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From Technological Transitions to Service Transitions : A Study of Attenuation Effects in IT Service Provisioning

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■ Abstract ■

In a day and age when contemporary businesses are transformed, driven by a service-dominance logic and dependent upon IT, we need to understand how firms cope with technological adaptations and how such technological adaptations can lead to service adaptations. Drawing on a framework on technological transitions and an interpretive longitudinal case study of the services provided by a team within a large public IT firm, this article addresses the following questions : How do service transitions come about? Can we distinguish particular patterns in service transition processes? This research unveils how technological and social dimensions mutually constitute each other within development and implementation of service provisioning. The findings show how : (a) IT plays a fundamental role in service provisioning; (b) technological transitions are the necessary but insufficient preconditions for service transitions; and (c) there are attenuation effects when it comes to the move from technology transition to service transition.

Keyword : Management, Service Transitions, Information Infrastructures

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1. Introduction

Contemporary society is transforming driven by a service-dominant logic (Lusch et al., 2007; Vargo and Lusch, 2008) and enabled by-and often dependent upon-information technology (IT) (Kallinikos, 2006; Rönnbäck et al., 2007; Barrett and Davidson, 2008). This view stipulates that value is co-created during the interaction between the IT service provider and the customer (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004). Information technology (IT) plays an essential part in service transitions-a recent trend that implies the provision of advanced product-based services and solutions that replaces a traditional product offering. Indeed, new technological developments following products digitalization (Bharadwaj, 2000) have direct implications for understanding of the central role of IT resources in such service transitions. We argue that IT service value is co-created, realized and assessed in the context of the simultaneous production and consumption process. Research on the co-production of services between the customer and provider has traditionally been anchored in user interactions with IT as a key driver in service innovation (Alter, 2008), with a focus on new service concepts and the redesign of existing services (Alter, 2010; Lyytinen and Rose, 2003; Chesbrough and Spohrer, 2006). However, existing research has paid less attention to understanding the conditions under which organizations successfully adopt new IT into their operations and how IT services are built on such IT platforms. This shortcoming in current theorizing about IT innovation is a reflection of the more general trend within research to treat IT as a "black box", disregarding its nature and use (Orlikowski and Iacono, 2001). To address this limitation, scholars have recently begun to examine materiality issues associated with IT (Jonsson et al., 2009; Leonardi and Barley, 2008; Orlikowski and Scott, 2008; Zammuto et al., 2007), targeting how IT provides "opportunities for and constraints on actions" (Leonardi and Barley, 2008: 162). Since the trend towards service-dominant logic is gaining momentum (Lusch, Wargo and Willcocks, 2007; Vargo and Lusch, 2008) we need to understand first how firms cope with IT adaptations and second how such IT adaptations can lead to service adaptations. Reflecting on the rapid technological advancements there is an emerging understanding in the business and management literature that IT resources can serve as an enabler of service transitions and ultimately as a source for sustainable competitive advantage (Wade and Hulland 2004).

In analyzing these processes we build on the theory of technological transitions (Geels, 2005; Geels, 2007). Geels coined the term 'technological transitions' to address the ways in which physical artifacts, organizations, legislative artifacts (e.g. laws) and macro-structures are combined and co-evolve (Geels, 2005). As noted by Geels (Geels, 2002; Geels, 2005; Geels, 2007), socio-technical reconfigurations resulting in technological transitions do not occur easily, because of the ways in which the different elements in a socio-technical configuration are linked and aligned to each other. Moreover, while technological adaptations can lead to service adaptations, there is a bigger challenge in taking the step from technological transitions to service transitions.

This article addresses this challenge by asking the following questions : How do service transitions come about? Can we distinguish partic-

ular patterns in service transition processes? We seek to answer these questions by building on an interpretive case study (Klein and Myers, 1999; Walsham, 1995) of the IT-based services provided by Weilgo, a large public IT firm providing a wide variety of products and services such as consulting, system integration and outsourcing. In particular, we focus on a team in the Swedish part of the company, whose key activity is to provide and maintain administrative portals for their customers.

Tracing the technological transitions and associated service transitions at Weilgo over a ten year period, we argue that today's pervasive digitization amongst Weilgo's customer base ushers in a new type of platform architecture : the layered modular architecture (Yoo et al., 2010). We posit that this new architecture is a result of a technological transition that is not easily followed by a service transition building on the new platform architecture. To this end, the new platform architecture provides the platform owners with profound challenges in the ways that firms organize for service innovation.

The remainder of the article is organized as follows. We will begin by describing existing research on IT services, followed by a description of Geels's theory of technological transitions as our theoretical lens. We proceed by presenting the method section followed by a detailed case description, outlining the IT platform evolution at Weilgo over a ten year period and the associated services and barriers associated with service provisioning.

2. Related Research

This section develops two concepts that are central to the research : (1) IT services and (2) technological transitions. The first section explains the concept of IT services and locates it within innovation studies literature. The second section outlines Geels's theory of technological transitions as our theoretical lens.

