

Transforming markets with ICT enabled service innovations – A dynamic capabilities perspective

ICT and service, Service innovation

ABSTRACT

Purpose – Information and communication technologies (ICT) is identified as key driver for the service phenomenon. Organisations operating, for example, in traditional service sector, manufacturing industry and public sector are increasingly interested in utilizing ICT to create service innovations to enhance their competitiveness. The purpose of this paper is to explore role of dynamic capabilities in four service innovation cases, which aim to transform relatively traditional and stable markets with ICT-enabled service innovations.

Design/Methodology/approach – The study adopts a qualitative research approach and is based on case study research design. The primary data has been collected from semi-structured interviews in four case studies in the areas of banking, elderly care, public sector and heavy machinery. Case study is especially suitable as a research method in this context due to the high complexity of the phenomenon and early stage of this field of inquiry.

Findings – Sensing capabilities related to understanding customers' value creation processes and value co-creation within service system were found critical capabilities for service innovations. Also understanding technological opportunities and threats had important role. However, in contrast to some previous studies, capability to seize opportunities was observed to be less dependent on technological capabilities of the company and more dependent on firms' capabilities to integrate technological resources and capabilities within the service system. Furthermore, capability to orchestrate service development with other service system entities was found to be essential, but very challenging especially for companies who have previously focused on product development. Finally, in many cases service innovations were recognized to be heavily dependent on the management capabilities and commitment, organizational culture and learning.

Research limitations/implications – Research brings dynamic capabilities approach closer to the discussions of service innovations in service science. Paper explores the role of dynamic capabilities in creation ICT-enabled service innovations. Study addresses case studies from many different sectors, which provides interesting data for comparative case analysis but also limits possibility to generalize findings.

Practical implications – Non-ICT companies, who are aiming at creating radical service innovations with help of ICT, can benefit by understanding what kind of technological and dynamic capabilities are needed. Moreover, they can benefit by adopting service systems perspective on capability development.

Originality/value – Study provides original empirical contribution to the practice-oriented discussion about innovation in service science. Paper introduces four case studies from domains that have not been covered in previous empirical studies combining capabilities and service innovation.

Key words: service innovation, dynamic capabilities, service science, ICT

Paper type – Case study

Introduction

Since the introduction of service science there has been continuous call for better understanding of service innovations in order to fuel further economic growth and to raise the quality and productivity levels (Chesbrough and Spohrer, 2006; Spohrer and Maglio, 2008). Paradoxically, while service are identified as a major priority for economic development and innovation is seen as a major driver of business success, service innovation has remained area with limited theory and empirical work being undertaken. (O’Cass et al., 2012). Hence, the major objective of service science is to provide theory and practise around service innovation in order to improve our ability to create service innovations systematically and reliably (Spohrer and Maglio, 2010).

Advances in information and communication technologies (ICT) can be considered as a key enabler for the recent service phenomenon (Vargo and Akaka, 2009). Digitalization of information has separated information from the matter and stimulated further specialization (Normann, 2001). As a result, the ICT has had major influence on rapid transformation of many information intensive markets (e.g. music distribution, photographing and travel agencies). In these markets many incumbent enterprises, who got used to their previous success (founded for example on the scale economies of production), have suddenly faced the erosion of their competitive advantage. Some of these incumbents have even created competency trap for themselves, where they force fiercely on improving efficiency of their operational capabilities that are increasingly less relevant for the success in evolving markets (Tallman, 2003; Teece et al., 1997).

In rapidly changing business environment improving and protecting operational capabilities built on one innovation is often not enough to sustain success in the long run. Instead being able to successfully introduce and exploit service innovations repeatedly, year after year, have become major source of competitive advantage and enabler for long run success (den Hertog et al., 2010; Bettencourt et al., 2013). This article consists of four case studies which investigate companies that aim to transform relatively stable markets with ICT-enabled service innovations. In this study we are particularly interested about the role of dynamic capabilities as an enabler for the service innovations. Dynamic capabilities approach has gained extensive academic attention especially in strategic management, but is less known in service research. Therefore, our aim is to bridge cap between service science and dynamic capabilities approach. Furthermore, despite recent theoretical advancements, dynamic capabilities approach still lacks a strong empirical base (Weerawardena and Mavondo, 2011). Thereby, our research aims to fill this gap by seeking an empirically deduced answer to question: how possession or lack of dynamic capabilities are reflected on the service innovation process.

