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**Service innovation challenges at the policy,
industry, and firm level: A qualitative enquiry
into the service innovation system**

by

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PREFACE

This working paper is written as part of the preparations for establishing a Center for service innovation at the Norwegian School of Economics and Business Administration. A call for proposals was issued by the Research Council of Norway on September 10, 2009, and we responded to this call by conducting an exploratory inquiry into the challenges of service innovation as they were expressed by representatives of the Norwegian innovation system for service innovation reflecting knowledge intensive service providers, regular service providers, capital market institutions, innovation policy system institutions and research institutions. While our intentions are to summarize and express the opinions of representatives of this innovation system as closely as possible, the text is the full responsibility of the authors. Thus, any errors in statements correctly reflecting these representatives' opinions or the lack of representativeness of such statements are also the sole responsibility of the authors.

Bergen, March, 2010

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Abstract

This report documents the results of an exploratory inquiry into the challenges of service innovation in Norway. It is based on 45 interviews conducted with 63 representatives of the Norwegian innovation system for service innovation reflecting the views of representatives from knowledge intensive service providers, regular service providers, capital market institutions, innovation policy system institutions and research institutions.

The report first briefly reviews the challenges expected to be found when using theoretical and empirical studies of service innovation as it is reflected in the research literature. Next, it reports the methodology applied to capture the opinions of the innovation system representatives. Finally, it reports the results at three different levels; the policy level reflecting challenges in innovation policy, regulatory policy and general political decision making affecting service innovation; the industry level reflecting cross sectoral challenges at the industry level, and finally, and most importantly in this report; the business level which covers both the firm and value network levels.

Our findings are organized by a framework focusing antecedents, processes, methodologies, types and effects of service innovation. We conclude that the challenges we find at the business level are rather complex and differ somewhat from what was expected from theory and considerably from those derived by market and systemic failure approaches to innovation. We conclude that the challenges at the business level should be approached with an interaction perspective on the dynamic parts of the service innovation system covering knowledge intensive service providers, capital market institutions and traditional service providers. A traditional approach to research driven

innovation where the source of the innovation is found in research institutions and where innovation is stimulated through traditional innovation policy instruments does not seem to be equally appropriate in service innovation.

1 INTRODUCTION

Services are dominating the economy of many western countries' economies today. For example, according to the government report "Innovasjonsmeldingen" (NHD, 2008/9), services represented 74% of employment and more than 56% of the gross product in Norway in 2007. In addition to the growth in traditional service industries, we also see a growth in services offered by traditional manufacturing industries, so called service activities (Oliva and Kallenberg, 2003). Services are often described as being different from products, and these differences are also often suggested to make innovation more challenging and difficult for services than for traditional products. Typical differences discussed in the literature are represented by the so called IHIP-paradigm proposing that services are more immaterial, more heterogeneous, more inseparable, and that services – in contrast to physical products - cannot be stored (perishability) (Zeithaml, Parasuraman and Berry, 1985). Fitzsimmons and Fitzsimmons (2004) emphasize customer participation, simultaneity, perishability, intangibility and heterogeneity as unique service characteristics. Miles (2004) claims that services are more information intensive than products, while Lovelock and Gummesson (2004) suggest that a lacking transfer of ownership differentiates services from products – because products are typically owned while services are not. Limited research has studied implications and challenges for service innovations as a result of these service specific characteristics. Also, characterizing service *innovation* by these same service characteristics is not trivial. Instead, it has been proposed that service innovations should be understood using alternative paradigms, such as the so called service dominant logic paradigm (Vargo and Lusch, 2004; Michel, Brown and Gallan, 2008). While service dominant logic introduces new perspectives on service innovations it primarily addresses service innovation

challenges at the business level and focus innovations in the interaction of providers and customers of the providers' offerings.

Service innovation challenges extend beyond this level and are found at three different levels. First, service innovations face challenges at the policy level (Rubalcaba et al, 2009). Second, several challenges are present at the industry level (Miles, 2007), and third, service innovations face challenges at the firm level (de Jong et al., 2003).

As a result of these challenges, the Norwegian Research Council has announced the establishment of a Center for service innovation in the private business sector. As an applicant to such a center, the Norwegian School of Economics and Business Administration has conducted a pre-study aiming to identify research challenges and potential activities of such a center as expressed by relevant organizations. Consequently, the purpose of this report is to give an overview of relevant challenges in service innovation as perceived by these organizations. Furthermore, it is to discuss challenges for service innovations at all three levels; policy, industry and firm level.

In the second chapter we discuss challenges at the three levels based on existing literature and theories. We then report on the study conducted among Norwegian company representatives, representatives from Norwegian innovation policy makers, and relevant informants from Norwegian (and a few international) academic institutions. The methodological approach for this study is briefly described in chapter 3 and the results from the study are reported in chapter 4. Finally, a summary of the results revealed in the empirical study is presented in chapter 5 along with some reflections of possible implications.

2 THEORY

In the theoretical part we start with a discussion of policy level challenges for service innovation. The discussion continues with challenges at the industry level while the final part elaborates on business level challenges of service innovation.

2.1 Challenges at the policy level

Innovation challenges at the policy level may be identified from a number of different perspectives. Applying a system of innovation perspective (Edquist, 1997) challenges may originate from failures of the innovation system. The sources of these failures are typically categorized as market failures (Martin and Scott, 2000) and systemic failures (Wolthuis, Lankhuizen and Gilsing, 2005). The two sources, however also represent two somewhat different, but partly overlapping failures perspectives of relevance to understanding challenges at the policy level (Rubalcaba, Gallego and Den Hertog, 2010).