2.1 IT Services

Services can be narrowly defined as intangible events that are consumed by the end-user and do not require any further processing (Grönroos, 1990; Grönroos, 2001; Quinn, 1992). This traditional definition of service, focusing on the distinction between products and services has recently been challenged due to technological developments where IT has fundamentally changed the way services are being conceived, developed, and delivered (Rai and Sambamurthy, 2006). IT has not only become an enabler of new services, but also a scope changer for existing ones (Alter, 2010; Chesbrough and Spohrer, 2006; Lyytinen and Rose, 2003). Vargo and Lusch coined the term "service-dominant logic", as opposed to a product-dominant logic, and they define service as the application of resources for the benefit of another (Vargo and Lusch, 2004; Vargo and Lusch, 2008). The co-creation of value is the central part of a service (Maglio and Spohrer, 2008) and the co-creation and customer-determined benefit of services make them inherently customer-oriented and relational (Vargo and Lusch, 2008).

Since the combination of resources that constitute a service can be fairly complex and what a service actually is, is not always apparent (Vargo and Lusch, 2008). Maglio and Spohrer used the term "service system" to address the compositional aspects of services (Maglio and

Spohrer, 2008). A service system "… represents any value-co-creation configuration of people, technology, value propositions connecting internal and external service systems, and shared information (e.g., language, laws, and measures)" (Maglio and Spohrer, 2008).

Alter (2010) defined services as "acts performed for someone else, including providing resources that someone else will use." (Alter, 2010). Since focus within the IS field is on "describing, evaluating, and improving IT applications and IT-reliant systems in organizations", Alter concluded that the need for stressing a distinction between product and service is of less importance (Alter, 2010).

Service management research has focused on a wide variety of issues, ranging from service demand (Basuroy, Chatterjee and Ravid, 2003; Bolton and Lemon, 1999; Sawhney and Eliashberg, 1996) and service pricing (Danaher, 2002; Shugan and Xie, 2000) to guarantees for service delivery (Moorthy and Srinivasan, 1995) and employee incentives (Hauser, Simester and Wernerfelt, 1994). In their description of the new "service science, management, and engineering (SSME)" science, Bardhan et al. presented several areas where advances in technology have increased the managerial challenge (Bardhan, Demirkan, Kannan, Kauffman and Sougstad, 2010).

2.2 Technological Transitions

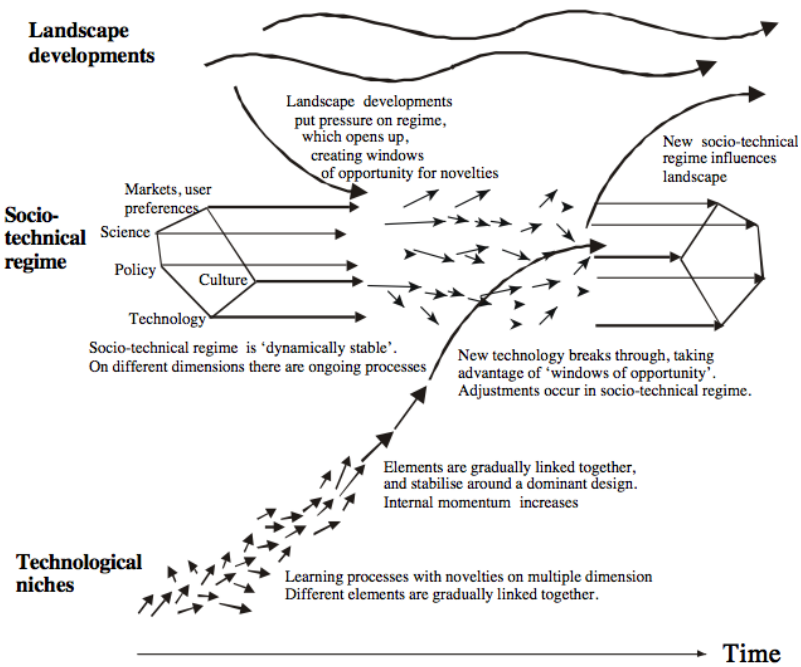
History will tell us that radical technological change in an industry entails a discontinuous shift to an entirely new base of technological knowledge and also a potentially superior price/performance trajectory (e.g. Dosi, 1982; Tushman and Anderson, 1986; Abernathy and Utterback, 1978). This is arguably particularly evident when it comes to the challenges that incumbent firms face in relation to technological transformations. History has shown how incumbent firms often respond successfully by entering new technological subfields (Mitchell, 1989) or by developing innovations and capabilities that allow them to survive radical technological transitions (e.g. Ahuja and Lampert, 2001; Tripsas, 1997; Rothaermel, 2001). Previous research has shown that incumbent firms can emerge as the winners after a major technological changes by delevoping complementary assets or dynamic capabilities (e.g. Tripsas, 1997; Teece, 1986). These dramatic shifts in technology are potentially "competence destroying" (Abernathy and Utterback, 1978), forcing firms to make major transformations, including acquiring new knowledge and capabilities (Abernathy and Utterback, 1978; Christensen and Bower, 1996). Researchers have also found that technological innovations can usher in "eras of ferment" characterized by rapid innovation, emergence of new competitors and high uncertainty (e.g. Abernathy and Utterback, 1978).

Although some research on the challenges associated with rapid technological changes has considered the socio-technical influences on firms' response to technological change (e.g. Christensen and Bower, 1996; Sull and Tedlow, 1997), research in this area has largely overlooked the complexities associated with technological transitions. An exception can be found in the work on transition management as a mode of governance that aims to resolve persistent problems in societal systems. The basic premise in this area of research is that socio-technical development requires transitions (Geels, 2002; Geels, 2005; Geels and Schot, 2007).