The paper is organized as follows. The second chapter introduces previous research related to dynamic capabilities and how this approach is applied in managing service innovations. Third chapter outlines methodology of our research, which is followed by findings from four case studies. Fifth chapter discusses about managerial and theoretical implications of our research. The paper is concluded by presenting limitations and final conclusions of the research.

Theoretical background

Dynamic capabilities

Dynamic capabilities view (DCV) has gained growing academic attention since the publication of seminal article of Teece et al. (1997). Their article proposes dynamic capabilities approach as an extension to resource-based view of the firm (see e.g. Barney, 1991), which is essentially static in

its nature and therefore inadequate to explain firm's competitive advantage in changing environments (Barreto, 2010). Despite of extensive body of research, lack of a common definition and disagreement on the effect of dynamic capabilities are holding back application of the concept (Barreto, 2010; Helfat and Peteraf, 2009).

In this study dynamic capabilities are defined according to Helfat et al. (2007:4) as capacity of an organization to purposefully create, extend, or modify its resource base i.e. the tangible, intangible, and human assets as well as capabilities, which the organisation owns, controls, or has access to on a preferential basis. Dynamic capabilities can thereby be seen as higher order capabilities that are needed for creating and modifying lower-order operational capabilities that enable firm to execute its day-to-day operating activities such as selling services (Zollo and Winter, 2003; Pavlou and Sawy, 2009). Firm's use dynamic capabilities to adapt purposefully to changes in their ecosystems (Helfat, 2007; Teece, 1997), and organisations can utilize dynamic capabilities also to shape their ecosystems through innovation and collaboration with other service system entities (Teece, 2007).

Several different ways of categorising dynamic capabilities have been suggested. Wang & Ahmed (2007) identify three main component factors of dynamic capabilities, which are adaptive capability, absorptive capability, and innovative capability. Adaptive capability refers to firm's ability to identify and capitalize on emerging market opportunities. Secondly, absorptive capability describes the ability to recognize the value of new, external information, assimilate it, and apply it to commercial ends. Thirdly, innovative capability explains ability to develop new products and/or markets, through aligning strategic innovative orientation with innovative behaviours and processes. Teece (2007) disaggregates dynamic capabilities similarly into three categories, which are:

1. *Sensing capabilities* to sense market and technological opportunities.
2. *Seizing capabilities* to address sensed opportunities, and
3. *Reconfiguring capabilities* that deals with maintaining competitiveness through enhancing, combining, protecting and reconfiguring firm's intangible and tangible assets.

Dynamic capabilities in managing service innovations

Although dynamic capabilities have been extensively studied in strategic management, there are few attempts to apply context in the field of service innovation and service business development. den Hertog et al. (2010) outline a promising conceptual framework for managing service innovations, and introduce a concept of dynamic service innovation capability which builds on the concept of dynamic capabilities. Based on their theoretical work, they hypothesize that successful service innovators outperform their competitors in at least some of these capabilities. Salunke et al. (2011) studied innovations in project-oriented service firms and found that entrepreneurial service firms pursuing innovations carefully select and use dynamic capabilities that enable them to achieve greater innovation and sustained competitive advantage.

Recently, product-service transition of manufacturing firms has gained notable academic interest and some studies have also examined service transition phenomenon from the perspective of dynamic capabilities (Kindström et al., 2012; Fischer et al., 2010). Kindström et al. 2012 adopt the threefold classification of Teece (2007) to analyse microfoundations that firms must develop in order to achieve service innovation. One of their main theoretical contributions is development of new service-innovation-oriented microfoundations for dynamic capabilities. Thereby, their research helps to interpret the concept of dynamic capability in the term of service science. In the following analysis of our case study findings, we will apply Teece's threefold classification of dynamic capabilities enhanced with the service-oriented microfoundations (Kindström et al., 2012).

Methodology

The current study adopts a qualitative research approach to identify and analyse the role of dynamic capabilities in the service innovation process. The study analysis four individual case studies, which have focused on creating new ICT-enabled service innovations, and compares the findings between the case studies. Case study is especially suitable as a research method in this context due to the high complexity of the phenomenon and early stage of this field of inquiry (Helfat and Peteraf 2009). Case study provides means to investigate a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2009).