2.1.1 Market failures

Based on the work of Kox and Rubalcaba (2007), van Cruysen and Hollanders (2008) discuss several potential market failures representing potential policy level challenges to service innovation. The first failure is related to *market power*. The traditional line of argument goes as follows: When one actor gains a high level of market power, competition is reduced. Reduced competition may reduce the level of service innovation while a high level of competition typically forces companies to innovate. Consequently, regulation ensuring sound competition is vital to stimulate service innovation. Recently, the relationship between competition and innovation has been questioned by several camps of economists (Aghion and Griffith, 2008). This debate is also of

relevance to specific service industries where the relationship between competition and innovation has been under debate among both researchers and regulators, such as telecommunications. Market power failure arguments are also particularly relevant to some market services that are typically provided in geographically more dispersed markets. EU (2009) suggests national markets and restrictions on market access for services and the lack of a properly functioning common EU market for services to be a barrier for service innovation in Europe. The service sector, however, is too heterogeneous to be given a general treatment with respect to challenges caused by market power. In some standardized services concentration has been going on for years resulting in market structures with limited incentives for innovation (e.g. retail), whereas in other industries, the reason for lack of innovation incentives are grounded on a completely different turf (e.g. client-specific services). Thus, the argument of market power failures should be transformed into an issue of whether there are structural characteristics of the market including, for example, fragmentation, competition, immobility and concentration that reduce the incentives of market players to invest in service innovations.

A second dimension is *externalities*, which can be positive or negative. Externalities can be related to business services. For example, business services like accountancy services, upholding trust in capital markets and financial systems, is a precondition for service innovation in companies in all sectors. Also, companies innovating infrastructure available for other than them self - like for example telecom systems and financial systems - contribute to positive externalities. Positive externalities, in particular from knowledge intensive business services are important to stimulate innovation in all parts of the economy, and regulatory authorities should put an effort into stimulating such positive externalities. A further problem related to these services is the lack of

appropriate IPR for services. Due to their intangibility it is more difficult to protect and retain the service and appropriately value such service innovations, for example as part of the company valuation. Spillovers and positive externalities are valued, but they may not be appropriately priced and valued under market governance forms. Consumer services also involve positive externalities. Consider the use of fitness centers which are mainly priced for their effects on individuals' wellbeing, but which also contributes to reduced health insurance costs and health-related absenteeism. Such externalities are typical of many consumer and personal services. Again, however, these externalities are not common across all service industries suggesting specific policy instruments are required to control them.

Many infrastructures in a society are *public goods and services* because they are used by most people in society and are preconditions for activity in general. Highways, for example, are the basis for activities and innovation in transport services but also a necessary infrastructure for activities in most other sectors. The same goes for public *services* like e.g. schools. A relevant challenge is related to the level of public involvement to ensure a satisfactory level of public goods and services. A more recent type of public services of relevance to failure challenges are the public datasets that could be used as a basis for service innovation. Several countries have realized that this represents an important source of service innovation that is not currently available under market governance. One example is the DataSF initiative of the city of San Francisco (<http://www.datasf.org/>).

The intangibility and heterogeneity characteristics of services may lead to *information asymmetry and/or non-transparency*. Because of the risks associated with information asymmetry and/or non-transparency of information, companies may under invest in activities in this economic area. An example

was mentioned above with the lack of IPR mechanisms. Another is represented by general intangibility of services which may increase information asymmetry among trading partners and increase the risk premium of investments in service innovations. Consequently this leads to reduced activities and engagement on services and also innovations in services. To summarize, market failure challenges of service innovations are represented by market power challenges of fragmentation, competition, immobility and concentration, positive and negative externalities, common or public service challenges and information asymmetry challenges. Partly within and partly parallel to these four broad categories, challenges of resources immobility of services and the lack of appropriate property right mechanisms are also included.

2.1.1 Systemic failures

Wolthuis, Lankhuizen and Gilsing (2005) suggest seven types of systemic failures and suggest analyzing these by identifying the potential failures on the one hand, and the actors involved in them along the other. A significant systemic failure pointed out by van Cruysen and Hollanders (2008) is what can be called a *dependency failure*. This failure is based on companies' tendency to keep to existing and established relationships, systems, markets, etc. It is an inertia failure that makes it difficult to explore new opportunities, new segments, new solutions, new systems, new relationships, etc. The reason for this focus on exploitation of the existing rather than exploration of new possibilities is based on the higher level of uncertainty and general risk associated with exploring new and unknown opportunities. Policies should focus on increasing trust and interaction and generally reduce perception of risks. In addition, academic spin-off schemes, science parks, venture capital, and public procurement incentives may help reducing the dependency failures (Gustafsson and Autio, 2006 – as referred in van Cruysen and Hollanders,

2008). *Capability failures* are also mentioned as a potential problem for service innovation. Although the degree of this failure varies a lot across service sectors, some service sectors typically have a relatively lower level of education and competence. This may of course hinder efficient service innovation. Policies strengthening the education, skills, competence and training have the potential to reduce this failure. *Institutional failures* may also be relevant. Hard institutional failures are present when (or if) innovation is not satisfactory prioritized by regulatory authorities. Often, regulatory authorities have a pure focus on securing competition (with an implicit assumption that competition drives innovation) without any specific focus on stimulating innovation. Soft institutional failures are present if political and regulatory institutions do not understand the specific challenges for service innovation or are not willing to take the necessary steps to stimulate service innovation. A fourth potential systemic failure is *network failures*. One type of network failure can be observed when all of the companies are following the herd rather than looking for unique and different directions for development – here called strong network failures. The variety of innovations is typically limited as a result of strong network failures. Soft network failures come into existence if service companies do not have access to a cluster of complementary companies. In particular as a result of immobility, many service companies depend relatively more on access to clusters that are located geographically close to their own location. Finally, *infrastructural failures* may also restrain service innovation. To fully take advantage of infrastructural investments, it is important that such investments are coordinated closely across all of the potential stakeholders. Consequently, a better coordination of infrastructural investments may enable the infrastructure to constitute a basis for service innovations among more types of services – consequently stimulating service innovation in general across

sectors. Thus, using Wolthuis, Lankhuizen and Gilsing's (2005) categorization of systemic failures, service innovation faces challenges related to infrastructural failures, transition, lock in, path dependency failures, hard and soft institutional failure, strong and weak network failure and capabilities' failure. These broad categories also cover most of the market failures mentioned above.

