capabilities by identifying, developing, and acquiring new resources and capabilities, and abandoning the old. Overcoming internal barriers shifts the focus onto the potential misalignment of mindset between the focal firm and the environment. Finally, once all the other barriers have been overcome, firms may be unable to engage in smart services, apply the new value logic, and create value with their customers due to mismatching resource and capability portfolios.

The resulting data structure is presented in Table 4, where all three groups of alignment barriers are aggregated into an “alignment barriers” category. For clarity, only a few quotes were added in the paper's text.

Table 4. Data Structure: The Thematic Hierarchy Emerging from the Coding Process

First-Order Concepts	Second-Order Themes	Aggregate Dimensions
Prevailing role, role conflict	Product company identity	Internal mindset barriers
Fear of the new and unknown, immaturity of the smart services, doubt of the vision	Legitimacy of the smart services and the new logic	
Heterogeneity of the fleet, depth of information, conflicting views on data ownership	Fleet as a platform for smart services	Internal capability barriers
Outdated processes and systems, wrong organizational structure, no incentive structure in place	Governance mismatch	
Profitability constrains resources, gaps in infrastructure, inability to sell value, liability management	Lack of resources and capabilities	
Vision ahead of capability, capability ahead of vision, capability mismatch discovered	Internal imbalance between mindset and capability	Alignment needs
Brand as a product company, difficult to get access to data, value of the smart services, differing expectations, only tangible actions create value, fear of dependency, expectation conflict, role ambiguity	Inter-organizational misalignment of mindset	
Lack of access to influence, inability to buy value	Inter-organizational mismatch of capability	

Internal Mindset Barriers

Several themes of internal differences of mindset, illustrating the conflict of logic between management and the rest of the organization, were discovered. The study finds that management, while being exposed to external influences, is often a forerunner in adopting a new mindset and logic, while the rest of the organization firmly lives the exploitative reality. The barriers discovered challenge the new vision involving smart services, the legitimacy of the smart services, and demonstrated unwillingness to redefine the prevailing role and beliefs.

We are a mechanical engineering company with service, not a service business. The service developed over time. Because of this, the whole mindset is not service-driven, but product-driven. (Gamma)

The first category of findings encompassed role-related contradictions. The role barriers were perceived at the organizational and individual levels. First, the informants often perceived their firm as a product-driven technology company. This role emphasized products as central and enduring, and services as a secondary addition to products. The informants defined their roles around products. Sales organizations, especially, frequently encountered paradoxical and conflicting requirements due to their boundary-spanning role. The informants perceived service selling as fundamentally different from product selling, thus experiencing a role conflict.

Selling services is much different than selling products. ... We all [salespeople] are hired to sell products not services. (Zeta)

Some of the informants perceived that selling services would have restricted them from performing their job. For instance, selling maintenance agreements is often a competing alternative to selling new products. Hence, the informants experienced a goal conflict. The data also show that the firms were dubious about the new business vision that challenges many established beliefs. The following quotes illustrate a few of the required mindset changes, involving service pricing and sales approach.

There is and especially was the mentality that we do not ask for money for training or services since they are part of our products. (Zeta)

The business significance of the smart services depended on the stakeholder's perception of logic. Informants who held the cost logic did not appreciate the value-creating elements of smart services that were not included in their narrow value conception. The informants also lacked the managerial insight to create and implement the new vision to support the change of logic.

Managers say that the solution is just costly product, but executives say that it is a big operational change. (Zeta)

The second category of internal mindset barriers challenges the legitimacy of smart services and the new logic. The informants did not find smart services as a legitimate expansion of their business activities. In many cases, they did not share the new vision of smart services and the subsequent new logic. They also believed that they lacked the resources and capabilities to succeed with smart services or were simply afraid of the change. The customer's fear of increasing dependency brought about by smart services and hence the lack of receptivity (see "Mismatch between internal and external mindset") contributed to the perceived lack of legitimacy of the smart services. Our analysis identified many dimensions of uncertainty, including novel and unproven technology and the perceived differences between product- and service-focused businesses.

It was a challenge and a struggle to convince people of smart services—they are used to the predictable lifecycles of products. Smart services with long product life seem complicated in comparison. (Beta)

The acceptance of smart services was complicated by the perceived immaturity of the offering. The informants were afraid of deteriorating customer relationships, image problems, and unplanned workloads.