The primary data was collected from semi-structured interviews in four companies that were developing their service business. All case companies developed technology-intensive service innovations, which had potential to transform existing markets. Additionally, presumed customers of service innovations were interviewed in three of these case studies. Overall, 19 interviews were conducted, 10 of them by the author and nine by other researchers in the research group. Interviews lasted on average about 60 minutes, and all the interviews were tape-recorded and transcribed.

The empirical interview data were analysed by content coding and theme-based categorization with the help of NVivo software. The dynamic capabilities view provided the basic framework for the analysis. The analysis was not, however, limited under these exact themes, and other relevant issues were allowed to be raised concerning the phenomenon. Table 1 depicts basic information of four case studies.

Table 1. Basic information of the case studies

	Case 1	Case 2	Case 3	Case 4
Domain	Financial services	Public sector	Heavy machinery	Private elderly care
Developed service	Mobile banking	Social media enhanced user-driven development	Remote maintenance and training of heavy machinery	Video-enabled home care
Main actors involved in the development	<i>IT company, bank, consumers</i>	<i>IT consultant, municipal org., citizens</i>	<i>Manufacturing company, B2B customers</i>	<i>Care service provider, video-communication provider, consumers, elderly association</i>
Data collection methods	an interview with executive vice president, group interview with management and a developer	3 interviews with IT company, 2 interviews with municipality	3 interviews within company, 6 customer interviews	an interview and a management workshop with care service provider, 3 interviews with video-com. provider,

Findings

In the following we will shortly introduce four case studies and present a brief overview on role that dynamic capabilities had in service innovation processes. Next chapter will focus more on comparing different case studies and the impact of dynamic capabilities microfoundations on studied service innovations.

Mobile access transforming financial services

IT company had gained deep customer understanding and substantial domain specific knowledge related banking systems, through the information systems development projects that it had conducted with its clients in financial sector for many years. Employees of the company had excellent technological capabilities and organisation culture in the IT company was fostering employees' interests to follow new technological developments. Company's top management was also interested in fostering open innovation practices within their organisation and paid a lot of attention on listening for its clients. Therefore, company can be considered to poses excellent dynamic capabilities related to sensing markets and technological opportunities.

Due to the combination of high technological expertise and profound customer understanding, IT company identified new market opportunity already before it was considered attractive opportunity by key actors in the banking sector. For this reason IT company had challenges to convince its clients to initiate joint development project and share the risks involved in the development. Although banks were interested about the opportunities, they wanted to wait before taking an action mostly because of fears related to information security. Despite the challenges company was confident about the future market and started building its own service prototype in order to show how service would work in real life.

Since IT company was utilizing very flexible and agile development practices, it was able to allocate resources quite fast on its own development project. By the independent development of service prototype it was also able to show to its customers that it had required expertise, passion, and commitment to the project. When its customer's international competitor announced aims to be first to launch mobile banking service, also customer realised that they had to secure their share of future mobile banking markets. As IT company had already developed a proof-of-concept, it had relatively easy task to sell development project to a bank that now had urge to stay competitive.

Digitalization driving service transition in heavy vehicle manufacturing

Manufacturing company had established brand leader position in its industry, which was focused mostly on selling heavy machinery products. Company had minor after sales organisation, but it had realised that in order to keep brand leader position they have to focus more on development of service business. Company had very active middle-level manager who saw transition into service business as a great opportunity. He was personally leading development project that aimed to introduce new ICT-enabled remote diagnostics and learning service, which would radically change the existing service logic at the market from fixing problems to preventing malfunction.

Although top management had accepted development project, their main concern seemed to be very focused on running existing business operations smoothly. Top management viewed their business from traditional manufacturing-oriented perspective, and had challenges on understanding the potential impact of new ICT solution and how it could transform whole business logic of the organisation. Therefore, most of the resources were allocated on development efforts that were aiming to improve operational efficiency of existing business.