2.2 Challenges at the industry level

In addition to policy level challenges, there are also challenges to service innovations at the industry level. Some of these are discussed below.

2.2.1 Services heterogeneity

Services are very diverse, and the heterogeneity of services can in itself be a challenge for proposing general propositions for service innovations. According to Miles (2008) services vary in their 1) fundamental processes. Some services focus on a) physical artifacts – transport, repairs, maintenance, etc, b) people – health, social welfare, etc, and c) symbols – finance, telecom, consultancy, etc. 2) knowledge intensity – degree of requirement for highly skilled, capable and professional workforce, and 3) market relations – whether the company is service consumers, other companies, or public sector. Furthermore, Pedersen (2005) found significant differences in the perception of the IHIP dimensions across various services (accommodation, retail, transport, media, etc). Also, studies analyzing the policy level challenges such as van Cruysen and Hollanders (2008), conclude that the service sector is very heterogeneous and that this makes it difficult to apply general policy instruments to the sector as a whole. Services vary across dimensions such as the interactive nature of services, the fuzzy nature of services, relative absence of quality standards, lack of market transparency, heterogeneity, and

intangibility. This type of service heterogeneity has to be taken into account when implementing and designing policy instruments. Consequently, using differentiated policy instruments and policies across service sectors is an important challenge to make regulatory and general policy decisions efficient.

2.2.2 Measuring services R&D

Given that service innovation conditions, types and processes differ from typical product innovation processes, measurement of service innovation and service companies R&D may also require new measures and measurement instruments. For example, Miles (2007) point to the fact that service innovation is often conducted on an ad-hoc basis. Such innovation activities that are not formalized in the organization and is typically not reported in innovation surveys, and consequently, the level of service innovation is typically underestimated relatively to more formalized product innovations. Also, many of the mostly reported innovation studies define R&D in a way that typically excludes a lot of the research and development activities conducted in service companies – in particular, the National Statistics Office’s Survey of Research and Development in UK and a US R&D study are used to exemplify this by Miles (2007). A similar situation is found in Norway with the biannual CIS-study. The study has been revised several times to better capture service innovation activities, but the study serves many purposes and must take historical and international comparison into account when revising its measures. Another problem is that R&D surveys are often not based on representative samples of companies but on samples where the most active performers of R&D are contacted (Miles, 2007). For example, a number of service industries are not included in the Norwegian CIS-studies (e.g. retail trade) and smaller firms are only partly represented in the applied sampling frame. Furthermore, statistical artifacts in existing surveys may also lead to

misreported results in service innovation and R&D. Miles (2007) refers to a situation in the US and Canada where companies are categorized as services or manufacturers based on the activities of the employees in the organizations. When a lot of employees in a typical manufacturing company are doing activities as sale, marketing, accounting, etc., this company may be categorized as a service company although it is a typical manufacturing company. In Norway, other problems of categorization exist because the categorization of companies is done through the Register of Business Enterprises. Changes in the main industry code of companies are seldom reported to this register, and when doing so, it is difficult to change the main industry code of a company. Such mis-categorizations impact the R&D statistics negatively. Similarly, Pedersen, Aas and Nysveen (2009) revealed several significant errors in the reporting of innovation statistics among companies in the Norwegian CIS study from 2006. For example, some software companies reported 3 times as many employed full-time equivalents of R&D as their number of employees and some software companies considered all computer programming hours as R&D hours. Correspondingly, we couldn't identify any shipyard that considered reporting the number of hours used for welding as R&D hours. In these examples, the problem is an over reporting of R&D activities in some service sectors. According to van Cruysen and Hollanders (2008, p. 1), "...there is a general lack of indicators and methodologies to measure service innovation". This makes it difficult to determine appropriate policies for service innovation but also makes it difficult for service sector associations to fully analyze the innovation situation in their own sector. Consequently, there is a need for an improved base of statistics for service innovation to be able to find out more about the true situation for service innovation, and based on this, implement

efficient strategies across the complete innovation system, not just through innovation policy instruments to improve service innovation in all sectors.

2.2.3 Market factors

According to de Jong et al. (2003), demand pull is a critical factor for the level of service innovation. When demand is growing, companies are motivated to do service innovations because of the potential for the innovations they see in a future larger market. This may be seen as a “chicken and egg” situation. For example, many service markets are characterized by indirect network effects. Examples are the markets for online content, mobile services, Internet services and services based on “common goods/services” or other infrastructural services as mentioned in section 2.1.1. Other services are characterized by direct network effects. Examples are financial services, telecommunication services and social media services, just to mention a few. For these services market pull situations are particularly critical, for example in order to reach critical mass. In this situation market growth stimulates innovation and is partly considered a precondition for active innovation. However, innovations also have the potential to increase market growth and the causal link between market growth and innovation may also be reversed. Consequently, a challenge is to stimulate innovation also in a condition of small and stable markets to stimulate market growth. Public initiatives stimulating demand may be more important than traditional policy instruments under the conditions mentioned above. For example, The Norwegian Post- and Telecommunications Authorities recently suggested that public service demand should be analyzed to understand its role in stimulating infrastructural innovation and completion in the NGN-market (NPT, 2010, see also FAD, 2009)

