Innovation Management Practices in Production-Intensive Service Firms

Abstract

This paper posits that innovation management practices are contingent upon the type of industry, and examines the innovation management practices in a distinctive set of service firms: production-intensive service firms. Production-intensive services are standardized services produced at a large scale. These services have received little attention from prior comprehensive qualitative innovation management practices research. The examination in this paper is based on in-depth interviews with 21 key-employees in five large Scandinavian production-intensive service firms. The results revealed a number of innovation management practices specific to production-intensive service firms in the four dimensions of strategy and culture, front end of innovation and portfolio management, development process as well as intellectual and organizational resources. The findings expose that production-intensive service firms are less likely to have an explicit innovation strategy and they are unlikely to measure the strategic impact of innovation activities. Furthermore, the innovation processes in production-intensive service firms tend to be flexible, although formal descriptions exist. The findings extend knowledge on innovation management practices research and provide useful lessons and implications for managers who seek to develop new production-intensive services. The findings also demonstrate that there is a need to acknowledge a contingent view of innovation management practices that are receptive to the type of context the innovation occur in.

***Keywords**: Service Innovation; New Service Development; Production-intensive Services; Innovation Management Practices; Qualitative Inquiry*

1 Introduction

Service innovation has been discussed in the research literature from the late 1980s (Droege, Hildebrand and Forcada, 2009). Research suggests that the management of service innovation differs from traditional product innovation when considering the innovation processes (Gallouj and Weinstein, 1997; Martin and Horne, 1993), the required capabilities (den Hertog, van der Aa and de Jong, 2010), the inherent organizational complexity (Johne and Storey, 1998), and the effects (Aas and Pedersen, 2010). The research results also disclose large variations in innovation practices between different service industries (e.g., Camacho and Rodriguez, 2005; Evangelista, 2000). Several quantitative studies suggest that success factors vary between service industries (e.g., de Brentani, 1989, 1991, 1995, 2001; de Brentani and Ragot, 1996), and Zomerdijk and Voss (2011) conclude that the diversity of the service sector suggests that "*differences exist not only between the development of services and the development of physical products, but also between different types of services*" (p. 63).

A relatively new research stream focusing on innovation practices in specific service industry contexts is thus emerging (Kuester et al., 2013), and recent contributions include analysis of innovation patterns (e.g., Chang et al., 2012) and success factors (Kuester et al., 2013) as well as the exploration of more detailed innovation practices in different service sectors such as experiential services (Zomerdijk and Voss, 2011) and nonprofit services (Barczak, Kahn, and Moss, 2006). The present study continues this research stream and examines innovation management practices in a specific subset of services that is quite different from both experiential and nonprofit services, namely production-intensive services. Production-intensive services are standardized services that are produced at a large scale, and include for example telecommunication, financial and transportation services. These services have some characteristics that distinguish them from other services. For example, they are often dependent on physical networks or information- and communication-technology (ICT) networks (e.g., Soete and Miozzo, 1989), and subject to strict government regulations (e.g., Picot and Wernick, 2007). These

characteristics are likely to have implications for how the development of new production-intensive services should be managed (e.g., de Jong et al, 2003). Thus, successful practices for the management of innovations in production-intensive service firms are expected to differ from the practices prescribed both to manufacturing firms and other service firms. Although prior quantitative research has provided valuable knowledge about innovation in production-intensive services (e.g., de Brentani, 1989; Nijssen et al., 2006), the in-depth comprehensive empirical insights on innovation management practices in production-intensive service firms are still relatively limited (Kuester et al., 2013).

This literature gap is concerning since the service firms delivering production-intensive services are typically large firms (de Jong et al., 2003) and account for a large amount of both the gross domestic product and employment in most developed countries. In 2012 the telecommunication industry alone, for example, accounted for a total revenue of about $4.7 trillion worldwide, or about 3 percent of the gross world product (Plunkett, 2014), and the same year the transportation industry accounted for almost the same revenue (about $4 trillion) (Plunkett, 2013). Thus, the improvement of innovation management practices in production-intensive services indeed has substantial financial potential. A better understanding of how production-intensive service firms manage their innovation activities is a prerequisite for realizing these potential benefits.

Insights in innovation management practices in production-intensive services are also expected to be relevant for firms that do not belong to the realm of production-intensive services per se. In particular, an empirical exploration can be relevant for theorizing about innovation management in *manufacturing* firms following a servitization or service-transition strategy (Gebauer, Gustafsson and Witell, 2011), and *service* firms that follow a standardization strategy (e.g., Ellingsen, Monteiro, and Munkvold, 2007). Thus, by studying the innovation management practices in production-intensive services, we also advance knowledge on the wider area of innovation management.

The aim of our paper is to extend the extant knowledge of innovation management practices by examining the innovation management practices of production-intensive service firms. In particular we address the following two research questions:

RQ1: What are the practices for managing innovation in production-intensive service firms?

RQ2: How do the innovation management practices in production-intensive service firms differ from the established innovation management practices?

The paper first reviews the literature on innovation management practices and production-intensive services. Next we present the chosen qualitative case-study methodology which we used to examine the innovation management practices of five of the largest Scandinavian firms delivering production-intensive services. In the following section, we present the empirical findings of the study. The paper finally discusses the theoretical and practical implications of production-intensive services as well as the wider context of innovation management.

2 Theory

The term "innovation management practices" refers to the tactics or methods implemented by firms to carry out innovation activities (Dooley, Subra and Anderson, 2002), including both the management of innovation processes and the management of the resources necessary to support those processes (Froehle and Roth, 2007). Both traditional product innovation research (e.g., Kahn, Barczak and Moss, 2006), service innovation research (e.g., Zomerdijk and Voss, 2011), as well as professional innovation management organizations (e.g., Product Development and Management Association, 2013), typically delineate innovation management practices across dimensions such as strategy and culture, front end and portfolio management, development process, metrics and measures and intellectual and organizational resources. There is a need to compare and contrast extant research on innovation management practices along the service-product dimension as well as identifying its implication for innovation management practices for production-intensive services.

2.1. Review of service innovation management practices research

Research disclose large variations in innovation practices between service firms and manufacturing firms (Droege et al., 2009). Generally the research stream aiming to identify differences between innovation practices in service and manufacturing firms is driven by an assumption that there

are some fundamental differences between service and manufacturing operations that in turn affect innovation activities in these industries (Gallouj and Weinstein, 1997; Johne and Storey, 1998; Vermeulen, 2001). The specific properties of service operations are particularly related to the intangible nature of their output (Zeithaml, Parasuraman and Berry, 1985). In addition, services are often produced and consumed at the same time (Zeithaml, Parasuraman and Berry, 1985), they are difficult to standardize (Gallouj and Weinstein, 1997) and store (Zeithaml, Parasuraman and Berry, 1985), and they are often information intensive (Porter and Millar, 1985; Miles, 2005). Early research focusing on service innovation typically discussed in what way these specific service characteristics affect innovation in the service sector. Gallouj and Weinstein (1997) for example argued that the characteristics of services make it difficult to detect and manage improvement or change, and they also argued that the distinction between product innovation and process innovation is irrelevant for service firms.

Later research has also found empirical evidence supporting the proposition that innovation practices in service firms differ from those of manufacturing firms (Droege et al., 2009). Successful service innovation is for example suggested to be more dependent on an innovative culture (Savory, 2009) and unique cultural norms (Lyons, Chatman and Joyce, 2007), compared to product innovation, although a “too-strong” culture seems to hinder service innovation (Lyons, Chatman and Joyce, 2007). In the front end dimension “soft” sources, such as clients, customers, suppliers (e.g., Meyer, 2010), consultants, competitors (e.g., Mansury and Love, 2008), employees (e.g., Menor and Roth, 2008), and government (as regulator) (e.g., den Hertog, Gallouj, and Segers, 2011), are suggested to be more important for service innovation than "hard" sources such as Research & Development (R&D) and acquired technology (e.g., Meyer, 2010). In the intellectual and organizational resources dimension, the involvement of front-line employees is suggested to be more important in service innovation than in product innovation, in part because front-line employees in service firms have an advanced knowledge of the firm’s customers (e.g., de Jong et al., 2003). Successful service innovation processes are also suggested to be associated with collectively held tacit knowledge, implying that team competences are more important for service innovation than product innovation (e.g., Leiponen, 2006).