Following Geels (Geels, Geels, 2005) transitions are viewed as the outcomes of developments at the micro, meso and macro level (see <Figure 1>). The micro level is the level of practices, occurring in a context of product regimes, regulatory regimes, science and research regimes (conceptualized as meso structures) and the overall macro landscape of values, infrastructures et cetera as the broader context. Within this scheme, novelties emerge in niches, particular domains of use, actor constellations and geography.

The novelty may be a new practice or a new technology. These developments not only shape the willingness of individuals to engage in the use of a new technology but also shape firm-level strategies. The final element of the multi-level perspective is the socio-technical landscape. The landscape is the wider context of practices. It is composed of infrastructure, systems of governance, political associations, regulations, societal values and so on.

The transitions literature focuses on a complex nested hierarchy of structuring processes (Geels and Shot, 2007) where changes within a regime tend to be incremental and path dependent. Since regimes tend to produce incremental innovation patterns, and more radical changes originate in niches, the quality of incremental innovations subsequently generated within a new regime will typically be radically different to those under the preceding regime. Both niches and regimes are situated within a broader landscape of social and physical factors that provides a macro-level structuring context. These levels interact and, over time, the rise of re-



〈Figure 1〉 Dynamic Multi-Level Perspective on System Innovations(Geels, 2002 : 1263)

gimes can be influential on broader landscape developments.

Given this theoretical background, we set out to develop a transitions perspective by building on an interpretive case study (Klein and Myers, 1999; Walsham, 1995) of the IT-based services provided by Weilgo, a large public IT firm providing a wide variety of products and services such as consulting, system integration and outsourcing. The next section outlines the in-depth case study.

3. Method

3.1 Research Site

This study focuses on a team in the Swedish part of a large public IT firm (Weilgo) providing a wide variety of products and services such as consulting, system integration and outsourcing for an international market. The unit under study originates from the consulting part of Zethro (which in 2008 became acquired by Weilgo) and the workforce consists of engineers and software developers, who are organized into groups based on the solution they are working on.

The development team ("The Team") being studied is a small team focused on providing and maintaining administrative solutions and services to internal as well as external customers. Over the ten year period that this study entails, the company as a whole as well as The Team in focus of our study, has gone through a lot of changes. When it comes to members, the development team has grown over this ten year period from being two consultants at the start to three and four and eventually to the current size of 15 consultants.

Being part of a consultancy firm means that practically all work done by the team is based on chargeable hours within the scope of management, maintenance or development projects. As a consequence, long-term, cross-project issues are difficult to manage, since team members always have to contribute to the project at hand in the best possible way.

At Weilgo all major customer is handled by a so called "customer team" that works close to, and handles most of the communication with, the end customer. Teams and other units at Weilgo that deliver services are required to go via the customer team when interacting with end users. Since The Team being studied delivers services internally, this means that their relationships to Weilgo's customers are handled via proxy.

3.2 Data Collection

The data collection during this retrospective longitudinal study was conducted using a combination of several different data collection techniques and data sources. Data collected in an initial focus group session and interviews formed the base for temporally ordering the events. The key events in the ten year period of the case, was then revealed using a combined iterative process of interviewing and identifying conducted between the insider and outsider external researchers (Coghlan and Brannick, 2001). The insider researcher, who also is the first authors of this article, is a project/maintenance manager within The Team under study, thus enabling total access to the company and data sources. As an initial activity, the outsider researchers interviewed the insider researcher and asked ques-

tions about the circumstances around The Team during the period of interest, activities and events that triggered changes, efforts undertaken, the outcomes of those efforts, opportunities that arose and the challenges involved. The collaborative interpretation of this activity was then, in a highly iterative manner, documented into an overarching timeline of key events, which was revised as further knowledge, and understanding of the process was gained.

After revision, the identified key events were presented to the other members of The Team so that they could provide further feedback and validation.

The overall timeline then constituted the base for defining the four phases that are in focus in this article. The phases were defined based on the larger technological advances that The Team took when creating their solutions.

Further data sources used in the study are archives of projects proposals, project contracts, meeting minutes, email conversations, focus groups and interviews with key people. Since an important part of the studied team's communication with their customers is mediated via various kinds of documents and presentations, we have also included document analysis of various central presentations. <Table 1> provides an overview of the data sources.

One focus group (Stewart and Shamdasani, 1990) was held, during which the insider researcher and one of the outsider researchers (moderator) participated. Eight interviews were conducted with key people from The Team at Weilgo and key people at internal customer sites to investigate the inner context. While the perspective of the external customers i.e. the outer context (Vargo and Lusch, 2006), has not been investigated through direct contact and interviews, their role and demands have been identi-

〈Table 1〉 Description of Data Sources

Data Sources	Description
Focus group	One focus group session was conducted with three team members plus the insider researcher and one of the outsider researchers. The session was recorded and transcribed.
Formal interviews	Eight formal interviews were conducted. Each interview lasted approximately one hour and they were all recorded and transcribed.
Open-ended, semi-structured interviews	Daily informal discussions that the insider researcher held regarding the services provided. These informal discussions provided insight into everyday practices at the company. These discussions were documented in field notes by the insider researcher.
Proposals	Ten of the proposals made during the study period were recorded, including both approved and rejected proposals, which all contributed important information to the study.
Contracts	The six contracts made during the study period were gathered.
Meeting minutes	The formal minutes of monthly and weekly meetings between the management group and the internal team groups were recorded, in total 200 sets of minutes.
Email conversations	Email conversations between the project manager (the insider researcher) and internal and external stakeholders during the study period were collected, amounting to approximately 1,150 emails.
Presentations	Presentations used to describe the team's offers to internal and external stakeholders during the study period were collected, in total 40 presentations.

fied through interviews with the team members and internal customers.