2.2.4 Taking advantage of KIBS and KISA

While the challenges mentioned at the policy level also involves actors representing all parts of the innovation system, many of the analyses and reports studying these issues focus mainly on the challenges that should be addressed by innovation policy instruments and government innovation policy. The interplay between actors at the industry level and the challenges related to this interplay is given less attention. Of particular interest is importance of the interplay between knowledge intensive services, in particular knowledge intensive business services (KIBS) and other service industries on service innovation. In most policy documents, the contribution of KIBS to innovation in both manufacturing and service sectors is believed to be strong. Miles et al. (1995) claim that KIBS can stimulate service innovation in companies both through explicit knowledge provision and by the transfer of tacit knowledge. Recent research, however, have discussed and questioned some of these relationships (Aslesen and Isaksen, 2007). A general problem with much of the literature on these relationships is that their point of departure typically is in individual KIBS categories. There are few studies capturing the complete dynamics of the service exchange between KIBS and other service firms. Still, the general opinion is that there is considerable service innovation potential in improving the interplay between KIBS service providers or KI service activities (KISA) and other service firms. A challenge for service innovation is therefore availability and access to relevant KIBS and their competence.

2.3 Challenges at the business level

The discussion of challenges for service innovation at the business level¹ is based on the review presented by de Jong et al. (2003). They discuss potential challenges for service innovation related to 1) the service innovation process, 2) antecedents of service innovation, 3) service typologies, and 4) effects of service innovation. In addition, 5) service innovation method challenges are included in the discussion below (Pedersen and Nysveen, 2007).

2.3.1 The service innovation process

Product innovations are typically developed through formalized and well coordinated processes. Service innovation processes, however, are often more ad-hoc, less linear and less coordinated. Often, service innovation is regarded as a *trial and error process*. Because of the intangible and perishable character of services, *prototypes usually do not exist*, and systematic testing of service innovations therefore does not take place. The intangible character of services also makes it *more difficult to directly observe the need for innovations*, and the need for service innovation may therefore not be recognized to the same degree as for products. Furthermore, the intangibility of services also makes it *more complicated to patent and protect innovations*, implying that service innovations more easily can be imitated – reducing the competitive advantage from active service innovation. Because of less formalized innovation process, service innovation processes can also *more easily be terminated* if other activities appear as more urgent. The intangible character of services also makes *communication of the innovation more complicated* - it is easier to communicate and show examples and drafts of tangible innovations than

¹ The term business level is used here to capture challenges at the firm and firm network levels.

intangible innovations. Finally, because of the similarity/inseparability of services, *front-line employees* are the ones who experience the need for innovation while innovation initiatives are often stimulated and implemented by leaders of the organizations. Consequently, there are several challenges related to these factors that have to be resolved to improve the service innovation process, and through this, increase the effectiveness and efficiency of service innovation. According to de Jong et al. (2003), a more formalized service innovation process is among the main factors that may potentially improve service innovation.

2.3.2 Antecedents of service innovation

De Jong et al. (2003) discuss three categories of antecedents; 1) success factors directly related to the service innovation process, 2) success factors creating a supportive innovation climate, and 3) external conditions affecting innovation success. Because factors related to antecedent category 3 – external conditions affecting innovation success – are discussed in section 2.1 and 2.2, this section only focuses the two internal or firm level antecedents.

Regarding success factors directly related to the service innovation process, de Jong et al. (2003) pay attention to factors related to people, structure, resources and networking. *People* factors highlighted as critical for success are the front line employees. Because of the inseparability/simultaneity of services, front line employees are critical both when it comes to the understanding of consumer needs (and thus the need for service innovations) and the implementation of service innovations. Furthermore, it is important to dedicate people to innovative roles as project leader, ambassador, decision maker, etc. This is typically not done for ad-hoc service innovations. Consequently, the assignment of such roles may lead to better organized and coordinated service

innovation processes. Finally, the lack of experience and highly qualified staff is often a higher barrier to service innovations relative to product innovations. The *structural* success factors highlighted by de Jong et al. (2003), point to the importance of a higher level of rules and procedures. Although too much formalization can reduce creativity, rules and procedures provide useful guideline for effective service innovation. Task descriptions can also be used to better communicate what is expected by the employees. Also, job rotation may be used more to increase the employees' understanding of the total activity of the organization – increasing the likelihood that the innovation ideas brought up by employees are based on a more complete understanding of the company's value proposition. De Jong et al. (2003) also refer to studies pointing to the general importance of multifunctional teams in service innovation and that internal co-operation should be stimulated to make sure that all groups of employees co-operate well and that all possible views on the innovation project are attended to. A final structural success factor may be to establish reward systems to, for example, stimulate idea generation and general positive contributions from service innovation projects throughout the organization. In addition to people and structural factors, availability of some specific *resources* is critical. To realize and motivate active service innovation, the company must be willing to come up with the necessary financial resources. Because of the intangible character of services, it is often more difficult to get funding and/or loans from banks and other financial institutions. Alternatively, higher risk premiums are applied for service innovation projects. For physical products, banks can take security in patents and prototypes while this is rarely possible for services, making banks less willing to offer loans. Information technology is a second critical resource. IT can be used as a source of idea generation both within the organization but also to get access to ideas from external actors – for