However, research has found similarities between product and service innovation in several dimensions. In the strategy and culture dimension, for example, it is suggested to be important to set clear goals for the innovation program as a whole both in the service sector (e.g., Johne and Storey, 1998; Easingwood, 1990) and in the manufacturing sector (e.g., Cooper, Edgett and Kleinschmidt, 2002). In the portfolio management dimension it is suggested that leading firms place less emphasis on financial approaches and more on strategic methods both in the manufacturing (e.g., Cooper and Edgett, 2008; Cooper, Edgett and Kleinschmidt, 1999) and in the service sector (e.g. Aas, 2011). The metrics and measures dimension studies of product innovation practices indicate that the best manufacturing (Cooper, Edgett and Kleinschmidt, 1999) and service firms (Aas, 2011) measure the success of their innovative efforts both at the project and business-unit level (e.g., Bygstad and Lanestedt, 2009) and use a combination of financial and nonfinancial measures (Aas, 2011; Cooper, Edgett and Kleinschmidt, 1999).

In some dimensions the results of extant research also provide inconsistent findings. This is particularly true for the development process dimension where some studies find a positive relationship between the implementation of a formal service innovation process and success (e.g., de Brentani, 1989; de Brentani and Ragot, 1996; Froehle et al., 2000), and others do not (e.g., de Brentani, 2001; Henard and Szymanski, 2001; van der Aa and Elfring, 2002). Research on product innovation, however, suggests that the best-performing firms use a formal development process with predefined and well-documented stages and decision gates (e.g., Cooper, Edgett, and Kleinschmidt, 2002).

Although research has provided relatively much knowledge on innovation management practices in services, our knowledge on how innovation management practices differ across service sub-sectors is limited. The aim of most studies is to identify innovation management practices that are valid across different sectors (e.g., Barczak, Griffin and Kahn, 2009). Only a few studies take a more sectorial approach and study innovation management practices in a particular sub-sector (e.g., Zomerdijk and Voss, 2011), and in-depth qualitative studies discussing innovation management practices in the sub-sector focused in this paper, i.e. production-intensive services, are not readily available. Therefore we now turn to production-intensive services and discuss how these services differ from other services and

products, and whether the innovation management practices suggested by general (cross-sectorial) studies of innovation management practices may or may not apply.

2.2. Innovation management practices of production-intensive services

The idea that production- intensive service firms have some characteristics that may affect innovation practices is not new. Three decades ago Pavitt (1984) suggested that manufacturing and service industries could be classified into supplier-dominated firms, scale-intensive firms, specialist supplier firms and science-based firms. Later authors have attempted to refine Pavitt's taxonomy by considering the characteristics of different service sectors more explicitly (e.g., Soete and Miozzo, 1989; Hulshoff et al., 1998; Evangelista and Savona, 1998; Silvestrou et al., 1992; Evangelista, 2000). According to de Jong et al. (2003), the findings of this research stream can best be summarized by distinguishing (1) supplier-dominated service firms, (2) specialized service firms, and (3) production-intensive service firms.

Supplier-dominated services are typically characterized by short client-contact times and little client-specific judgment (Silvestrou et al., 1992). Examples of supplier-dominated services include personal services, hotels and restaurants, and retail trade (Soete and Miozzo, 1989). Specialized services, also known as knowledge-intensive business services (e.g., Miles et al., 1995) and science-based services (e.g., Soete and Miozzo, 1989), are typically characterized by a dependency on the knowledge of the coworkers. Examples of specialized services are R&D services, engineering, and management consultancy.

Production-intensive services, which are the focus of this paper, may be divided in two subcategories: (1) network services that are dependent on ICT networks (e.g., bank services, insurance services, and telecommunication services), often with high standards of information security, and (2) scale-intensive services that are dependent on physical networks (e.g., transportation services) (Soete and Miozzo, 1989). Production-intensive services are usually offered by large firms that are subject to strict government regulations. Soete and Miozzo (1989) state that production-intensive service firms put

considerable efforts into service simplification and adaptation of standardized services to particular user needs.

Thus, based on the literature, it seems clear that production-intensive services may be distinguished from other services and products. Nevertheless, even if production-intensive services have often been included in quantitative survey based innovation management research (e.g., de Brentani, 1989; Martin and Horne, 1993; Frohle et al., 2000; Nijssen et al., 2006), previous in-depth comprehensive qualitative case-based research has only rarely investigated whether the distinguishing characteristics of production-intensive services lead to differences in the innovation management practices between production-intensive services compared to the more general innovation management practices. Due to the size of typical production-intensive service firms we may for example expect that the implementation of formal strategies, portfolio management procedures and development processes are more common in these firms compared to other service firms. Furthermore, due to the dependency on ICT-/physical-networks we may assume that other types of intellectual and organizational resources are needed to develop new production-intensive services than the resources needed to develop other services.

Therefore, to contribute in filling the literature gap related to production-intensive services, this paper examines the innovation management practices for production-intensive services in four dimensions: (1) strategy and culture, (2) front end and portfolio management, (3) development process, and (4) intellectual and organizational resources. The paper aims to discuss how the practices in these dimensions are relative to general innovation management practices.

4 Methodology

To examine the innovation management practices of production-intensive service firms, and to get a more in-depth understanding of the practices than prior quantitative research (e.g. Chang et al., 2012) has obtained, we used a qualitative case-study approach (e.g., Yin, 2003). A qualitative research design arguably has advantages when the phenomenon to be studied is not well understood and the variables are still unknown (e.g., Meredith, 1998; Johnson and Harris, 2003). In addition a qualitative

approach provides opportunities to examine a phenomenon in real-life (Yin, 2003), enabling a deeper understanding of the innovation practices than would have been possible to achieve by other more quantitative research methods.

A purposive sampling strategy was used to select case study firms. We aimed at identifying firms that offered opportunities to learn and build theory about innovation management practices in production-intensive services. Since production-intensive services according to Soete and Miozzo (1989) typically are delivered by banks, insurance firms, telecommunication firms, and logistics/transportation firms we targeted firms in these sub-sectors. Firms were targeted both on the presumption that large firms would be providers of production-intensive services, and on the presumption that large firms would have the size and resources to undertake innovation activities in a systematic manner, and thus having explicit innovation practices that can be observed. Five of the largest providers of production-intensive services in Scandinavia were contacted and all agreed to participate in the study.

The five firms provided different types of production-intensive services, both to other firms and to consumers. One firm provided telecommunications services, three firms provided financial, banking, and insurance services, and one firm provided logistics and transportation services. All firms were successful in the market, as evidenced by the fact that they had expanded beyond the national border to several countries. All case organizations were large firms with their main location (i.e., headquarters) in a Scandinavian country. By consciously sampling five successful production-intensive service, firms catering to different industries within the same national market we aimed at robustness of our data.

The main method of data collection was in-depth interviews with employees involved with innovation in the case organizations. Each firm appointed a contact person that had a central role in the firm's innovation activities, and these employees assisted us in selecting key-informants internally. To reflect the overall service innovation management practices, informants with different roles and from different firm levels were targeted in each firm. As a result top-level business managers and line managers with an overall responsibility for innovation, as well as managers on lower levels with an explicit responsibility for innovation were interviewed. We also interviewed specialists in areas such as IT and service design. In each firm, we began by interviewing one employee from each category. In

firms with coexisting organizational structures, such as mother/ group companies and national companies, we interviewed several employees from each category. Between three and seven employees were interviewed in each firm. In total, 21 interviews were conducted. Table 1 lists key characteristics of the firms and the informants.