Manufacturing mindset represented by the top management was also seen throughout the organisation. Project manager experienced that organisational culture was so heavily built on manufacturing logic that, for example, sales and service staff would have significant challenges in transformation towards new service-oriented business. Due to the lack of management support and fit between organisational culture, middle-level manager had insufficient resources for trying to introduce new service innovation internally and externally. Although company possessed knowledge required to sense market opportunity, it clearly lacked capabilities to seize the opportunity and implement reconfiguration of organisational practices and structures.

Service for involving citizens to service development through social media

As a starting point, IT consultant had for years been major actor in information systems development project for public sector. Through their extensive domain knowledge, IT consultant had identified two major trends that could provide potential for new service innovation: 1) pressure to increase effectiveness of development projects in the public sector, and 2) need to introduce more customer-oriented ways to develop municipal services. As a result they identified a promising opportunity for a new service innovation, which was relying on two key ideas: A) the utilization of social media tools as channel of communication between users and municipality, and B) external facilitation of user-driven service development. IT consultant believed that through the combination of these key ideas, they could eventually establishment entirely new consultation market for user-driven development.

In order to seize the promising opportunity, IT consultant established development project with a municipality as a key partner and research institution providing support for the facilitation. During the project internal organisational changes in IT company and municipality were causing most difficult challenges. Also municipal organisations internal cultural change was experienced to cause some challenges. However, since IT consultant had already extensive expertise in various consulting tasks, they seemed to have required mindset for organisational learning that was needed to adopt new service concept. Hence, their organisation had dynamic capabilities needed to sense and seize the challenges, at least at the small scale. One challenge remained, however, how organisation can scale new user-driven development service to larger scale.

Boosting home care service markets with video-communication technologies

Elderly care service provider had been providing various home care services (action therapy, group signing, physical exercising, religious events, etc.) to customers who were living in their assisted living buildings. During many years of operation, service provider had identified increasing demand for home care services also to older adults, who can still live at their own home. The physical provisioning of home care services was, however, very costly and therefore they had not actively marketed service outside their premises.

Pieces seemed to start fall into place when service provider got in discussion with a company that had most recent knowledge about technological opportunities of video communication. As a result of discussions new service that would enable digitally distribution of home care service was chosen to be developed. Both companies seized the opportunity with great enthusiasm, but during the field trial it turned out that designing viable business models for both partners would be rather difficult without major service process restructuration. One of the reasons was that video communication platform provider had previously focused on providing services in business-to-business context and service provisioning for consumers would have required notable reconfiguration of resources. At the same time video communication platform provider had gone through major strategic changes. Consequently, developed service would have required notable realignment of specific assets, but was not fully fit with the new strategy anymore. Thereby, care service provider noticed that it needed new partner for seizing the highly promising opportunity to scale home care services to broader markets.

Discussion and implications

Sensing capabilities

Sensing capabilities related to understanding customers' value creation processes (customer-linked service sensing) and value co-creation within service system (service system sensing) were found to be prerequisites for service innovations in all case studies. Customer-linked sensing

capability was considered to be much more than just receiving and processing customer feedback and development ideas. In fact customers' explicit needs were mostly focused on upgrades on existing products and services, and ideas for more radical innovations came through companies own experts who were working continuously with customers (internal service sensing).

Visioning alternative ways to co-create value with customers and other service system actors was observed to rely on experts' domain specific knowledge cumulated over the years. Both deep and broad domain specific knowledge was seen as highly valuable for the creation of service innovations. Long lasting relationships were seen to provide such a deep understanding of customer's value creation that it provided significant competitive advantage for the company in service innovation activities. At the same time, circulating experts regularly from one customer to other was regarded as a key for developing experts who could offer customers new insights that finally lead to service innovations. The main challenge in the capability development was that the domain specific knowledge can be rather difficult to diffuse inside the organization. Diffusion of knowledge was experienced to be especially challenging in cases, such as mobile banking, where people possessing the knowledge worked continuously in the premises of the customer and thus had very limited daily contacts to their own organization.

Also dynamic capability to understand technological opportunities (technology exploration) was important for development of service innovations. The capability was experienced to be strategically important in the cases where company had to open up new technological opportunities either through internal or external R&D activities. In mobile banking case, for example, the combination of understanding technological opportunities and changes in the customer behaviour were considered to be vital capabilities for the success service innovation. On the other hand, role of technology exploration was lesser in cases where the service was based on already well known technologies, and needed capabilities could be easily acquired from other service systems actors.