Issues propagate like a wildfire—when someone tried to use a new smart offering [it doesn't work] and it takes two days to get the machine back online—These negative experiences lead to statements such as, see, I told you, this shows that it is too new and doesn't work, let's wait on it. (Delta)

Internal Capability Barriers

Smart services build on a bundle of resources and capabilities, which either extend or replace parts of the existing resource and capability portfolios. Our analysis revealed three categories of resource and capability-related barriers to renewal: the applicability of the fleet as a platform for smart services, governance mismatch, and several examples of missing resources and capabilities.

Several issues relate to the readiness of the current fleet of equipment and people to serve as a platform for smart services. The fleet is often technically, geographically, politically, and legally incompatible

with emerging demands. In many cases, the installed base of equipment was built over decades, and has gradually become highly heterogeneous. In addition, the support for digitalization is often inconsistent and the richness of the information flow. While the fleet could be unified by modernization investments, such an upgrade may not be profitable.

Regarding complexity—what makes it [providing smart services] difficult for us is the long lifecycle [of our products]. This makes it very difficult for us, this extreme diversity in the installed base. [...]. There is this huge number of components, where we cannot read out anything and do not even know what is installed at all. (Epsilon)

Even if data were technically available, the conflicting views on the ownership of the data and the lack of legal framework governing the use of the fleet-generated data impede investment and involve risks for profitability, relationships, and brand.

Data that we receive from the customer are our property. However, we are under the obligation not to share the data with third parties. That's clear, that's an obligation. (Gamma)

Our findings reveal that the prevailing governance structures, including organizational structure, management processes, business processes, performance metrics, incentives, and other elements of the existing business infrastructure, enforce outdated practices. Outdated systems and gaps in infrastructure prevent change. Our analysis also revealed that the management culture often favors and rewards short-term achievements of product-based offering. Smart services represent complicated and difficult-to-evaluate offerings, for which the sales cycles are long and outcomes risky. The existing management practices, goals, and incentives reflect the prevailing product-focused culture, which firmly maintains the outdated sales culture.

We are still first and foremost a component supplier and all the systems, logistics, and sales channels are designed for this. (Zeta)

There is also a severe lack of resources and capabilities. Four groups of barriers were identified: profitability-induced constraints on developing resources, gaps

in business infrastructure, inability to communicate value, and liability management. The following statement illustrates resource barriers.

We simply do not have enough Smart Talents, i.e., personnel qualified for smart services. This resource problem goes hand in hand with a usage problem. If I had more customers for smart services, I could afford more resources. At some point I have to make the decision whether we believe [in smart services], then I have to commit resources, even when I don't have any usage. (Gamma)

The firms find it difficult to determine, quantify, and sell the value of novel offerings. As the customer relationships revolve around product-based exchange and customer-driven buying processes, the marketing and sales functions lack the capabilities to analyze and understand customers' processes, drivers, and pains, and connect their novel offerings to those pains to demonstrate a business impact.

We are really struggling to develop a value proposition. This technology is just emerging, developing. Also, we have the status quo of today, and we know what comes in one year, but our sales people who talk to the customer, they rather want to talk about horsepower and kilowatts than these new technologies. (Delta)

The firms also feel a strong need to manage and protect against any liability issues relating to access to confidential information.

There is this permanent fear to be liable to re-course, that someone takes customers' data. This fear is crippling. (Delta)

Alignment Needs

Internal imbalance between capabilities and mindset. Our case firms often sustain a mismatch between their vision and capability portfolios. Firms may have built a vision involving smart services and the associated value logic, but fail to recognize the need to renew their resources and capabilities to serve the new vision. Their vision is ahead of their capability. Alternatively, the firms may have already

developed resources and capabilities, but lack the strategic vision to fully leverage them.

Smart services were pushed by top management with the premise that no changes would be necessary regarding organization, infrastructure, or additional technical equipment. (Gamma)

Eventually, the firms discovered the need to align their resources and capabilities with the vision, as illustrated by the following excerpt.

Initially we used our normal development process for service products. Unfortunately, we had to realize that it just didn't work for the software component of smart services. The redesign of the entire development process proved to be quite the challenge. (Alpha)

Inter-organizational misalignment of mindset—no receptivity. Once the progressive firms in our data overcome the internal mindset, resource, and capability constraints, they face external barriers. In our data, the supplier firms are quicker to adopt the emerging value logic. Hence, they frequently face customers who are not receptive to the novel value propositions, proactive sales approach, new pricing models, higher level contacts, changes in roles and responsibilities, and the other conflicting elements between the logics. Our analysis identifies eight groups of barriers. First, the brand image of the case firms as product companies reduces the legitimacy of the new approaches. For many case companies, their brand as a product company, as well as their reputation as a service provider, represent a significant perceptual barrier. Despite some rather significant re-branding by the case companies, the traditional core business and the business relationships resist the identity evolution. Further complicating value demonstration, customers are reluctant to grant access to their data.