Table 1 The sample

Firm no.	Number of employees	Type of services provided	Annual turnover (2010)	Informants
A	30 000	Telecom	£* 10.1 billions	Top/Line/Unit managers: 4 Innovation managers: 2 Experts: 1
B	13 500	Financial, banking, insurance	£* 4.24 billions	Top/Line/Unit managers: 1 Innovation managers: 1 Experts: 2
C	2 221	Financial, banking, insurance	£* 5.16 billions	Top/Line/Unit managers: 1 Innovation managers: 1 Experts: 1
D	20 000	Logistics, transportation	£* 2.41 billions	Top/Line/Unit managers: 1 Innovation managers: 1 Experts: 1
E	4 300	Insurance	£* 1.95 billions	Top/Line/Unit managers: 2 Innovation managers: 1 Experts: 1

* translated into pounds using average exchange rates from 2010

We followed a semi structured interview guide (see Appendix I) that reflected the dimensions of the innovation management practices (i.e., strategy and culture, front end of innovation and portfolio management, development process, tools and techniques, metrics and measures, intellectual and organizational resources). To obtain concrete and specific answers about the innovation management practices, informants were given the opportunity to select the two most recent innovation initiatives in the firm that they had been involved in personally, and they were asked open questions about the management practices in the aforementioned dimensions. Thereafter, to obtain a more in-depth and complete understanding of the practices of each firm, several closed follow-up questions were asked, such as those related to whether specific tools or measures were used (see Appendix 1 for more examples on closed follow-up questions). We also asked whether the management practices for these initiatives were representative of the firm's normal practices and whether the informant believed the practices were successful.

Two researchers participated in each interview, which lasted between one and a half and two hours. The interviews were recorded and transcribed. The data were coded and mapped onto the aforementioned innovation management dimensions (strategy and culture, front end of innovation and portfolio management, development process, intellectual and organizational resources). To ensure internal validity, the coding and mapping processes were first independently performed by three researchers. Thereafter, the results were discussed among the researchers until a common consensus was achieved. Finally, the coded data were analyzed and compared to obtain cross-firm results.

5 Findings

5.1 Strategy and Culture

All the case firms had explicitly defined strategic business goals, and innovation was primarily perceived as a tactical instrument to close the gap between the firm's current situation and its strategic ambitions. This perception may be illustrated by the following statement from one manager in Firm A: "*We have defined strategic goals in 5 or 6 areas: for example, coverage, expansion, customer experience, efficiency. To achieve the strategic goals, we in the organization are assigned to operationalize them and define the initiatives necessary to reach the goals. Then, innovation is one tool.*"

In addition to its role as an instrument to achieve strategic business goals, a few of the interviewed informants also perceived innovation as a means for business strategy creation. It was suggested that innovations had the potential to define new strategic goals and change existing goals. This concept may be exemplified by the following statement of a top manager in Firm A: "*Innovation in our firm is a lot of different things…, but if we try to categorize, we can say that we have four different types of innovations. One type is related to customer centricity or customer experience. Another type is what we call new ecosystems. This is about service positioning and cooperation with global actors. A third category is what we call new business or new revenue. Finally, we have innovations related to operational excellence and efficiency."* Therefore, innovations—at least in the third category—may have the potential to define new business strategies. This possibility is exemplified by the same top

manager, who stated: "…*Our machine-to-machine (M2M) initiative started in our business unit in Sweden. They started to develop M2M solutions especially for the automotive industry. After a while, we saw that these solutions had a bigger market. It was a growth opportunity. Thus, we chose to establish a new business unit focusing on M2M solutions, and we defined this as a new strategic area…*" This broad view of innovation was highlighted explicitly by only a few informants.

Another striking observation was that the role of innovation—that is, the goal of all of the innovative activities and how this goal should be achieved—was not explicitly articulated by any of the interviewees; an explicit innovation strategy was lacking in all firms. For example, none of the case firms had articulated an innovation strategy whether the gap between the current situation and strategic ambitions should be closed by using radical high-risk and/or incremental low-risk innovation projects or what types of resources were needed to innovate.

In practice, however, our observations indicate that the firms followed an innovation strategy characterized by low-risk and incrementality, since new service ideas with a high likelihood of short-term financial gain were often given priority. We observed a general unwillingness to undertake radical, high-risk projects in the studied firms. That said, we should also add that each firm in our sample also conducted projects with a more radical and disruptive profile (for example the M2M project referred earlier), but the number of such projects were small.

Informants from Firms B, C, D, and E reported that their firm's culture was generally characterized by professionalism, conservatism, and strong traditions, with an unwillingness to take high risks. The following statement from one manager in Firm C is illustrative: "*I think that the culture in our firm is driven by the insurance discipline itself. We are very keen on doing things correctly and thoroughly. We do not want to experiment. We are very concerned about getting approval, both internally and from our customers, before we try something new. We dare not just… try. In my view, this culture is problematic from an innovation point of view. Innovation is not impossible, but the innovation process is hard and expensive.*"

Some informants stated that the culture was somewhat different in various parts of the firm. For example, one informant from Firm D stated: "*I think the culture is very mixed. Some are enthusiastic*

and think it is cool that we are trying to establish new digital services, whereas others are more skeptical because they think the new solutions will steal from the existing services."

The culture in Firm A was somewhat different from the other firms. When the informants from Firm A reflected on their culture, although they also indicated that it was characterized by professionalism, they replaced the terms "conservative" and "traditions" with other words, such as "flexible," "dynamic," and "innovative". For example, one informant from Firm A stated: "*Innovativeness is something superior. It is a part of our organizational culture. We employ people that are able to take part in this innovative culture. We expect that our employees are able to run projects, be dynamic and innovative. Everyone is supposed to be like that.*"

5.2 Front End of Innovation and Portfolio Management

In the firms, new service ideas came from a variety of "soft" sources, such as competitors, customers, employees, and government. An informant from Firm B explained that: "*Ideas may come from several sources. It may be from monitoring competitors. If we see that a competitor has developed something successful, we often think that we must do the same or something better.*" An informant from Firm C explained that the idea for a new insurance service originated from government regulations: "*The incentive for the innovation was that the government implemented a new law. We responded with a good and innovative solution.*" Another informant from Firm C highlighted that the ideas often originated from customers and were identified in different forms of market analyses: "*In our firm, we do market analyses on two levels. First, we establish general customer knowledge with numbers, trends, and development (...) Second, we establish specific market knowledge in areas where the general information is not enough. We carry out in-depth interviews with customers together with anthropologists to get this knowledge. New ideas often arise from the knowledge we get.*"

Our informants only infrequently mentioned certain other "soft" sources for innovation ideas, such as business partners and suppliers. Informants claimed that it was difficult to cooperate with other firms in the front end of innovation due to contractual issues. For example, one informant in Firm A

explained: "*We have a supplier policy in our firm. This policy states that suppliers are not allowed to be involved early in the innovation process(...)*"

Nevertheless, we did identify a few examples of successful cooperation with other firms in the front end of innovation. For example, an informant from Firm A explained: "*We have cooperated with a Swedish firm [anonymized] from 2008. We started an online music store where customers could buy music by downloading mp3 files together with this firm in 2008. In 2009, we got the idea that we could establish a new store where customers could stream music instead of downloading. The idea came from [anonymized](…)*".