example through online communities. IT is also a critical resource for communication and cooperation throughout the innovation process, supporting the effectiveness of the innovation process. Finally, a lot of service innovations are directly related to or based on IT, making this resource one of the most critical resource of service innovations today. To clearly highlight the importance of service innovation in an organization, co-workers should be assigned to innovation tasks on a 100 percent basis. If innovation projects are only based on part time engagements from some co-workers, their motivation is probably only half-hearted, and the work on innovation projects will not be pushed forward in a satisfactory speed. Finally, de Jong et al. (2003) point to *networking* as a success factors directly related to the service innovation process. They underline the importance of interaction with clients, a general external focus to reveal ideas for innovation projects, and co-operation with other parties. These are all central elements of open innovation, as described by Chesbrough, Vanhaverbeke, and West (2006). Also, de Jong et al. (2003) stress the importance of pre-launch testing, although this may be challenging for intangible services relative to tangible products. Market launch also calls for specific challenges, and front-line employees really have to be trained and prepared for the launch of new services because of the simultaneity or inseparability characteristics of services. Finally, the heterogeneity and intangibility of services make evaluation of service innovations more difficult than product innovations. Service companies' reputation is therefore relatively more important as a trigger for consumers' adoption of service innovations. A strong brand is therefore also relatively more important for companies launching service innovations than for companies offering tangible innovations. The second category of success factors are related to creating a supportive innovation climate. *Culture and leadership* is one of the challenges related to

this category. De Jong et al. (2003) refer to the general importance of management support, but claim that this is relatively more critical for services than for products. Given the heterogeneity and intangibility, and the critical role of front-line personnel, managers really have to listen to people in their organization and to support initiatives and ideas among employees. An open culture and internal communication is also highlighted as critical for innovation of services. Information should flow freely throughout the organization. This will stimulate the generation and exchange of ideas and stimulate service innovation. A precondition for this is a clear and unambiguous internal communication. Given the intangibility and heterogeneity characterizing services, organizations face several challenges to ensure a clear and unambiguous communication within the organization related to service innovation projects. De Jong et al. (2003) also refer to studies reporting the importance of co-worker autonomy and that decentralized decision making stimulate innovation ideas. Although this may contrast their point about increasing the formalization of service innovation processes, an obvious challenge is to strike a balance between the formalization of processes and co-workers autonomy. A second main factor to simulate a supportive innovation climate is related to the *strategy* of the companies. De Jong et al. (2003) point to the importance of having a clearly defined business vision as a guiding star for innovation projects. Innovation objectives should be defined and prioritized in accordance with the business vision and should fit with the overall strategy of a company. The heterogeneity and intangibility of services can make such prioritization extra challenging for service innovations. A third element is *company characteristics*. Here, de Jong et al. (2003) call attention to the importance of technological synergies. Technological synergies may reduce the rate of errors in innovation processes and increase the innovation speed. The

size of the firm is presented as a doubled edged sword by de Jong et al. (2003). Large companies often have more available resources to stimulate and support innovation projects. On the other hand, smaller companies are often more flexible and more able to make changes faster. Finally, the complexity of service design is proposed to be critical. Because service innovations are often not protected by patents, increasing the complexity of the service innovations may be one way of reducing the chance that service innovations are copied by other companies. Adding unique resources and/or competences to service innovations may be one way to overcome the challenge of not being copied by competitors.

When looking at these proposed antecedents of service innovation success, they seem to fall into two categories. One category is based on how the unique characteristics of services have implications for service innovation. An example is the need for cross-functional teams and openness towards the customers in capturing service innovation ideas. The other category is based on transferring known success factors from product innovation to service innovation because the characteristics of services makes it likely that these success factors have been underestimated. An example of this category is the suggestion that service innovation processes should be better managed and more formalized. Often the two categories represent the dilemma between a demarcation approach and an assimilation approach to service innovation that is not yet resolved (Drejer, 2004) making it difficult to provide normative recommendations in service innovation.

2.3.3 Service and innovation typologies

One of the service innovation typology most referred to is the one presented by den Hertog (2000). They categorize service innovations into 1) *service*

concepts, 2) *client interface*, 3) *service delivery systems*, and 4) *technology*. Service concepts can be explained as a new business proposition or a service that is new in a particular market. Client interface refers to innovations in the way services are delivered to users – for example, the usage of self-services has increased significantly the last few years. Service delivery systems refer to innovations in back office systems. These are innovations that usually cannot be directly observed by the users of the innovations, but such innovations can be experienced through the improved quality of the services offered – for example increased speed of service delivery. The final typology of service innovation relates to technology. One example is that some types of surgeries can be conducted more precise and secure today because of technology improvements. Also, we know that the internet has enabled a lot of service innovations, particularly related to distribution of digital services. As seen from the typology suggested above, service innovation types differ considerably from the traditional product/process types. This also represents a particular challenge because the categorizations of innovation types usually used to capture and systematically organize knowledge of successful innovation types, how the different types should be managed and their critical success factors do not readily apply to service innovations (Pedersen, 2005).

2.3.4 Effects of service innovation

De Jong et al. (2003) discuss effects of service innovation at the a) firm level and at the 2) market level. At the *firm level*, innovation in services is assumed to influence financial results positively. For example, this means that revenue and profit is positively correlated with the level of serious service innovation. An argument presented by de Jong et al. (2003) is that service innovations can be more difficult to trace than innovation in tangible and homogeneous products. Consequently, their effects on financial performance may be difficult

to isolate. This is also confirmed in a recent study by Aas and Pedersen (2010b) using CIS2006 and accounting data in a large scale Norwegian sample. Referring to Tether and Metcalf (2001), de Jong et al. (2003, p. 51) claim that “*Service innovations typically transform the state of customers*”. They, therefore, recommend measures of service innovation performance to be conducted at the consumer level, measuring variables as consumer satisfaction, consumer loyalty, and consumer value. These are also variables typically mediating eventual financial effects of service innovation, and effects of service innovation can often be observed as changes in consumers’ perceptions before the results are manifested in financial results. Finally, deJong et al (2003) suggest that effects of service innovations are also measured as degree of strategic success. Companies that are active innovators may get a position in the market as a technology leader, as a future-oriented company, as an interesting brand, as a modern brand, etc. Strategic effects of service innovations may also transfer into financial results over time.