We are perceived as a product company by our customers, less as a solution or service provider. (Beta)

Amplifying the importance of demonstrating the value of smart services, customers have difficulty appreciating the value of smart services in their internal decision-making.

We started [offering smart services] with the premise “nothing for free.” We then switched to one year free of cost and noticed that registration for payment after this year does not work as the customer has not had sufficient experiences with the [smart service] system, neither positive nor negative. Our dealers did not use the time to convey positive experiences to demonstrate value. (Delta)

Smart services create information asymmetry. The production data generated by the fleet provide new knowledge to the suppliers, but sharing that knowledge with customers is complicated. Alerting customers to potential future issues may affect the quality image of the supplier and lead to new demands from customers. The transparency made possible by smart services would help both parties to improve performance, but transparency itself requires trusting and open customer relationships.

Customers have never told us what they expect. They only tell us when expectations haven't been met. The customer is not communicating specific numbers because he is unaware of them. But inwardly he has expectations that are based on experiences that he had. (Delta)

We also made a fascinating observation of what is perceived as the legitimate ground for billing. Smart services often create value without any physical and visible action from the supplier (or anybody). However, industrial actors tend to associate value creation with concrete actions, service visits, and the like. They have difficulty paying for something that did not require a tangible effort from the supplier. Customers seem willing to pay for actions rather than outcomes.

Preventive maintenance will lead to fewer direct contacts with the customer. [...] At some point, the customer will say, this is too expensive—because he doesn't have any machine-down experiences any longer. (Delta)

Our study finds that the prevailing relationship practices discourage dependence and deeper relationships, fearing the potential risk of opportunism more than appreciating the potential benefits of cooperation. The parties are also often unclear about firm boundaries. New ways of creating value require receptivity

to redefinition of the roles and responsibilities within business relationships.

The assumption that we know what to do and what the customer should do has failed. These things [smart services] have to be jointly developed. (Delta)

Inter-organizational mismatch of capability. Finally, exchange parties create value by integrating their resources and capabilities in joint, boundary-spanning processes. However, either party may lack the complementary resources and/or capabilities, and hence are unable to perform their share of the joint value creation. Our findings demonstrate a situation where progressive suppliers fail to engage in value creation with customers that hold resource and capability portfolios built for the cost logic. The first barrier found relates to the lack of access to influence the right stakeholders. Novel offerings often create value in novel ways, which often resonate with business decision-makers, but fail to impress those performing the procurement function, for instance, due to the narrow focus on capital expenditure-related decision criteria.

Of course, we want to move from the left lower corner, a component supplier, to the right upper corner, a solution supplier. ... For solution providers, communication is open and you can see the big picture. Sometimes we can solve problems that the customer did not even know to ask. But getting there is really challenging. (Zeta)

Also, many impediments to buying based on value created were found. Smart services represent a high-value offering with potential for improved value for all stakeholders. However, often the existing industrial procurement model favors short-term wins, exercise of high buyer-power, and cost-based pricing. The focus is on transactional efficiency and arm's-length relationships. The value focus of smart services is often not aligned with the price focus of industrial buying, and the procurement lacks capabilities to evaluate the holistic value impact.

Costs arise when customers use the product until it is broken. With smart services, I can see problems

before they break. To develop the business case and show value from reducing secondary damage, that is our job. (Delta)

There is also a conflict of earnings model. For instance, customers may have more price-setting power during a business relationship than when selling the initial equipment. Hence, customers optimize their offerings on lower capital expenditure and higher operational costs for their customers, while our case firms' value proposition communicates a more holistic value optimization scope. Customers may not be receptive to value if they cannot sell value to their downstream customers.