In addition, to some extent, the outer context is represented in formal documents such as project contracts, email conversations and meeting minutes (see <Table 1>) and has been captured through written documentation.

4. Results

In this section, we present the findings of the study of a Swedish team at Weilgo, whose key activity is to provide and maintain administrative portals for their customers.

Because the barriers associated with service provisioning were closely associated with the IT platform on which Weilgo built their services at a particular point in time, we organized our results in the sequence in which we explain how service provisioning was organized in each period, how each new IT platform offered new possibilities, how this change eventually led to new service provisioning and what barriers to service provisioning emerged in each period.

Distinct historical periods, each associated with the deployment of a new IT platform, punctuated the process by which the organization of service provisioning changed over time. We begin by describing the situation characterized by exploration of new solution areas (Period 1). We then describe what transpired when The Team adapted their solution to fit a centrally hosted service (Period 2), what occurred when The Team built a solution that was deployed for service provisioning (Period 3) and finally what took place after the initiation of The Team's largest implementation project.

4.1 Platform/Technological Development and Transition Barriers

In this section the platform development are described. Each phase description is followed by a section that describes the transition barrier for that phase.

4.2 Phase 1 (2001∼2004) : Product Ownership

In early 2001, a customer faced with an urgent need to find efficient ways to keep track of inventory and to manage access to information, systems and processes, contacted the unit. The customer had chosen a new technology-MS Active Directory-as their identity storage and needed an IT solution developed on this.

While the technology provided some of the requested functionality, additional functionality and an improved user interface was called for by the customer. A main requirement was to enable decentralized administration, which was one of the functions added by the unit to the solution. The work with this customer was characterized by a close collaboration for the development work, in which two consultants from the unit were engaged in the operative work at the customer site. The work performed in the assignment was based on time and material based and hence posed no financial risk for the unit. However, the assignment turned out to grow much larger than estimated and the customer eventually ran into financial problems. The invested efforts at this point had resulted in an almost complete product, and Zethro decided to jointly finance the completion of the product (the Alpha solution) with the customer in exchange for ownership of the code.

With ownership of an application supporting a new and very potent technology such as Active Directory, The Team engaged in product packaging activities. These activities were promoted not only from the unit, but also from upper management within Zethro. With an application adding value to a new Microsoft technology, The Team had a great opportunity to take a large market share within the area of administrative portals.

They managed to significantly increase their customer base by adapting the solution for each customer implementation. As a result, each implementation was, to varying degrees, unique for each customer.

4.3 Transition Barriers Phase 1

The environment at the unit provided little support regarding product and marketing strategies. Despite the organizational support, The Team actively promoted their solution, both internally and externally, in different efforts to build a solid customer base. They managed to significantly increase their customer base by adjusting the solution for each customer implementation. As a result, each implementation was, to varying degrees, unique to each customer.

4.4 Phase 2 (2004~2005) : Internal Service Delivery

In 2004, the Alpha solution was chosen as the interface and workflow engine in a functional platform (Beta) for the infrastructure management department of the company. The competition between solutions included both internal and external solutions and the one promoted by The Team was selected thanks to its ability to make the administration of users and access rights easier and more effective. In addition, The Team benefited from the network of contacts that they had previously established internally when they had promoted their solution.

The internal service solution functioned as a back-end service offering e.g. Service Desk resources, administration of mailbox accounts and access rights management. Beta was established as an integration technology internally at Weilgo and the use of the MIIS server increased flexibility. Although still basically a console application, Alpha was adapted to function in a larger, more heterogeneous, environment.

The centralized service provided support for administration of several platforms through one single interface in a way that no competitor had managed to provide. Zethro hence had a unique opportunity to market themselves and thus gain a larger share of the market. From their perspective, The Team had a chance to secure a long-term strategic collaboration via a maintenance agreement.

The infrastructure management department demanded a one-to-one functional mapping between their old solution and the new solution. This involved extended functionality and configuration as changes to the contracted design of the new solution, which increased the workload for The Team. By the time the project was completed, it had significantly exceeded its budget. Therefore, there was an urgent need to deploy the new solution and to become more effective in order to realize a return on the investments.