The informants rarely mentioned "hard" sources for innovation ideas, such as R&D. An informant from Firm A said: "*Some years ago, we believed that all ideas come from our own R&D activities. We no longer believe this, however. A few ideas come from this source, but I think a lot of the ideas that end up as innovations are driven by the industry as a whole. Firms share innovations and inspire each other and influence […] each other… It is almost like the ideas come a little bit randomly.*"

Some informants highlighted the importance of managing the front end of innovation carefully to ensure that the most valuable ideas were identified. For example, one informant in Firm B stated: "*In many large companies, they have so-called suggestion boxes, or something similar, where employees are allowed to drop ideas on how the firm may be improved. In my view, this is not a clever way to do it. Perhaps you get 2000 ideas, and for obvious reasons it is impossible to follow-up on all of these ideas, and when the employees see that there is no follow-up, they lose interest. So, this is not the best way to get ideas… In my opinion, you must start on a higher level. Create knowledge and choose a few challenging areas you want to improve… Start by answering where we want to go and why, and discover what we need… Now, it may sound as if I'm very negative towards ideas and in a way I am, but I think the ideas are really important, but handled in a proper way…*" One informant from Firm A also reflected on the challenge of managing the front end of innovation: "*In our firm, we do not have a structured process in the fuzzy front end of innovation, in the idea collection stage. We do not have a process to deal with ideas and challenges, nor do we know how to involve other parties in the early stages. In my view, we need to improve the way we manage this stage of the innovation process.*"

In all of the case organizations, portfolio decisions were considered by a steering committee consisting of managers at different levels, including top managers. These steering committees were tasked with prioritizing innovation projects, deciding whether projects should get financial and personnel resources, and ensuring that the firm always had a valuable portfolio of innovation projects. All of the informants reported that the number of innovation project ideas was much higher than the available resources for innovation activities. Thus, in all firms, the prioritizing process was considered to be difficult, as only a small portion of the projects assessed were given priority and resources.

Projects were prioritized in all firms on the basis of various financial and nonfinancial criteria. However, several informants from all firms indicated that the financial criteria were the most important. They claimed that for an innovation project to be funded, it had to demonstrate the potential for a positive economic impact, often in the short term. The following statement from an informant in Firm A illustrates this requirement: "*To get funding, a business case is required. We have an Excel sheet that is to be used, and justified positive financial numbers are required in this sheet.*" The focus on short term financial effects may also be illustrated with the following statement from one informant in Firm C: "*The innovation projects that are selected have to be able to be financially beneficial after a short time… We have to be able to demonstrate in the business case that the investment will have a payback time of less than 1 year…*"

Although all firms seemed to have a strong focus on short-term financial effects when project ideas were prioritized, several of the firms also gave examples of projects that were prioritized and funded due to other reasons. One example was the development of a new music-streaming service in Firm A. The informant explained that this project idea was given priority due to expected positive effects on customer satisfaction: "*The new service generates some income, but it is marginal compared to other effects. We were also very clear on this right from the start. The business case stated that we should not make money on the music. What we highlighted was that this is such an attractive service that customers will be very pleased to have it and will become very satisfied with and loyal customers to our firm.*"

Another example was given by one of the informants in Firm B. She explained that she was given funding for a project aiming to develop new banking services for youth because the steering committee thought that the project was important from a strategic perspective. In other words, the project was necessary to close the gap between the strategic ambitions for the youth segment and the current situation. Informants from other firms also highlighted the importance of strategy when innovation project ideas were assessed. Furthermore, project ideas related to the establishment of new technological platforms were often given priority in favor of other ideas, even without the estimation of financial benefits.

The findings indicate that both potential short-term financial effects, as well as more intangible, often long-term, nonfinancial qualitative effects, gave an innovation idea high priority at the investigated firms. However, the firms had only established a structured predefined procedure to find the value of the tangible financial effects; the intangible effects were valued on a more ad-hoc and case-to-case basis, without any predefined rules. Strikingly, none of the firms deployed any form of scoring model, checklist, or other explicit tools in any structured manner to find the value of potential intangible effects. Some informants even compared the process of convincing the steering committee of the importance of intangible effects with an election campaign. One informant in Firm A explained: "*We got the project approved by the steering committee at last, but the work we had to do before we got the approval was like running an election campaign.*"

In all case firms, before a project could get funding, the steering committee had to decide whether the project idea was beneficial or not. The firm also had to assure available resources to carry out the project. Several informants stated that promising projects were frequently not funded or prioritized due to a lack of, for example, internal IT personnel resources.

Interestingly, comparing the potential of new innovation project ideas with those of ongoing innovation projects was rare. The informants reported that ongoing projects were very seldom canceled in favor of new and better ideas. Thus, portfolio management in the case organizations may be characterized as an "idea prioritization exercise" more than a process by which the mix of *all* innovation projects was updated and revised. Under this portfolio management regime, there is a risk that very

beneficial new projects are queued while ongoing projects with lower benefits are carried out. Some informants expressed that this practice was unsatisfactory.

5.3 Development Process

All of the studied firms had a defined formal process for new service development, either for the entire process from idea search to launch or for selected parts of this process. These formal processes were inspired by the stage-gate methodology, and they all consisted of stages with activities and decision gates. The firms had defined who the decision makers were at the different gates and what part of the organization had responsibility for the activities in different stages. However, the level of detail to which the firms had described the formal process for new service development varied. Some firms had defined a superficial, general, and coarse process, whereas others had defined a more detailed, specific, and fine-grained process.

At the detailed end of this continuum was the formal process of Firm A. This process had five gates and covered the entire process from search to launch. The activities in the stages and the criteria to be met at the gates (i.e., criteria that had to be met for a project to move from one stage to the next) were explicitly defined. One informant from Firm A explained: "*All projects have to deliver the required documentation to be allowed to pass decision gate 1, 2, 3, and so forth."* According to one informant, "*The most difficult gate [to pass] is, perhaps, decision gate 2. If a project passes this gate, it is given capex funding...*"

The predefined formal process was not as well-detailed in the other firms since neither the stages nor the gate criteria were so explicitly defined. The gate evaluations were done on a case-by-case basis, and their outcomes were more associated with the preferences of the gate decision maker than with predefined rules. In Firm D, for example, one informant expressed: "*I will say that our innovation process is a bit ambiguous. There are always some small and detailed decisions to be made. It is a bit ad hoc and chaotic… But, nevertheless, we do have some main stages and a balance between chaos and structure.*"

In all case organizations, including Firm A, the actual innovation process often deviated from the predefined process. One informant from Firm A gave an example of a project that did not follow the predefined process: "*The project was not run like a standard project. Since this project was more like a cooperation project than a traditional internal development project, it was decided not to follow the normal process… So, the project was not evaluated at specific gates like other projects...*"

Another example is from Firm B. An informant from this firm explained how she was allowed to work in a particular project she managed: "*It is not like I draw up a process and follow this from A to Z. It is more like I use my intuition. But I am very strict in every meeting, so I know exactly what I want and where I am heading. So, I have always thought carefully through every step, but it is not like I make a huge project plan or something.*" When this informant was asked why she thinks she was allowed to deviate from the standard procedures, she reflected: "*My boss, the business development director, who is part of the top management team and a member of the steering committee, supports me. He initially told the other members of the steering committee that 'We are going to find the solutions on the strategic challenge they have given us,' namely, to become the preferred bank for youth and dominate this segment. And, when he puts it like this, I think they [the other members of the steering committee], in a way, had to support him, because they had given him the responsibility to answer this strategic challenge in the first place...*"

5.4 Intellectual and Organizational Resources

To carry out their innovation activities, the studied firms employed intellectual internal resources in four domains: 1) professional innovation managers, who managed, guided, facilitated, and controlled the innovation process; 2) top managers or line managers, who made decisions; 3) experts, who managed selected parts of the innovation process and specified, designed, developed, and implemented solutions; and 4) front-line employees, who gave advice, especially related to service design. The firms also involved external intellectual resources, in particular, customers and marketing research agencies, in their innovation processes.