In addition to the effects at the firm level, service innovation may also influence *market level* factors. The competitive power between the major players in a market can be changed by innovations launched in a market. This may lead to exits and eventual new entries in a market and /or changes in existing value chains. Furthermore, innovations can also cause shifts in demand mechanisms. For example, innovations may shift demand and/or cost curves and through this, change consumers’ behavior and consumption. For example, transaction costs are significantly reduced for financial services the last decades because of growth in electronic transactions. The increased transparency of prices also has the potential to change demand. Recommendation agents and price comparison services like e.g. www.telepriser.no which promotes transparency of prices of mobile subscriptions, make it easier for consumers to

make optimal choices. Innovations may also influence demand conditions. The relative power of consumers has increased significantly the last few years because of the transparency enabled by the Internet. We have also seen substitutions of services as a result of Internet as an innovation. For example, traditional mail is partly substituted by e-mail. Looking at the telecom industry, several new services have been developed like SMS and MMS creating brand new markets. What characterizes many of these service innovations is, however, a simultaneous offering of a rather simple service and a considerable change in consumer behavior. This has led service innovation research to explore the possibility of service innovation effects from rather minor changes in the offerings of service providers coupled with a dramatic change in consumer behavior (Michel, Brown and Gallan, 2008). This kind of innovations represents a particular challenge to service innovations as the behavioral change required for the effects to take place are outside the control of the service providers.

A rather extensive review of service innovation effects has been conducted by Aas and Pedersen (2010a). This review shows that many of the effects of service innovation are more difficult to measure. It is also likely that the causal chain of effects for service innovations is more complex and that it takes longer before mediating effects of service innovations appear in financial performance indicators. This makes it more likely that service innovation projects are dropped due to underperformance before they are finalized.

2.3.5 Methodologies for service innovation

Nysveen and Pedersen (2007) and Nysveen, Pedersen and Aas (2007) show how service characteristics influence the applicability of innovation methodologies used for product innovation. These reports conclude that,

although existing methodologies can be used, several methodological modifications and/or adaptations should be done to make these methodologies equally useful for service innovation as for product innovation. Also, supplemental methodologies may be needed in some areas. The main reasons for these modifications are grounded in the characteristics of services. It is well documented, however, that the characteristics of services do not apply equally well to all service categories (Lovelock and Gummesson, 2004). This suggests that for some service innovations, product innovation methodologies may be applied without considerable modification, for other services, however, considerable modifications or totally new methodologies may be required. This makes it more difficult to apply and adopt methodologies as well as to differentiate between appropriate and less appropriate methodology providers and management consultants offering methodological assistance. It is also worth noting that some service areas are among the more creative in developing new service innovation methodologies. In particular within ICT services, the richness of service innovation methodologies is considerable.

3. METHODOLOGY

To identify which of the service innovation challenges summarized in the literature and theoretical review in section 2 were actually perceived as relevant service innovation challenges among representatives of the service innovation system, we designed a qualitative study and organized it around the topics of section 2. During the fall of 2009, we interviewed representatives from 45 companies, industry associations, innovation policy and government agencies, and universities and research institutions. Recruitment was based on relevance for the purpose of the interviews. We contacted organizations and respondents considered to be relevant and asked them to provide informants that could elaborate on the innovation challenges suggested in section 2. The sample, thus, represents a convenience sample. None of the organizations we contacted refused to take part in the interviews and all suggested one or more interviewees of relevance. The focus of the interviews was on challenges for service innovation among Norwegian companies. Consequently, mainly respondents from Norwegian organizations were recruited for interviews. A broad approach was chosen, and informants from a variety of organizations were asked to participate. Our main target group was private- and public companies and 25 of the interviews were conducted among informants in such companies. Furthermore, relevant informants from ten external national and international universities and colleges were interviewed in addition to eight internal professors at the Norwegian School of Economics and Business Administration. Finally, two interviews were conducted with informants of government and government owned institutions responsible for managing individual innovation policy instruments. In many of the interviews, more than one respondent/informant participated on behalf of the company or institution. Totally, 64 respondents participated in the 45 interviews.

The context of the interviews was the fact that the Research council of Norway had announced a call for new centers of research based innovation. In this call, particular attention was paid to the challenges of service innovations. Except from clarifying this context and using the theoretical challenges reviewed in section 2 as a basis for organizing the interviews, the proceeding of the interviews was very informal. Although the respondents were informed about our purpose of illuminating relevant challenges of service innovation, relevant activities for a service innovation centre, suggestions for how to organize a service innovation centre, and suggestions for other organizations of relevance to a service innovation centre were also touched upon by the respondents. Besides from this organization of the interview, the respondents were free to focus on topics of interest for them within these main areas.

Most of the interviews, 34 to be exact, were conducted by two professors while 11 of the interviews were conducted by one professor alone. Each of the interviews started with a brief presentation of the background and purpose of the interviews. Notes were taken carefully during all of the interviews and a rather thorough report was written for each of the interviews. All of the interviews were discussed and reviewed by two professors, and the informants responses were systemized into categories of challenges related to antecedents of service innovation, service innovation processes, service innovation methodologies, typologies of service innovation, and the effects of service innovation. In addition to the service innovation challenges, the respondents were also encouraged to come up with relevant ideas for activities of a service innovation center, and how to organize a service innovation center. After the interview, the respondents were given a summary of the written report from the interview and were encouraged to correct if any errors had been done in the reporting or if they had considered additional issues that should have been

explored after the interview had been held. Most interviewees used this opportunity to confirm that the summary reflected their opinions and around 10% of the interviewees provided us with additional topics that they had come up with after the interview.