The Team struggled to build a foundation for their activities within the area of portals, but the maintenance agreement stipulating the service

〈Table 2〉 Platform Evolution Transition Barriers Phase 2

Socio-technical Regime	Manual handling of administrative tasks			
Platform evolution	1	2	3	4
Solution	**Alpha**-An application targeting administration of MS Active Directory. Started out as a simple address book, but then expanded to AD and Exchange administration.	**Beta**-Centralized functional service that only used parts of the functions present in Alpha as the interface and workflow engine. Beta used Microsoft Identity Integration Server (MIIS) as the underlying connecting technology.	**Gamma**-Second generation of Alpha. Similar, but more powerful functions than Beta. Built to provide a user-friendly interface for administrators, managers and end-users involved in user administration. Inspired by Beta in terms of integration and connectivity.	**Delta**-End-user self-service portal built on SharePoint Portal Services (SPS). A development of Gamma's end-user interface. Configured and administrated via Gamma, which functions as Delta's back-end.
Service (target)	The Team market and implement the administrative application (Alpha). The Team strives for a packaged product.	The Team signs a maintenance agreement for Beta with a goal of developing and using this as a foundation for their business.	The Team market and implement the portal solution (Gamma). The Team yet again strives for a packaged solution.	The Team tries to position themselves as providers of special skills regarding administrative portals.
Barriers to transition	Business model at Weilgo (resource consultancy) makes product packaging impossible.	View of self-service. Lack of competence and resources within infrastructure management department. Existing solution mapping.	Uncertainty regarding future directions within the infrastructure management department.	Lack of ownership candidates for the new solution creates great uncertainty regarding the strategic directions.

that was supposed to be provided to the infrastructure management department lacked strategic elements aimed at developing the solution/service. Somewhat naive product thinking by the infrastructure management department created a strategic vacuum that was not identified by all parties until many years later.

4.5 Phase 3 (2005~2008) : Product Ownership

During the autumn of 2005, The Team had begun developing a new version of Alpha (from here on called Gamma). After some economic difficulties delaying the development, The Team eventually managed to create a version that they could market and, after the summer of 2007, The Team had started developing Gamma for the pilot customer. With the completion of Gamma within reach, The Team also intensified the strategic dialog with their large internal customer i.e. the infrastructure management department, regarding an upgrade of Beta. Since Gamma offered more powerful functionality, an upgrade could potentially solve many of the challenges and problems that had been present during the maintenance of Beta.

The dialog regarding a new version of the Beta continued through the autumn and The Team met representatives from the infrastructure management department for a two-day strategic work-

shop. At the beginning of 2008, the infrastructure management department formulated a strategic objective to increase their market share in the area of outsourcing. This objective called for a solution to promote sales projects and the sales organization sent their requirements for the solution to the service manager responsible for Beta. However, during the first meeting, it became clear that Gamma was more suitable, considering the demands articulated in customer requests. Hence, Gamma was selected as the solution that was going to be offered.

The functionality present in Gamma made it potentially useful for many different customer projects. The infrastructure management department initiated most of the projects initiated during this time, as they were a key actor in large-scale infrastructure projects. In June 2008, the infrastructure management department landed an outsourcing agreement. This was not only the largest outsourcing agreement that the Nordic part of Weilgo had ever signed, it was also the first delivery in an outsourcing setting for The Team. This new delivery setting meant that The Team had to meet requirements not only from the external customer, but also ones stemming from an internal customer too.

With the infrastructure management department landing several contracts, there was a growing demand for Gamma. The Team, still only four in number, struggled to manage the new projects that were being established. Although running several large projects, the unit was ambivalent towards the hiring of more resources due to the general economic situation and an economic recession that had led to internal saving programs within the company. Thus the Team had to face extreme pressure as they attempted to handle the three parallel deliveries.

4.6 Transition Barriers Phase 3

After completing the pilot project for the new solution (Gamma), The Team had a solution with more powerful functionality than Beta. The Team saw that these functions could solve the problems that had surfaced during the maintenance of Beta and to communicate this, The Team initiated dialog with the infrastructure management department regarding an upgrade of Beta. This dialog continued through the autumn and The Team met representatives from the infrastructure management department for a two-day strategic workshop.

Despite being aimed at starting work on an upgrade of Beta, the workshop did not lead to any further upgrade of Beta. The dialog faded and it was not until the beginning of 2008 that Beta and Gamma discussions were held again. The initiation came from another part of the infrastructure management department responsible for the strategic objective of increasing the market share in the area of outsourcing.

This objective called for a solution to promote in sales projects and the sales organization sent their requirements for the solution to the service manager responsible for Beta. However, during the first meeting, it became clear that Gamma was more suitable when considering the demands articulated by customer requests. Hence, Gamma was selected as the solution that was going to be offered.

4.7 Phase 4 (2009~2010) : Product Ownership

At the beginning of 2009, The Team engaged in the establishment of a large implementation

project where Gamma was to be implemented as an administrative interface. Early on in the project, when The Team had initiated dialog with the stakeholders, it became evident that the internal customer had shifted their focus regarding the targeted users of this solution. Instead of focusing on providing an interface to a limited amount of customer users i.e. approved orderers, they now targeted all end-users at the customer site. This change in scope created a need for substantial investments. These investments were to be secured by the development project and The Team was appointed to build a completely new solution (from here on called Delta) to meet the customer demands.

Although not yet launched, news about the upcoming new portal had spread. The line business within Weilgo, as well as the end customers, had waited a long time for that kind of solution and a huge demand for further implementations grew. Apart from new customers, the existing customers in other installed base components were also candidates for migration to Delta, creating even greater pressure on the implementation projects.