The role of the professional innovation managers was to guide, facilitate, manage, and control the innovation process from the idea screening to launch. Innovation managers often were responsible for innovation within a certain area, either alone or with a team. In all of the studied firms, this role constituted what may be compared to a "hub" in all innovation activities. All progress in the innovation activities depended on actions from the person with this role guiding the project through the stages and gates.

To illustrate, an innovation manager in Firm B explained her role in this way: "*It is a lot about process methodology, building projects, and making people talk together…"* Another innovation manager from Firm C highlighted his role at the decision gates in the following way: *"I put forward a document to the steering committee and held this presentation: what are we going to do, what is the solution, what are we changing*." An innovation manager in Firm E explained his role in involving customers in this way: "*I think it helps to talk with them [the customers], have a relation so that they will buy services that we would have to work with. Also, it is important for us to listen to their needs*".

The innovation managers did not have a background from their company or from the field of the particular production-intensive service provided by their company. Most of them had background from professional management consultancy, IT consultancy, or business process consultancy. For example, one informant in Firm C explained: "*I worked for the Idea laboratory for 5 years, as an idea astronaut, facilitating processes for business, before working as an innovation consultant in a leading branded consumer goods company with facilitating, prototyping, and idea development for management, before I was asked to apply to [anonymized] as an in-house innovation consultant...*" Another innovation manager explained her background before joining Firm E: "*I don't have an insurance background; I have been in a business lab, I have been in auditing, adult learning, a lot of different jobs, being a pedagogical consultant, marketing… I have a mosaic background*."

All firms had a pool of innovation managers. In some firms, these pools were organized in a separate department; in other firms, they were part of the line organization. In most firms, the innovation manager was responsible for the innovation process from A to Z. However, there were also a few examples in which the innovation manager was only responsible for the first stage (search stage), and

experts or professional project managers were responsible for the later stages. Often, a change in the process manager caused problems for the firm.

Top managers and line managers played a crucial role in the studied firms' innovation activities. They acted as the developers of the firms' strategic ambitions, the decision makers at the gates in the innovation process, and the sponsors and supporters of the innovation managers. One informant in Firm E explained the role of top managers as follows: "*Which innovation activities… are given priority depends on who is in the corporate management. Our change of corporate governance has really changed what we prioritize.*"

Our findings indicate that the studied firms involved internal experts, particularly in IT and service design but also in other fields, to manage selected parts of the innovation process and to specify, design, develop, and implement solutions. An informant from Firm B explained the importance of involving experts from the firm's IT department in the innovation process: "*The new digital services we develop have to be integrated with our IT systems… Then, I depend on [anonymized] from the IT department do this integration job, and this is a very complex task in our firm*".

The firms frequently involved front-line employees when new services were developed. This category of personnel was involved for two reasons: 1) they often had detailed insight into customer needs, and 2) they often were the intended providers of the new service, and their commitment was very important for the new service's success. An informant from Firm B explained the importance of this commitment in the following way: "*The trick is not to forget involving the staff. My firm is very big, and we use a lot of money on external marketing to create commitment externally. And sometimes, we are perhaps a little bad at creating the internal commitment. So, I am very keen not to make that mistake. So, all the way I involve the front-line employees.*"

In addition to using internal intellectual resources to innovate, the studied firms deployed different sources of external intellectual resources. Involvement of customers was mentioned by several informants in all stages of the innovation process. Several informants also mentioned that technical suppliers were involved in later stages of the innovation process.

Our findings also suggest that the use of cross-functional teams was important for innovation. An employee from Firm C described cross-functional teams for a typical project: "*On that project, there were two people from the IT strategy department, resources from scanning solutions, some from insurance and others knowing the pension process in depth. In total, there were five to six developers, one functional architect to look at the totality, project manager, test resources, and professional resources, being in total about 10 people*". The innovation managers were both involved as project managers and responsible for putting together the project teams.

6 Discussion

This paper aims to address two research questions; 1) What are the practices for managing innovation in production-intensive service firms? 2) How do the innovation management practices in production-intensive service firms differ from the established innovation management practices? We now revisit and discuss these questions in light of our empirical findings and the literature:

6.1 Strategy and Culture

Established innovation management practices, prescribed by prior innovation management studies, suggest that leading firms are likely to have an explicit and articulated innovation strategy (e.g., Cooper, Edgett and Kleinschmidt, 2002), in which clear goals for the innovation program are set and resources are made available (Menor and Roth, 2007). In our study none of the firms studied had implemented an explicit and articulated innovation strategy. We found that the firms followed an innovation strategy characterized by low-risk and incrementality, in line with the conservative and tradition oriented culture in the studied firms. These findings are in line with the suggestions of Barras (1986). He proposed that innovation in services is characterized by what he calls a "reversed product cycle" (Barras, 1986, p.161), meaning that new products and technology developed by the manufacturing industry typically lead to incremental process improvements in the service industries. However, our data suggest that production-intensive service firms may also take a leading role in the development of new technology and radical new services. In the firms in our sample this occurred admittedly by exception, but we assume, however,

that if a production-intensive service firm should succeed in following an innovation strategy characterized by high-risk and radicality, not in line with its culture, an explicit and articulated strategy would be needed. Hence, we prescribe P1, as follows:

P1a: High performing production-intensive service firms following an innovation strategy characterized by low- risk and incrementality are not likely to have an articulated and explicit innovation strategy.

P1b: High performing production-intensive service firms following an innovation strategy characterized by high-risk and radicality are likely to have an articulated and explicit innovation strategy.

6.2 Front End of Innovation and Portfolio Management

Our findings suggest that innovation ideas come from various sources. The dominating sources are soft sources, such as clients, customers, suppliers, consultants, competitors, and employees. This finding is consistent with established innovation practices (e.g., Meyer, 2010; Mansury and Love, 2008).

We also found that production-intensive service firms typically have more ideas than they have resources available for innovation activities. Thus, portfolio management is a critical managerial task, to enable the sensible prioritizing and mixing of projects, as well as the reasonable allocation of resources to projects. This finding is also consistent with established innovation practices (e.g., Edgett, 2013). However, on the more detailed level the identified portfolio management practices differed when compared to the normative advices provided by the product innovation literature. The established literature, for example, advices that value of new ideas should be compared with the value of ongoing projects, and that ongoing projects should be cancelled if the value of new ideas is higher (Cooper, 2001). However, in our case organizations, portfolio management was characterized more as an "innovation idea prioritization exercise" than as a process whereby the mix of both ideas and ongoing innovation projects was updated and revised.

The normative product innovation literature advises firms to implement formal and explicit portfolio methods with well-defined rules and procedures, and to place less emphasis on financial

approaches and more on strategic methods (e.g., Edgett, 2013). All of the case firms had defined portfolio management procedures and rules, but these rules were largely financially oriented and stated that projects should be prioritized based on financial estimations in the form of a business case description. However, these predefined rules were not always followed. In particular projects with a radical nature were often prioritized for other reasons: The project was esteemed important from a strategic, legal, or customer experience perspective. For cases that deviated from the predefined rules, the process leading to portfolio decisions seemed to be difficult, random, and often dependent upon active lobbying from a dedicated innovation manager. Several informants stated that they were not satisfied with this practice and were afraid that valuable projects were not given priority due to the selection process.

Thus, we suggest that the portfolio management practices in production-intensive service firms are dependent upon the innovation strategy implicitly followed by the firm. P2 is offered:

P2a: *High performing production-intensive service firms following an innovation strategy characterized by low-risk and incrementality are likely to base portfolio decisions on financial estimates.*

P2b: *High performing production-intensive service firms following an innovation strategy characterized by high-risk and radicality are likely to place less emphasis on financial approaches and more on strategic methods when portfolio decisions are made.*

6.3 New Service Development Process

The innovation management literature is inconsistent regarding whether firms ought to implement a formal new service development process (e.g., Froehle et al., 2000; de Brentani, 2001; Henard and Szymanski, 2001). Our findings suggest that production-intensive service firms do implement formal processes that are inspired by the stage-gate process (Cooper, Edgett, and Kleinschmidt, 2002). However, in practice, the firms seem to realize that the ideal process for a small incremental innovation project differs from that of a large development project or a radical project.