After all interviews had been conducted, a feedback conference was held where all respondents were invited. 25 of the 64 interviewees attended the feedback conference. At the feedback conference our results from summarizing and aggregating findings across all informants were presented and discussed. The informants were given the opportunity to correct our aggregations and underline specific topics. The respondents expressed appreciation for being given this form presentation and for having a second opportunity to underline and discuss relevant topics.

4 RESULTS

In accordance with the theoretical part, our findings are organized by the three levels of challenges. Further, challenges related to antecedent, process, methodologies, typologies, and effects, in addition to suggestions for center activities, organization and milieus are discussed within each of the sections reflecting these three levels of findings.

4.1 Policy level findings

Input on challenges for service innovation at the policy level mainly relate to need for research on how regulatory policies influence service innovation. It also, however, relates to how government policies in other areas affect service innovation. Initiating a center for service innovation in the private business sector reflects a policy seeking to increase the competence of innovation in services. Such a center should be a reference milieu to contact for all actors working with service innovation, including regulatory and other government authorities.

4.1.1 Research challenges

Regulatory issues were brought up by many of the respondents as important *antecedents* for service innovation. First, regulations of service sectors are reported to directly influence the innovation activities of service companies. When regulatory authorities implement new laws or other types of regulations, companies have to adapt to these. Typically, the companies report regulatory changes to be challenging, but they mainly consider regulatory changes to offer opportunities for refinement of their services, opportunities for entering new markets, and in general opportunities for re-thinking their value proposition. Often, companies have to adapt to regulatory changes relatively fast. This often

also influences their innovation *process*. One of the companies referred to a given situation where they had to establish a specific innovation project group to be able to adapt their service to new regulations within the time limit specified. A relevant research question is to study potential effects of regulatory efforts on service innovation success.

In some service sectors, innovation is partly reflected in the aims of the regulatory policy. One example is telecommunications where the services are believed to be an important input factor in the economy, and thus it is required that regulation takes this into considerations. There has been a development in the regulation of this sector towards more “soft regulation” reflecting voluntary and negotiated actions in a joint understanding between regulatory authorities and market players. In other sectors such considerations are seldom reflected in the regulatory policy despite the fact that many services share some of the characteristics of telecommunications. The fact that regulation and government policies in general significantly affect innovation and innovation capabilities could thus be paid considerably more attention to. A suggestion could also be to apply best practices in how to apply innovation considerations or how to increase the innovation capabilities of the sector being regulated through e.g. more negotiated or “soft” regulation.

In Norway, several public- and private organizations manage a number of innovation policy instruments. The system of agencies managing these instruments is an important *antecedent* for service innovation and is regarded to stimulate service innovation through financial- and advisory support. We term this system of agencies the *innovation policy system* to underline the differences between this system and the complete *innovation system* that reflects all actors involved in innovation and the interaction between these actors (Edquist, 1997). Although the attitude towards this innovation policy

system is generally positive, some of the companies are questioning the efficiency of the system. Some service companies feel that their value proposition is not well understood by the innovation policy system and that it is difficult to get the necessary and relevant support. The difficulty of understanding service innovations value propositions may be partly attributed to the intangibility of services. Implicitly, these respondents are questioning the level of competence among the employees in the innovation policy system. In particular, they question whether the innovation policy system representatives have a sufficient understanding of the logic of services. The organization of the innovation system is also mentioned as a possible liability. For example, the level of bureaucracy is perceived as rather high by some of the informants. In addition, many service companies do not have well established traditions for relating to the innovation policy system as a source of advice and funding. This tends to have created a negative spiral where service companies to a lesser degree consult the innovation policy system, and consequently, the innovation policy system has not been required to develop the necessary competence to provide advice and funding sources that could have been in demand. Consequently, there seem to be an interest for researching topics related to the competence and the organization of “the innovation system”, and for finding ways to cope with the negative spiral reflected in the relationship between this system and the rest of the innovation system for service innovation.

Another issue of relevance to the innovation policy system is that when we ask respondents about their competence networks for service innovation and their sources of knowledge support and interaction in informing service innovation they seldom mention the innovation policy system and they also seldom mention research organizations. Sometimes they compare the situation for research driven technology-based innovation with the situation for knowledge

driven service innovation to underline how the sources of knowledge differ. In knowledge driven service innovation, the informants are much more often represented by KIBS or KISA actors and representatives. They also more frequently mention professionals in non-competing service provider firms and often participate in knowledge networks sharing ideas and knowledge between non-competing company representatives. In business services, this network also often constitutes of supplier and customer representatives in the same value chain or network. Another relevant actor category that is mentioned are representatives of capital market institutions, whether they are single investors, representatives of traditional banking firms or they are highly specialized representatives of private equity or venture funds. This suggests that for service innovation there is an innovation dynamic at the business and industry level that is not driven by government innovation policy instruments or by research institutions, but by the interaction between knowledge intensive service provider representatives, capital market institution representatives and service provider managers.