4.8 Transition Barriers Phase 4

In June 2010, The Team launched the first version of Delta. At this time, The Team was already working on a parallel project, implementing Delta for customer number two. Despite having already been raised as an issue to management throughout the first establishment project, the Delta solution lacked governance. This uncertainty regarding the strategic directions had negative effects on the establishment projects since they had nothing to fall back to when customers demanded more platform functionality. Gaps in platform functionality had already been revealed during the initial phases of the second implementation project. This decreased fit, which was due to the decision to decrease the budget during first implementation, called for further development. This was something that subsequently delayed the implementation for the second customer and postponed implementations for all customers waiting to have Gamma implemented.

5. Discussion

In this article, we addressed the following questions : “How do service transitions come about?” and “Can we distinguish particular patterns in service transition processes?” Our study shows that the new platform architecture-the layered modular architecture (Yoo et al., 2010)-provides the platform owners with profound challenges in the ways that firms organize for service innovation and, by calling attention to these service transitions, we contribute to the literature on IT service innovation.

First, our research has contributed to the theoretical examination of service provisioning by expanding the vocabulary to explore, understand and engage in discourse on the subject. More specifically, we have contributed by showing how the IT plays a fundamental role in service provisioning. Over the last decade, numerous studies have highlighted the transition from goods to services. In particular, the so-called S-D (service-dominant) logic (Vargo and Lusch, 2004; Vargo and Lusch, 2006) is a service-centered alternative to the traditional goods-centered paradigm for understanding economic exchange and

value creation. Service logic is "dominant" in the sense that all businesses are seen as service businesses. Vargo and Lusch (Vargo and Lusch, 2004) have argued that traditional goods-dominant logic is insufficient for understanding current markets, economic exchange and marketing. New perspectives that focus on "*intangible resources, the co-creation of value, and relationships […] are converging to form a new dominant logic for marketing, one in which service provision rather than goods is fundamental to economic exchange*" (Vargo and Lusch, 2004). However, their conceptualization does not go far enough. In particular, S-D logic does not sufficiently incorporate the fundamental role of IT in service provisioning. Indeed, even though S-D logic underscores how the service revolution and the information revolution are opposite sides of the same coin and how IT "has a dramatic effect on the ability of all entities in the value-creation network to collaborate" (Lusch et al., 2007) little, if anything, has been said about the actual role IT plays in the context of IT-enabled services. Against this backdrop, we have contributed to this discourse by showing how service provisioning is deeply intertwined with the IT platform on which it is built. Indeed, although prior work has highlighted the importance of socio-technical processes in the evolution of new complex technologies (Rycroft and Kash, 1994; Tushman and Rosenkopf, 1992), this study has explicitly considered the socio-technical process of service transitions, as the findings suggest that there are barriers to service transitions that are found in the interdependencies between the social and the technical. In this way, our findings suggest that technological transitions are the necessary, but insufficient, preconditions for service transitions. The shortcomings in delivering the services envisioned based on the technological resources available, we label as an *attenuation effect*. An attenuation effect, in this context, is thus defined as the gradual loss of quality when moving from a technology transition to a service transition.

Second, our case study demonstrates how changes within a service regime tend to be path dependent. While the service regimes in the case study produced 'normal' innovation patterns, potentially 'revolutionary' change failed to emerge. It is clear that both the knowledge about the technology as well as the supporting network continuously grew and led to technological transitions. However, there were clear attenuation effects when it came to the move from technology transition to service transition. Our results thus confirm Geels and Kemp's (2007) argument that a transition path consists of a repetitive process with the following ingredients : A) Formation and stabilization of expectations and strategies; B) Learning processes (about technology, consumer wishes, infrastructure etc.) and C) Formation and stabilization of the network (Geels and Kemp, 2007; Geels, 2004). These three main ingredients were not sequential but were constantly influencing each other as shown in the Weilgo case. During this process, knowledge increased about the technology in transition and the system worked as a continuous feedback mechanism-if results are positive, then the transition continues; if results are negative or less positive than expected, then the transition process is hampered. This is illustrated in <Table 2> outlining an overview of the platform evolution at Weilgo, the service provisioning evolution and the associated barriers to service provisioning.

We can see clearly how the results underscore how challenging it is to make the service transitions associated with the evolving IT platform in a knowledge-intensive, fast-growing and dynamic industry. The case thus illustrates how service evolution, which refers to the process by which services are provisioned based on IT platforms, is difficult to manage.

6. Conclusion

In this article, we have offered insights into how service transitions come about. Building on a longitudinal study at Weilgo, we present findings that suggest how technological and social dimensions mutually constitute each other within development and implementation of the service provisioning. Taken together, the findings suggest that a framework that treats service provisioning involving technological and social change as mutually constitutive must be attuned to how : (a) IT plays a fundamental role in service provisioning; (b) technological transitions are the necessary but insufficient preconditions for service transitions and (c) there are attenuation effects when it comes to the move from technology transition to service transition.

References

Abernathy, W.J. and J.M. Utterback, "Patterns of Industrial Innovation", *Technology Review*, Vol.64, 1978, 40-47.

Ahuja, G. and C. Lampert, "Entrepreneurship in the Large Corporation : A Longitudinal Study of How Established Firms Create Breakthrough Inventions", *Strategic Management Journal*, Vol.22, No.6/7, 2001, 521-543.