Seizing capabilities

Although *structured service innovation process* has been recognised as a core microfoundation with respect to seizing capability (Kindström et al., 2012), none of the case companies were recognised to have very structured service innovation process. Instead of systematic processes, new ideas for service innovations were often handled in ad hoc manner. In manufacturing firm, new service innovation ideas were discussed and selected in marketing team meetings, but the implementation of development process was left mostly on one development manager. Also care service provider did not have organisation or processes for service development, and hence the responsibility of capitalizing service innovation opportunities was appointed almost solely on one manager. IT company was also missing clear process of seizing opportunities, however, their top management understood the importance of seizing opportunities, and also allocated their own resources for that.

Detecting the right timing to seize the opportunity was thought to be critical capability for service innovations. However, capability to react opportunities were found to vary significantly between cases and to be heavily dependent on management practices and organizational culture and how these supported organisational learning. Especially management practices and culture that were bound to manufacturing logic (manufacturing firm) and on product innovations (IT company) was experienced to conflict with dynamic capabilities needed for introduction of more holistic service innovations. As an example, heavy machine manufacturer's management team's minor interest and contribution on promoting service-oriented culture seemed to hinder whole organisations efforts on seizing the opportunity to transform into service business.

Reconfiguring capabilities

In these case studies, service innovations were not observed to be highly dependent on technological capabilities of the company. Instead innovations were more dependent on firms' capabilities to manage service system and integrate different types of technological resources and capabilities within the service system (orchestrating the service system). Only one organisation in these case studies seemed to have service culture that promoted agile reconfiguration of existing resource and capabilities and efficient management of this change process. The reason why one company stood out might be that it was relatively young and had operated in IT-service business from the beginning. This organisation's culture seemed to foster employees' continuous motivation to develop themselves, improve and innovate their services thereby enhancing value co-creation.

Although care service provider was born to operate in service business, organisation had become accustomed on running existing operations through the years. Therefore, they lacked many of the dynamic capabilities needed to seize opportunities and especially to reconfigure existing resource base. Nevertheless, with the lead of two new employees, who took responsibility of the service innovation process, care service provider was able to seize the opportunity and initiate organisational learning process.

Conclusions and limitations

Dynamic capabilities have been studied with an aim to gain understanding about long-run success of enterprises. The limitation of this case study is that our data does not indicate if dynamic capabilities have contributed on long-run success of enterprise. Our study suggests, however, that dynamic capabilities have important impact on firms' ability to create service innovations more systematically and continuously. Accordingly, more effective service innovation process has potential enhance value co-creation thereby making long-run success possible for the firms.

Case study approach sets also another limitation because of small set of studied innovations. As a result it is very challenging to extract impact of specific dynamic capabilities for complex service innovation process that has huge number of continuously changing endogenous and exogenous variables. Nevertheless, those common aspects that are found between these cases provide interesting empirical insights on role of dynamic capabilities in the development of ICT-enabled service innovations.

From these four case studies it can be concluded that service innovations require versatile capabilities which are context dependent. Importance of technological capabilities depends, for example, on the technological novelty and complexity of service innovation. In the cases in which service innovations were based on the state-of-the-art technologies, understanding the opportunities of new technologies in customers' context were experienced to be highly important. However, uncertainty related to technology intensive innovations is always high and therefore capability to seize opportunities at the right moment is even more critical. Without the ability to proactively invest on service innovation activities company is likely to be follower instead of an innovator.

Impact of dynamic capabilities for the success of service innovation has not been studied extensively. This study focused on identifying dynamic capabilities in service innovation process based on Teece's (2007) categorisation. In the case studies sensing capabilities were most easy to identify and their possession was considered to be initiating factor behind service innovation process. Capability to seize opportunity was recognised to be more difficult requiring capability and courage to experiment with new solution and technologies, and willingness invest in innovation activities that often has uncertain outcome. Lastly capability to reconfigure organisations existing processes, capabilities and resources, and the whole service system, was identified as a major challenge in most of these studies. However, without this dynamic capability, that is tightly linked to organisational learning, the outcome of service innovation process is likely to be far from optimal.

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