Because the variety of innovation projects is large, it is not very surprising that the firms often deviate from the predefined formal process due to the specific project characteristics. Our findings also indicate that a select few "core" decision gates are used for all project types. For example, all projects must pass decision gates where it is decided whether the project should get funding and whether the new service should be launched. The use of predefined rules and procedures at these core gates may increase the speed and quality of decisions. We prescribe P3:

P3: To accommodate the high variety of innovation project types, the stage-gate processes in high performing production-intensive service firms are likely to be implemented in a flexible manner through a balance between predefined, non-contextual gate criteria and contextual, case-by-case–determined criteria.

6.4 Intellectual and Organizational Resources

Our findings show that involvement of internal personnel from different organizational levels (e.g., front-line employees, managers, and experts) and different functional areas (e.g., IT and business operations), and sometimes also external resources, in cross-functional teams is necessary for production-intensive service firms to innovate successfully. Thus, overall, our findings related to organizational and intellectual resources are consistent with the practices prescribed in general service innovation management studies (e.g., de Jong et al., 2003; Droege, Hildebrand and Forcada, 2009).

However, our findings also indicate that the presence of skilled professional innovation managers that are not organizationally linked to a specific functional area is perhaps more important for the success of an innovation in production-intensive service firms than it is in other firms. In our case firms, these managers were typically given responsibility for innovation in a particular area. They facilitated the search process, managed the screening of ideas, defined project proposals, established cross-functional project teams, involved key employees, and guided, facilitated, managed, and controlled the innovation process.

Our findings indicate that employees with an innovation role in production-intensive service firms are important for several reasons. The culture in production-intensive firms is typically more

oriented towards operations than towards innovation. Thus, personnel that are given an explicit responsibility to manage innovation may be crucial for innovation to happen. Furthermore, the services produced by these firms are complex and involve a number of functional areas. Thus, employees that are able to see beyond the functional areas are important when new production-intensive services are developed. Based on our findings, we offer P4:

> *P4: The presence of professional innovation managers and the involvement of top managers, line managers, experts, and front-line employees in cross-functional teams, as well as external intellectual resources that complement the internal intellectual resources are important for the successful development of new production-intensive services.*

7 Conclusions and further research

In this paper, we have addressed practices for managing the innovation of production-intensive services and identified how these practices differ from descriptions given in established innovation management guidelines (e.g. Kahn, 2013). By using comprehensive case study data from five large production-intensive service firms, we explored four dimensions (i.e., strategy and culture, front end of innovation and portfolio management, development process, intellectual and organizational resources) of innovation management practices. Our results suggest that some innovation management practices of production-intensive service firms are similar to general innovation management practices, whereas other practices are more distinctive to the nature of these services.

Thus, our findings confirm the suggestion of prior authors (e.g., Kuester et al., 2013; Zomerdijk and Voss, 2011) that innovation management practices are contingent upon the type of industry and setting. Our findings also imply that the established innovation management guidelines (e.g., Kahn, 2013) are limited in their ability to capture the actual innovation practice in production-intensive service firms. Hence, we claim that there is a need to acknowledge a contingent view of innovation management practices that are more receptive to the type of context and process the innovation occur in. The selection of production-innovation service firms as research setting was deliberate as these firms represent an intermediate position between services and the production scale emphasis in

manufacturing. By demonstrating the limitations of the established innovation management guidelines (e.g., Kahn, 2013) in this setting we assume that the inadequacy of its normative predictions would be even greater in other types of service innovation management practices. The findings of for example Zomerdijk and Voss (2011) and Barczak, Kahn, and Moss (2006) support this assumption.

Our study also provides a basis for discussing managerial prescriptions. The propositions offered are based on practices in the studied firms through a qualitative approach. We are confident that the sampling procedure provided us with firms that had an exceptional focus on innovation. However, our approach has limitations, mainly due to the number of cases studied. Consequently, we suggest that the propositions offered in this paper are investigated further through qualitative follow-up studies, to understand more deeply why production-intensive service providers practice innovation management the way that they do. In particular production-intensive service firms following a high-risk radical innovation strategy should be included in these follow-up studies, to investigate whether the practices of these firms differ from those following a more incremental innovation strategy. In addition, future studies should search for contextual factors that may explain variations in practices. More specific knowledge of these areas may have important managerial implications and provide valuable insights into the types of practices that should be recommended in different circumstances.

8 References

Aas, TH (2011). Management Control of Service Innovation Activities: An Exploratory Investigation of Best Practice. *International Journal of Services Technology and Management*, 16(3/4), 318-336.

Aas, TH and PE Pedersen (2010). The firm-level effects of service innovation: A literature review. *International Journal of Innovation Management*, 14(5), 759-794.

Alam, I (2012). New service development in India's business-to-business financial services sector. *Journal Of Business & Industrial Marketing*, 27(3), 228-241.

Adams, R, J Bessant and R Phelps (2006). Innovation management measurement: a review. *International Journal of Management Reviews*, 8(1), 21-47.

Akroyd, A, S Narayan and VG Sridharan (2009). The use of control systems in New Product Development Innovation: Advancing the 'Help' or 'Hinder' Debate. *The IUP Journal of Knowledge Management*, 7(5/6), 70-90.

Barczak, G, A Griffin and KB Kahn (2009). Perspective: Trends and Drivers of Success in NPD, Practices: Results of the 2003 PDMA Best Practices Study. *Journal of Product Innovation Management*, 26, 3–23.

Barczak, G, KB Kahn and R Moss (2006). An Exploratory Investigation of NPD Practices in Nonprofit Organizations. *Journal of Product Innovation Management*, 23, 512-27.

Barras, R (1986). Towards a theory of innovation in services. *Research policy*, 15(4), 161-173.

Bygstad, B and G Lanestedt (2009). ICT based service innovation – A challenge for project management. *International Journal of Project Management*, 27(3), 234-242.

Cainelli, G, R Evangelista, and M Savona (2004). The impact of innovation on economic performance in services. *The Service Industries Journal*, 24(1), 116-130.

Camacho, JA and M Rodriguez (2005). How innovative are services? an empirical analysis for Spain. *The Service Industries Journal*, 25(2), 253-271.

Casadesus, M, F Marimon and M Alonso (2010). The future of standardised quality management in tourism: evidence from the Spanish tourist sector. *The Service Industries Journal*, 30(14), 2457–2474.

Chan, A (2005). Using an effective metrics program to support business objectives. In KB Kahn (ed.), *The PDMA Handbook of New Product Development*, pp. 445-454. New Jersey: John Wiley & Sons.

Chang, Y-C, JD Linton and M-N Chen (2012). Service regime: An empirical analysis of innovation patterns in service firms. *Technological Forecasting and Social Change*, 79(9), 1569-1582.

Chesbrough, H (2011). Bringing Open Innovation to Services. *MIT Sloan Management Review*, 52(2), 85-90.

Camacho, JA and M Rodriguez (2005). How innovative are services? An empirical analysis for Spain. *The Service Industries Journal*, 25(2), 253-271.

Cooper, RG (2001). *Winning at New Products*, 3rd ed. New York: Perseus Books.

Cooper, RG and SJ Edgett (1999). *Product development for the service sector. Lessons from market leaders*. Cambridge, MA: Basic Books.

Cooper, RG and SJ Edgett (2008). Maximizing Productivity in Product Innovation, *Research Technology Management*, 51, 47-58.

Cooper, RG, SJ Edgett and EJ Kleinschmidt (1999). New Product Portfolio Management: Practices and Performance. *Journal of Product Innovation Management*, 16, 333-51.