Alter, S., "Viewing Systems as Services : A Fresh Approach in the IS Field", *Communications of the Association for Information Systems*, Vol.26, No.11, 2010, 195-224.

Alter, S., "Service-Dominant Logic Provide Insight about Operational IT Service Systems?", *Proceedings of AMCIS, the 16th Americas Conference on Information Systems*, 2010.

Bardhan, I.R., H. Demirkan, P.K. Kannan, R. Kauffman, and R. Sougstad, "An Interdisciplinary Perspective on IT Services Management and Service Science", *Journal of Management Information Systems*, Vol.26, No.4, 2010, 13-64.

Barrett, M. and E. Davidson, Exploring the Diversity of Service Worlds in the Service Economy, Information Technology in the Service Economy : Challenges and Possibilities for the 21st Century, *Hiedelberg : Springer Publishers*, 2008, 1-10.

Barrett, M., E. Davidson, C. Middleton, and J. DeGross, Information Technology in the Service Economy : Challenges and Possibilities for the 21st Century, *in IFIP International Federation for Information Processing*, Vol.267, 2008, 61-81.

Basuroy, S., S. Chatterjee, and S.A. Ravid, "How Critical are Critical Reviews? The Box Office Effects of Film Critics, Star Power and Budgets", *Journal of Marketing*, Vol.67, No. 4, 2003, 103-117.

Bharadwaj, A.S., "A Resource-Based Perspective on Information Technology Capability and Firm Performance : An Empirical Investigation", *MIS Quarterly*, Vol.24, No.1, 2000, 169-197.

Bolton, R.N. and K.N. Lemon, "A Dynamic Model of Customers' Usage of Services : Usage

an Antecedent and Consequence of Satisfaction", *Journal of Marketing Research*, Vol.36, No.2, 1999, 171-186.

Chesbrough, H. and J. Spohrer, "A Research Manifesto for Services Science", *Communications of the ACM*, Vol.49, No.7, 2006, 35-40.

Christensen, C.M. and J.L. Bower, "Customer Power, Strategic Investment, and The Failure of Leading Firms", *Strategic Management Journal*, Vol.17, No.3, 1996, 197-218.

Coghlan, D. and T. Brannick, Doing Action Research in Your Own Organization, London : Sage Publications, 2001.

Danaher, P.J., "Optimal Pricing of Subscription Services : Analysis of a Market Experiment", *Marketing Science*, Vol.21, No.2, 2002, 119-138.

Dosi, G., "Technological Paradigms and Technological Trajectories : A Suggested Interpretation of the Determinants and Directions of Technical Change", *Research Policy*, Vol. 11, No.3, 1982, 147-162.

Geels, F.W., "Technological Transitions as Evolutionary Reconfiguration Processes : A Multi-Level Perspective and a Case-Study", *Research Policy*, Vol.31, No.8/9, 2002, 1257-1274.

Geels, F.W., "From Sectoral Systems of Innovation to Socio-Technical Systems : Insights About Dynamics and Change from Sociology and Institutional Theory", *Research Policy*, Vol.33, No.6-7, 2004, 897-920.

Geels, F.W., Technological Transitions and System Innovations, a Co -Evolutionary and Socio-Technical Analysis, Cheltenham : Edward Elgar, 2005.

Geels, F.W., "Transformations of Large Technical Systems : A Multi-Level Analysis of the Dutch Highway System (1950~2000)", *Science Technology and Human Values*, Vol.32, No.2, 2007, 123-149.

Geels, F.W. and R. Kemp, "Dynamics in Socio-Technical Systems : Typology of Change Processes and Contrasting Case Studies", *Technology in Society*, Vol.29, No.4, 2007, 441-455.

Geels, F.W. and J. Schot, "Typology of Socio-Technical Transition Pathways", *Research Policy*, Vol.36, No.3, 2007, 399-417.

Grönroos, C., Service Management and Marketing, Massachusetts, Toronto : Lexington Books, 1990.

Grönroos, C., Service Management and Marketing, A Customer Relationship Management Approach, 2nd edition, Chichester, NY : John Wiley and Sons, 2001.

Hauser, J.R., D.I. Simester, and B. Wernerfelt, "Customer Satisfaction Incentives", *Marketing Science*, Vol.13, No.4, 1994, 327-350.

Jonsson, K., J. Holmström, and K. Lyytinen, "Turn to the Material : Remote Diagnostics Systems and New Forms of Boundary-Spanning", *Information and Organization*, Vol.19, No.4, 2009, 233-252.

Kallinikos, J., "The Institution of Bureaucracy : Administration, Pluralism, Democracy", *Economy and Society*, Vol.35, No.4, 2006, 611-627.

Klein, H.K. and M.D. Myers, "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems", *MIS Quarterly*, Vol.23, No.1, 1999, 67-93.

Leonardi, P.M. and S.R. Barley, "Materiality and Change : Challenges to Building Better Theory About Technology and Organizing", *Information and Organization*, Vol.18, No.3,

2008, 159-176.

Lusch, R.F., S.L. Vargo, and L. Willcocks, "Competing Through Service : Insights From Service-Dominant Logic", *Journal of Retailing*, Vol.83, No.1, 2007, 5-18.