Selling spare parts is really profitable business for them [customers]. ... Even if we sell quality components, they are not ready to develop their products for the same quality level. (Zeta)

Maximizing value creation for different stakeholders often necessitates the redistribution of work between firms through changes in firms' boundaries and hence through the reallocation of processes, resources, and capabilities. Also governance structures, incentives, and many external influences, such as trade unions, discourage customers from reconfiguring and reallocating their resources and capabilities to allow for higher value creation with smart services based on value logic. Service provision most often involves change in the organizational boundaries: the customer outsources a business function to the supplier. As our study has shown, customers are often unwilling to relinquish their resources and capabilities, fearing future loss of competitive advantage, unhealthy dependence, and similar consequences.

Discussion

Powerful drivers of change, digital transformation (Brynjolfsson and McAfee, 2012; Kagermann et al., 2013), and service transformation (Ulaga and Reinartz, 2011; Vandermerwe and Rada, 1988) shape industrial offerings, business relationships, and value creation, and encourage industrial firms to innovate and renew their thinking and capabilities. In our data, the firms responded by launching digitally enabled smart services. The new service innovations induce a fundamental change of mindset and

associated field-level logic from cost logic to value logic (as illustrated in Table 1), and require a renewal of resource and capability portfolios.

Our findings are framed as categories of barriers that resist such change. Internally within firms, the mindset (beliefs, rules, and norms about a proper way of conducting business) and the resource and capability portfolios (the operational value-creation engine) evolve at a unique, idiosyncratic pace, facing their respective barriers of change, and often leading to internal misalignment between mindset and capabilities. Customers and other firms in the business network respond to the same industry-shaping forces also at their unique pace, and with similar consequences. As a result, an alignment need between mindset and capabilities emerges at three organizational interfaces. These alignment needs are labeled as *imbalance*, *misalignment*, and *mismatch* barriers. Figure 1 illustrates the three categories, and each of these categories is discussed next.

The first group of alignment barriers relates to the internal need within firms to *balance* the organizational mindset and the capabilities to implement. As our findings evidence, different organizational groups are affected by the external institution-preserving or institution-changing influences through mechanisms, such as customer relationships, industry associations, best practice benchmarking, business press, and similar. Previous research has already shown (e.g., Tripsas and Gavetti, 2000; Vuori and Huy, 2016) how reluctant firms are to update their beliefs, which have generated wealth in the past, despite external pressure. While Teece (2010, p. 712) defines the role of a manager to orchestrate, align, develop, and divest complementary resources and capabilities, managers bound by their adopted logic may fail. However, progressive management sensing and seizing an opportunity (Teece, 2007) may develop a vision and adopt a logic that is ahead of the firm's implementation capability, yet fail to detect the imbalance between their vision and capability. When vision outpaces the capability to implement, the new logic may fail in gaining internal support due to frustration, uncertainty, and the fear of failure. In addition to the identified barriers to capability renewal (such as IT systems, governance mechanisms, incentives), the resource and capability development and acquisition decisions are risky and ambiguous, their implementation slow, and they compete against

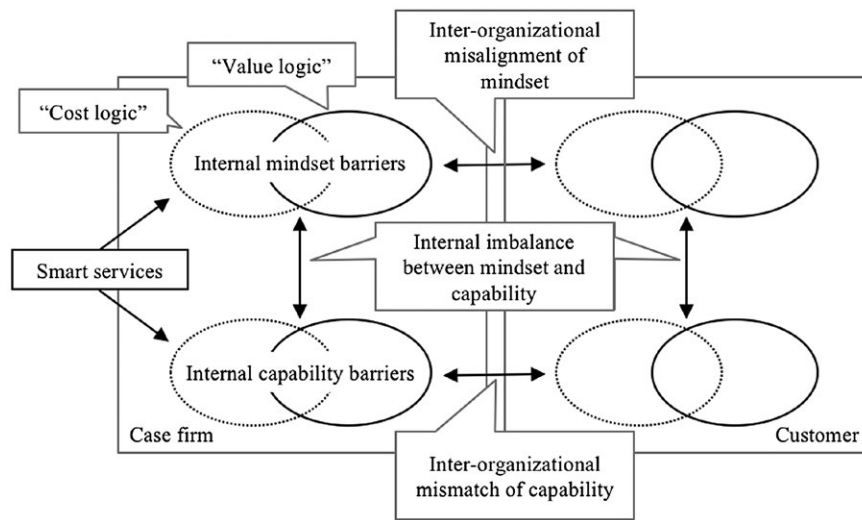


Figure 1. The Three Categories of Internal and External Barriers to the Realization of Service Innovations, Resulting from the Loosely Coupled Evolution of the Mindset, and Resource and Capability Portfolios

existing resources and capabilities. Many of the existing organizational resources and capabilities, such as structures, governance modes, management processes, incentive policies, IT systems, and general business processes need to change. Those have been designed to support cost logic, and do not serve the new opportunities well.