Cooper, RG, SJ Edgett and EJ Kleinschmidt (2002). Optimizing the stage-gate process: What best-practice companies do-I. *Research Technology Management*, 45, 21-27.

Coyle , D (1999). *The Weightless World: Strategies for Managing the Digital Economy*. Boston: MIT press.

De Brentani, U (1989). Success and failure in new industrial services. *Journal of Product Innovation Management*, 6, 239-58.

De Brentani, U (1991). Success factors in developing new business services. *Journal of Product Innovation Management*, 6(4), 239-258.

De Brentani, U (1995). Firm size: Implications for achieving success in new industrial services. *Journal of Marketing Management*, 11(1-3), 207-225.

De Brentani, U (2001). Innovative versus incremental new business services: different keys for achieving success. *Journal of Product Innovation Management*, 18, 169-87.

De Brentani, U and E Ragot (1996). Developing new business-to-business professional services: what factors impact performance?. *Industrial Marketing Management*, 25, 517-30.

De Jong, JPJ, A Bruins, W Dolfsma and J Meijgaard (2003). *Innovation in service firms explored: what, how and why? Strategic study B200205. Zoetermeer*. Holland: EIM Business & Policy Research.

De Jong, JPJ and RAJ Kerste (2002). *De kracht van het idee: betere resultaten door innovatief gedrag van medewerkers*. Schoonhoven: Academic Service.

Dooley, KJ, A Subra and J Anderson (2002). Adoption Rates and Patterns of best practices in New Product Development. *International Journal of Innovation Management*, 6(1), 85-103.

Den Hertog, P, F Gallouj and J. Segers (2011). Measuring innovation in a 'low-tech' service industry: the case of the Dutch hospitality industry. *Service Industries Journal*, 31(9), 1429-1449.

Drejer, I. (2004). Identifying innovation in surveys of services: A Schumpeterian perspective. *Research Policy*, 33(3), 551–62.

Drew, S. (1995). Strategic benchmarking: innovation practices in financial institutions. *International Journal of Bank Marketing*, 13(1), 4-16.

Droege, H, D Hildebrand and MAH Forcada (2009). Innovation in services: present findings, and future pathways. *Journal of Service Management*, 20(2), 131-55.

Easingwood, CJ (1990). Service design and service strategies. In: Conference Proceedings: 1st International Research Seminar in Service Management, 188-90. Aix-en-Provence: Institute d'Administration des Enterprises.

Edgett, SJ (2013). Portfolio Management for Product Innovation. In K Kahn (Ed.), *The PDMA Handbook of New Product Development*, New York: John Wiley & Sons.

Ellingsen, G, E Monteiro and G Munkvold (2007). Standardization of Work: Co-constructed Practice. *The Information Society*, 23, 309–326.

Evangelista, R (2000). Sectoral Patterns of Technological Change in Services. *Economics of Innovation and New Technology*, 9, 183-221.

Evangelista, R and M Savona (1998). Patterns of Innovation in Services: The results of the Italian Innovation Survey. Paper presented to the 7th Annual RESER Conference, Berlin, 8-10 October.

Fang E, RW Palmatier and JB Steenkamp (2008). Effect of Service Transition Strategies on Firm Value. *Journal of Marketing*, 72, 1–14.

Fischer, OAM, R Garrelfs and JD van der Meer (1993). Innovatie in de commerciële dienstensector. Van der Meer & Van Tilburg: Enschede.

Froehle, CM, AV Roth, RB Chase and CA Voss (2000). Antecedents of new service development effectiveness: an exploratory examination of strategic operations choices. *Journal of Service Research*, 3(1), 3-17.

Froehle, CM, and AV Roth (2007). A resource-process framework of new service development. *Production and Operations Management*, 16(2), 169-88.

Gallouj, F. and O. Weinstein (1997). Innovation in services. *Research Policy*, 26, 537-556.

Gebauer, H, A Gustafsson and L Witell (2011). Competitive advantage through service differentiation by manufacturing companies. *Journal of Business Research*, 64(12), 1270-1280.

Griffin, A (1997a). Drivers of NPD success: The 1997 PDMA Report. Chicago, IL: PDMA.

Griffin, A (1997b). PDMA research on new product development practices: Updating trends and benchmarking best practices. *Journal of Product Innovation Management*, 14(6), 429–58.

Grönroos, C (2007). Service Management and Marketing: Customer Management in Service Competition. Chichester: John Wiley & Sons.

Henard, DH, and DM Szymanski (2001). Why some new products are more successful than others. *Journal of Marketing Research*, 38, 362-75.

Hulshoff, HE, FMJ Westhof, JJ Kirchhoff, BA Kirchhoff, ST Walsh (1998). New services: strategic exploratory survey of a dynamic phenomenon. Zoetermeer: EIM.

Javalgi, RG and CL Martin (2007). Internationalization of services: Identifying the building-blocks for future research. *Journal of Services Marketing*, 21(6), 391-397.

Johne, A, and C Storey (1998). New Service Development: A Review of the Literature and Annotated Bibliography. *European Journal of Marketing*, 32(3/4), 184-252.

Johnson, P and D Harris (2003). Qualitative and Quantitative Issues in Research Design. In: D Partington (ed.) Essential Skills for Management Research, 99-134. London: Sage Publications.

Johnson, SP, LJ Menor, AV Roth and RB Chase (2000). A critical evaluation of the new service development process. In JA Fitzsimmons and MJ Fitzsimmons (eds.) New service development: Creating memorable experiences, 1–32. Thousand Oaks, CA: Sage Publications.

Kahn, K. (2013). *The PDMA Handbook of New Product Development*. New York: John Wiley & Sons.

Kingman-Brundage, J (1993) Service mapping: Gaining a concrete perspective on service system design. In EE Scheuing and WF Christopher (eds.) The service quality handbook, 148–63. New York: AMACOM.

Kuester, S, MC Schuhmacker, B Gast and A Worgul (2013). Sectoral Heterogeneity in New Service Development: An Exploratory Study of Service Types and Success Factors. *Journal of Product Innovation Management*, 30(3), 533-544.

Leiponen, A. (2006), Managing Knowledge for Innovation: The Case of Business-to-Business Services, *Journal of Product Innovation Management*, 23, 238-258.

Leonard, D and JF Rayport (1997). Spark innovation through empathic design. *Harvard Business Review*, 75(6), 102–13.

Lusch, RF, SL Vargo and M O'Brien (2007). Competing Through Service: Insights from Service-Dominant Logic. *Journal of Retailing*, 83(5), 5–18.

Lyons, RK, JA Chatman and CK Joyce (2007). Innovation in Services: Corporate Culture and Investment Banking. *California Management Review*, 50(1), 174-191

MacCormack, A and R Verganti (2003). Managing the sources of uncertainty: Matching process and context in software development. *Journal of Product Innovation Management*, 20(3), 217–32.

Mansury, MA, and JH Love (2008). Innovation, productivity and growth in US business services: A firm-level analysis. *Technovation*, 28 (1/2), 52-62.

Meiren, T and T Burger (2010). Testing of service concepts. *Service Industries Journal*, 30(4), 621-632.

Menor, LJ and AV Roth (2007). New service development competence in retail banking: construct development and measurement validation. *Journal of Operations Management*, 25, 825-46.

Menor, LJ, MV Tatikonda and SE Sampson (2002). New service development: Areas for exploitation and exploration. *Journal of Operations Management*, 20(2), 135–57.

Meredith, J (1998). Building operations management theory through case and field research. *Journal of Operations Management*, 16(4), 441–54.

Meyer, J (2010). Does Social Software Support Service Innovation? *International Journal of the Economics of Business*, 17(3), 289-311.