Lyytinen, K. and G.M. Rose, "The Disruptive Nature of Information Technology Innovations : The Case of Internet Computing in Systems Development Organizations", *MIS Quarterly*, Vol.27, No.4, 2003, 557-595.

Maglio, P.P. and J. Spohrer, "Fundamentals of Service Science", *Journal of the Academy of Marketing Science*, Vol.36, No.1, 2008, 18-20.

Mitchell, W., "Whether and When? Probability and Timing of Incumbents' Entry into Emerging Industrial Subfields", *Administrative Science Quarterly*, Vol.34, No.2, 1989, 208-230.

Moorthy, K.S. and K. Srinivasan, "Signaling Quality with a Money Back Guarantee : The Role of Transaction Costs", *Marketing Science*, Vol.14, No.4, 1995, 442-466.

Orlikowski, W.J. and S. Iacono, "Desperately Seeking the 'IT' in IT Research-A Call to Theorizing the IT Artifact", *Information Systems Research*, Vol.12, No.2, 2001, 121-134.

Orlikowski, W.J. and S.V. Scott, "Sociomateriality : Challenging the Separation of Technology, Work and Organization", *The Academy of Management Annals*, Vol.2, No.1, 2008, 433-474.

Prahalad, C.K. and V. Ramaswamy, "Co-creation Experiences : The Next Practice in Value Creation", *Journal of interactive marketing*, Vol.18, No.3, 2004, 5-14.

Quinn, J., Intelligent enterprise : A Knowledge and Service Based Paradigm for Industry, New York, NY : The Free Press, 1992.

Rai, A. and V. Sambamurthy, "Editorial notes-The Growth of Interest in Services Management : Opportunities for Information Systems Scholars", *Information Systems Research*, Vol.17, No.4, 2006, 327-331.

Rothaermel, F., "Incumbent's Advantage Through Exploiting Complementary Assets Via Inter-Firm Cooperation", *Strategic Management Journal*, Vol.22, No.6/7, 2001, 687-699.

Rycroft, R.W. and D.E. Kash, "Technology Policy in a Complex World", *Technology in Society*, Vol.16, No.3, 1994, 243-267.

Rönnbäck, L., J. Holmström, and O. Hanseth, "IT-Adaptation Challenges in the Process Industry : An Exploratory Case Study", *Industrial Management and Data Systems*, Vol.107, No.9, 2007, 1276-1289.

Sawhney, M.S. and J. Eliashberg, "A Parsimonious Model for Forecasting Gross Box Office Revenues of Motion Pictures", *Marketing Science*, Vol.15, No.2, 1996, 113-131.

Shugan, S.M. and J. Xie, "Advance Pricing of Services and Other Implications of Separating Purchase and Consumption", *Journal of Service Research*, Vol.2, No.3, 2000, 227-239.

Stewart, D.W. and P.N. Shamdasani, Focus groups : Theory and Practice, London : Sage, 1990.

Sull, D., R. Tedlow, and R. Rosenbloom, "Managerial Commitments and Technology Change in the U.S. Tire Industry", *Industrial and Corporate Change*, Vol.6, No.2, 1997, 461-500.

Teece, D., "Profiting From Technological Innovation : Implications for Integration, Colla-

boration, Licensing and Public Policy", *Research Policy*, Vol.15, No.6, 1986, 285-305.

Tripsas, M., "Unraveling the Process of Creative Destruction : Complementary Assets and Incumbent Survival in the Typesetter Industry", *Strategic Management Journal*, Vol. 18, No.s1, 1997, 119-142.

Tushman, M.L. and P. Anderson, "Technological Discontinuities and Organizational Environments", *Administrative Science Quarterly*, Vol.31, No.3, 1986, 439-465.

Tushman, M.L. and L. Rosenkopf, "Organizational Determinants of Technological Change : Towards a Sociology of Technological Evolution", *Research in Organizational Behavior*, Vol.14, 1992, 311-347.

Vargo, S.L. and R.F. Lusch, "Evolving to a New Dominant Logic for Marketing", *Journal of Marketing,* Vol.68, No.1, 2004, 1-17.

Vargo, S.L. and R.F. Lusch, "Service-Dominant Logic : Reactions, Reflections and Refinements", *Marketing Theory*, Vol.6, No.3, 2006, 281-288.

Vargo, S.L. and R.E. Lusch, "Service-Dominant Logic : Continuing the evolution", *Journal of the Academy of Marketing Science*, Vol. 36, No.1, 2008, 1-10.

Wade, M. and J. Hulland, "Review : The Resource-Based View and Information Systems", *MIS Quarterly*, Vol.28, No.1, 2004, 107-142.

Walsham, G., "Interpretive Case Studies in IS Research : Nature and Method", *European Journal on Information Systems*, Vol.4, No.2, 1995, 74-81.

Yoo, Y., O. Henfridsson, and K. Lyytinen, "The New Organizing Logic of Digital Innovation : An Agenda for Information Systems Research", *Information Systems Research*, Vol.21, No.4, 2010, 724-735.

Zammuto, R.F., T.L. Griffith, A. Majchrzak, D.J. Dougherty, and S. Faraj, "Information Technology and The Changing Fabric of Organization", *Organization Science*, Vol.18, No.5, 2007, 749-762.

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