As our findings illustrate, a salient example of the cost-logic-optimized capability is the sales function, which in many industrial companies has over time developed effective product sales capabilities, but which is becoming increasingly dysfunctional in meeting the new demands. Based on our findings, the new resources and capabilities required by smart services include building data management and analysis capabilities on top of technological capabilities to improve the functionality, availability, performance, and quality of industrial processes. Also included are the boundary-spanning capabilities to learn, map, and improve customers' and broader industrial ecosystems' business processes by customer value research (e.g., Bettencourt and Ulwick, 2008), and to manage networked value creation and proactively sell the impact of smart services (Töytäri and Rajala, 2015).

Alternatively, capability may outpace the vision. Technological advances generate new assets, such as industrial data, remote connections, and technical platforms. These opportunities often lead to innovation and create pressure on the prevailing logic through internal and external influences, such as

benchmarking, requests from innovative customers, success stories, and the like. If the decision-making body does not recognize these innovations as a legitimate part of the firm's logic, the opportunities might not be leveraged and change will not occur (see a salient example of capability outpacing vision in Tripsas and Gavetti, 2000). Our findings illustrate both routes to imbalance, and show how the logic-driven evaluation of the opportunities and technology-driven evolution of the resource and capability portfolios are connected.

The foregoing concerns the internal change of firms. Firms in a business network respond to the institutional pressures at varying paces, and exercise their dynamic capabilities of identifying and evaluating smart service opportunity for heterogeneous resource and capability outcomes (Helfat and Peteraf, 2015). Resulting from the uneven progress among connected firms, our findings identify two important sources of external *misalignment* and *mismatch*. Effective service-based value creation requires mindset and capabilities that are well aligned with those of network actors (Adner, 2017; Adner and Kapoor, 2010). Progressive firms, those which have achieved internal change and a balance between mindset and capability, likely meet customers at different stages of transition, and fail to align their views along any number of contrasts between cost and value logic. For instance, progressive firms may demonstrate operational savings to buyers only interested in capital savings, or promote service outsourcing to a risk-averse

firm, or suggest joint innovation to a buyer that is afraid of knowledge leakage. Smart services and value logic reposition and extend a firm's entry into new activities that do not match the expected role of the firm, challenge the current division of activities and established views on firm boundaries, and threaten the established power balance of the firms. Over time, external influences reduce resistance and may lead to a shared logic through different carrier mechanisms (e.g., Oliver, 1997).

However, achieving a shared logic may not be enough. The resource and capability portfolios of exchange partners also need to *match* for seamless integration of activities. Implementing shared logic often leads to re-allocation of resources and capabilities between firms (for instance, firm boundary changes by service transformation), application of dynamic capabilities to build new ones, and matching the resource and capability portfolios to achieve integrated capability support for the shared logic in all firms that participate in the joint value creation (Adner, 2017). A salient example of co-specialization is bi-directional dependence between production data and a capability to utilize the data in production optimization. In our data, these resources and capabilities are frequently managed by different firms; one firm generating and managing the data and another firm developing and managing the smart services. Successful adoption of smart services clearly demands coordinated and synchronized application of the dynamic capabilities of the connected firms to develop co-specialized assets (resources and capabilities) across firm boundaries (Adner and Kapoor, 2010; Teece, 1986). These observations lead to the rather unavoidable conclusion that the fragmented governance of the networked value creation by connected firms in a business network needs to possess complementary (co-specialized) dynamic capabilities.

Theoretical Implications

The study makes three contributions to service innovation research. The contributions are grounded in the analysis of the implementation of smart services within a business network. Our results integrate and extend institutional (e.g., Thornton et al., 2012) and dynamic capability (e.g., Teece, 2007) theories for a model of the synchronized change of the mindset and capabilities.

First, our study integrates the theories by providing a framework for understanding and analyzing the connected and synchronized change of mindset and capabilities at three organizational interfaces during implementation of service innovation. Specifically relating to the internal imbalance between mindset and capability, our results add to recent studies on how managerial mindset drives (or fails to drive) the application of dynamic capabilities (Helfat and Peteraf, 2015). Firms may be more unwilling than unable to acquire assets and develop capabilities if they lack institutional support, and would not match with prevailing beliefs about proper ways of conducting business. Our results suggest two paths for the balance of mindset and capability. A “top-down” (also a more frequent) path promotes managerial foresight by suggesting that managers engage in institutional work by developing and effectuating a novel value logic and then proceeding to renew the asset and capability portfolios. The other “bottom-up” path is driven by the emergence of new assets and capabilities supporting novel value creation and driving the evolution of the logic.