Miles, I (2005). Innovation in services. In J Fagerberg, DC Mowery and RR Nelson (eds.) The Oxford Handbook of Innovation, 433-458. Oxford: Oxford University Press.

Nijssen, EJ, B Hillebrand, P Vermeulen and RGM Kemp (2006). Exploring product and service innovation similarities and differences. *Research in Marketing*, 23, 241-251.

OECD (2005). Measuring The Interaction Between Manufacturing And Services. edited by D. a. W. Pilat, Anita: STI Working Paper Series, OECD.

Ostrom, AL, Bitner, MJ, Brown, W, Burkhard, KA, Goul, M, Smith-Daniels, V, Demirkan, H, Rabinovich, E (2010). Moving forward and making a difference: Research priorities for the science service. *Journal of Service Research*, 13(1), 4-36.

Page, AL and GR Schirr (2008). Growth and development of a body of knowledge: 16 years of new product development research, 1989-2004. *Journal of Product Innovation Management*, 25(3), 233-248.

Papastathopoulou, P, and EJ Hultink (2012). New Service Development: An Analysis of 27 Years of Research. *Journal of Product Innovation Management*, 29(5), 705–714.

Pavitt, K (1984). Sectoral patterns of technical change: towards a taxonomy and a theory. *Research Policy*, 13, 343-373.

Plunkett, JW (2013). Plunkett's Transportation, Supply Chain & Logistics Industry Almanac 2013 Edition, ISBN: 978-1-60879-700-4.

Plunkett, JW (2014). Plunkett's Telecommunications Industry Almanac 2014 edition, ISBN: 978-1-60879-713-4.

Product Development and Management Association (PDMA) (2011). 2011 New Product Development Best Practices Survey. Available at: http://www.pdma.org.

Product Development and Management Association (PDMA) (2013). New Product Development Professional Certification Program. Available at: http://www.pdma.org/p/cm/ld/fid=23.

Picot, A, and C Wernick (2007). The role of government in broadband access. *Telecommunications Policy*, 31(10-11), 660–674.

Rosenthal, SR and M Capper (2006). Ethnographies in the front end: Designing for enhanced customer experiences. *Journal of Product Innovation Management*, 23(3), 215–37.

Sako, M (2009). Technology Strategy and Management: Globalization of Knowledge-Intensive Professional Services. *Communications of the ACM*, 52(7), 31-33.

Savory, C (2009). Building knowledge translation capability into public-sector innovation processes. *Technology Analysis and Strategic Management*, 21(2), 149-171.

Shostack, GL (1984). Designing services that deliver. *Harvard Business Review*, 62(1), 133–39.

Silvestrou, R, L Fitzgerald, R Johnston and C Grant (1992). Towards a classification of service processes. *International Journal of Service Industry Management*, 3, 62-75.

Soete, L and M Miozzo (1989). Trade and development in services: a technological perspective, Working paper No. 89-031, Merit Maastricht.

Song, LZ, M Song and CA Di Benedetto (2009). A Staged Service Innovation Model. *Decision Sciences*, 40(3), 571-599.

Spohrer, J (2008). Services sciences, management, and engineering (SSME) and its relations to academic disciplines. In B Stauss, A Kremer and A Luhn (eds.) Services Science: Fundamentals, Challenges and Future Developments, 11-40. Frankfurt: Springer.

Spohrer, J and PP Maglio (2008). The emergence of service science: toward systematic service innovations to accelerate co-creation of value. *Production & Operations Management Society*, 17(3), 238-246.

Tidd, J and FM Hull (2003). *Service Innovation: Organizational Responses to Technological Opportunities & Market Imperatives*. London: Imperial College Press.

Urban, GL and JR Hauser (1993). *Design and marketing of new products*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Van Ark, B, L Broersma and P den Hertog (2003). Service innovation, performance and policy: a review, Synthesis Report in the Framework of the Project Structural Informatievoorziening in Diensten (SIID). The Hague: Ministry of Economic Affairs.

Van der Aa, W and T Elfring (2002). Realizing innovation in services. *Scandinavian Journal of Management*, 18, 155-71.

Vargo, SL and RF Lusch (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1-17.

Yang, HL and S-L Hsiao (2009). Mechanisms of developing innovative IT-enabled services: A case study of Taiwanese healthcare service. *Technovation*, 29(5), 327-337.

Yin, RK (2003). Case Study Research-Design and Methods 3rd ed. Thousand Oaks: Sage Publications.

Zeithaml, V.A., Parasuraman, A. and Berry L.L. (1985), "Problems and strategies in service marketing", *Journal of Marketing*, Vol. 49, pp. 33-46.

Zomerdijk, LG and CA Voss (2011). NSD Processes and Practices in Experiential Services. *Journal of Product Innovation Management*, 28, 63–80.

Appendix 1 – Semistructured interview guide

No.	Question	Follow-up questions (examples)
1	What is your background and your role in the organization?	
2	Please give some examples on new or improved services introduced by your firm lately.	To what degree are the examples typical?
3	Please select two service innovation projects that you know well and, for each project, explain: a) where did the idea come from, b) why did the firm decide to invest in the project, c) did you reconsider the investment decision during the development stage, d) how did the development process work (please provide detail about the stages and activities within your process, including who and which departments were involved), e) what kind of tools were used during the development process, and f) how did you measure the results of the project.	Was the idea a result of a formal or informal search process? If formal, what methodologies were used (e.g., swot analyses, market research, ethnography, focus groups, lead-user analysis)? Was the source of the idea internal or external? If external, what was the external source (e.g., customer, supplier, competitor, research institutes, consultants), and how was the idea captured? Before deciding to invest in the idea, did you use any specific methods to evaluate the idea (e.g. return on investment, Monte Carlo, real option, strategic methods and balanced scorecards). Who evaluated the idea? Who made the decision to invest? Who led the development process? Did you appoint a formal project manager? Did you change project managers during the process? Did you establish a project team? What departments/functions were involved in the process? Did you involve external partners? To what degree was the process predefined and formal? Did you have predefined decision gates? If so, what were the decision criteria and who made decisions at the gates? What tools and methodologies were used during the process (e.g., Alpha testing, Pilot-testing, Online focus groups, Six Sigma, Triz, Project management software, Simulation systems)?
4	Are the management practices related to the projects described in the previous question the typical practices for the management of innovation projects in your organization?	
5	What is the business strategy of your firm? What is the relationship between innovation and strategy? Do you have an articulated innovation strategy? Do you measure how innovation contributes strategically?	How have the strategic goals been developed? How often are they revised? Are strategic goals revised on a regular basis or when a particular incident occurs? Who is responsible for achieving the strategic goals? If you measure how innovation contributes strategically, what do you measure and do you use a particular tool (e.g., balanced scorecard)? What are the typical actions if measures are below the target?
6	What is your firm's approach to ensure that you have the right intellectual resources (i.e., competence, skills, etc.) to carry out innovation activities?	What is important when you recruit new employees? What is done to increase the employees' skills? How do you evaluate if you have personnel with the right skills? Do you use external knowledge, and if so, when and why?
7	What is your firm's approach to ensure that you have the right organizational resources (i.e., organizational structure etc.) to carry out innovation activities?	What is the organizational structure of the firm? How are roles and responsibilities specified? What parts of the organization are involved in innovation activities? When, why, and how is the organizational structure revised? Do employees often rotate between different jobs? Do you have any incentive systems?
8	How does your firm ensure that you have the right physical resources (i.e., offices, IT resources etc.) to carry out innovation activities?	What ICT systems are used in the firm? How are these systems used as an innovation tool?
9	What is the firm's culture? To what degree does this culture hinder or promote innovation? What is done to develop the culture?	To what degree are conflicts recognized in the innovation process? Are mistakes perceived as being a natural part of the innovation process? Is taking risks a barrier to career opportunities?
10	What does your firm do well in terms of service innovation? What areas need improvement?	