Second, our study empirically illustrates how smart services drive a change of business logic from “cost logic” to “value logic.” Our results explicate the differences and tensions between the established and emerging logic and provide empirical evidence of the contextual factors driving the change of logic (cf. Ertimur and Coskuner-Balli, 2015; Lounsbury, 2007). To benefit smart service opportunity, the connected actors need to adopt a new mindset about value creation, inter-organizational exchange, and value sharing. In our data, technological change enables novel value creation by smart services. The novel service-based value creation requires a more complex constellation of actors, activities, resources, and capabilities than product-based value creation, and induces the change of logic. The findings improve the understanding of how organizational field-level logics emerge and change (Nigam and Ocasio, 2010).

Third, our results extend the dynamic capability theory to synchronized application of dynamic capabilities within a business network. As illustrated, smart services provide a salient example of value creation by resources and capabilities under distributed governance. As our literature analysis shows, the dynamic capabilities literature (e.g., Barney, Wright, and Ketchen, 2001; Helfat et al., 2009; Teece, 2007) has primarily focused on how firms adapt to changing market conditions, or how a firm can influence

the external environment in their favor (Schilke et al., 2018). Our study employs the concept of complementary capabilities (Jacobides et al., 2018; Teece, 1986) to show that smart services are dependent on both specialized (such as value communication) and co-specialized (such as shared activity system) capabilities under distributed governance. Our conclusion is that firms need synchronized application of co-specialized dynamic capabilities when renewing their resource and capability portfolios for smart services.

Managerial Implications

For managers, the implications are rather straightforward. To realize the potential of smart services (or any major business innovation), managers need to identify, appreciate, and address the identified alignment needs. The framework (Figure 1) explicating the three organizational interfaces provides a template for detecting the potential imbalance, misalignment, or mismatch. Previous research has already shown how technologically progressive firms may fail if the outdated managerial beliefs prevent benefiting from technological advances (Tripsas and Gavetti, 2000; Vuori and Huy, 2016). Likewise, managers with updated visions appear to underestimate the effort to align the visions through the organization or the need to build new capabilities to support the vision. Managers need to identify the resources and capabilities that are required to implement the new vision, with special attention to the governance modes, incentives, capabilities, processes, tools, and relationship management. As our findings evidence, managers attempt to govern new business with outdated management models, resources, and capabilities. By hanging onto outdated resources and capabilities, instead of divesting them with diminishing potential for value creation, managers delay renewal (Teece, 2010). Even if successfully promoting the new logic and applying dynamic capabilities to create new resources, managers may be too inwardly focused in their change management efforts, and ignore the potential mindset misalignment and capability mismatch with their business partners. Managers need to appreciate the varying pace of mindset and capabilities within their business network. They need to evaluate the logic of their business partners and customers for alignment and match to avoid non-converging sales processes and waste of resources on wrong opportunities. Oliver

(1997) identifies five sources of external forces creating conformity and inducing change: regulation, alliances, human capital transfers, social networks, and imitation, all of which involve information exchange in the form of success stories, best practices, business process benchmarking, and similar. Managers should leverage these mechanisms to progress change.

Limitations and Further Research

Several promising avenues for further research are identified. Our research studied change in a rather specific context, so the generalization of our findings needs to be done with caution. The timing of the change allowed us to explore barriers to change while the change was unfolding. Clearly, the next step would be to understand how the connected firms address their alignment needs.

This study uses smart services as a case of a change in logic. Research that further theorizes on value logic would complement the previously well-established theoretical foundation of cost logic (cf. Williamson, 1985). Despite some contributions (e.g., Slater, 1997; Zajac and Olsen, 1993), there is still demand for a value-based theory of firms.

This study combines institutional theory and dynamic capabilities to provide a comprehensive explanation for the adoption of service innovation. Our results suggest that rather than focusing on capabilities or institutional factors only, future studies should focus on the interplay between these two theoretical frames. Our study offers an attempt to concretize how the interplay between capabilities and mindset is way more important than one theoretical perspective alone.

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