Finally, some of the respondents also bring up a discussion about the responsibility of capital markets versus government activities to support innovation. The main question is that different challenges call for different solutions or types of support. It seems to be a need for a better understanding of when – under which conditions and/or in which situations – the capital market is a better tool for stimulating service innovation and when government support is preferable. This is closely related to the sources of market and systemic failure treated in our theoretical review. In the interviews, however, the problems are raised at a more practical level. For example, the question of what can be learned from capital market valuation of service innovations that may be adopted by the innovation policy system is one question that is raised. How

capital market and new innovation policy instruments may be combined is another. For example, there seems to be an interest in how the capital market contributes to structural innovation in service industries through e.g. private equity funds because many of these markets are considered as structurally immature. There seem to be a general interest in research on the effects of capital market versus government institutions by respondents both from private companies and academic institutions being interviewed.

4.2 Industry level findings

Several ideas have been brought up by the respondents about interesting research areas and potential activities that should be focused by a center for service innovation. Also, some of the respondents have presented ideas for how to organize such a center to make it as relevant and useful as possible for all actors involved in service innovation.

4.2.1 Research challenges

A precondition for an efficient service innovation policy in a company is to have a clear and unambiguous vocabulary on service innovation. There are several theories describing differences between products and services, but these differences typically vary a lot depending on the type of products and services compared. We also see that the level of intangibility, heterogeneity, etc. also differs across services (Lovelock and Gummesson, 2004). Consequently, a clearer understanding of what is a service and what is a product is not necessarily easy to develop. For example, recent theory intending to assist in developing relevant constructs of a service science, such as the service dominant logic paradigm differentiates between services and service. During our interviews it seems that much of this logic is difficult to grasp for many of the respondents, but it also seems that many seem to cope well with altering

between constructs of a goods dominant and a service dominant logic. Another example of a construct mentioned by several of the respondents is the concept of a business model. A lot of companies want to innovate in their business model, but many of the respondents find the meaning of the business model construct to be unclear and to vary across people in different organizations and also within organizations. This makes it difficult to discuss and communicate issues of business model innovations. Consequently, an important area of research to stimulate efficient service innovation is to establish a clear and unambiguous vocabulary on service innovation and related constructs to avoid equivocal communication between people working in this field. This will also enable companies and company organizations to better share and disseminate their knowledge across service sectors.

A second *antecedent* of service innovation at the industry level is structural innovations - such as buyouts mergers, or alliances between companies. Structural innovations usually cause significant changes and enables innovations related to organization of the company, standardization of services, branding of the service, etc. Some of the respondents elaborate on the balance between political means and structural changes as sources of service innovations. There seem to be an interest for research on the relative efficiency of stimulating service innovation through political means versus structural changes in different situations and conditions. This issue has also been touched upon in section 4.1. Service innovation seems to differ from other types of innovation with respect to the importance of structural innovation. One respondent representing a large private equity fund suggested this is due to the immature character of some service areas. Consequently, considerable value may be created from structural innovations making buyouts instruments more relevant than venture instruments in some service areas. It also seems that the

principles for allocating growth capital in service areas do not differ so much from manufacturing areas as the principles for allocation venture capital.

4.2.2 Activities

In accordance with Miles (2007), the interviews also revealed a need for strengthening the statistical foundations for service innovations. This was an issue that was brought up by institutions as company associations, innovation policy agencies and research institutions, and not by service companies. A solid and correct statistical foundation is a precondition for understanding service innovation challenges and to implement the right stimulating activities for improving service innovation. Among the academic respondents, ideas about coordinating and integrating statistical material from for example Nordic countries were presented as a relevant and important activity for a service innovation centre. From the perspective of the service providers, however, this was not a very salient issue.

Both respondents from the universities and companies agree that a center for service innovation has to focus service innovation research. Consequently, an important ongoing activity in the center should be to do research on research questions considered to be of relevance among the companies focusing service innovation. The quality of the research has to be high, and publication in international highly ranked journals is the best proxy of research quality. It is important that the center is dynamic and open for new ideas for research questions from both service innovating companies and from research literature on service innovation. Consequently, topics for research questions have to some degree to be decided throughout the lifespan of the center. While there was considerable agreement on the quality of the research, the focus of the research was not equally agreed upon. Research institutions are still rooted in a

innovation research perspective conducting research on service innovation. Service companies, on the other hand, look for research that could more directly stimulate or lead to service innovations. They compare the research of engineering and natural science with social science research suggesting that much of the social science research could be more applied and be used to stimulate, facilitate and create innovations. Looking more closely at engineering and social science research of relevance to innovation, the differences are also much in the framing of perspectives. While engineering would frame a research task in the context of what is actually created from the research, social science research often frame the research task in the context of what research activities are conducted. Also, social science research often leaves implementations of research implications to decision makers whereas engineering more often takes part in implementations. This is a challenge that relates to all social science research of relevance to service innovation regardless of service industry.

Other activities suggested by respondents are related to an increased educational focus on service innovation. One way of building a competence on service innovation is to ensure that relevant topics for service innovation are lectured in regular educational programs at relevant universities. Consequently, students will have the necessary competence when employed in companies. Respondents also suggest that students with a special interest in service innovation should be offered the possibility to immerse in service innovation topics, for example on their master theses. In addition to include service innovation relevant topics in courses, student both at the master and PhD levels should be particularly encouraged to immerse themselves in service innovation relevant topics when writing their theses. Furthermore, executive programs may

be established to improve the possibilities of all employees interesting in building a higher competence in topics of service innovations.

Respondents representing companies mention several other potential activities for stimulating service innovation at the industry level. One suggestion is that a center for service innovation should conduct best practice studies and make successful service innovations visible through presentation of best practice cases or examples across different service areas. Other suggestions for activities are to monitor trends of relevance and to communicate these trends to companies as an input for their service innovations. One of the respondents brought up the idea of establishing and coordinating innovation panels. An innovation panel should be groups of companies with complementary interests and without potential competitive conflicts. Such innovation panels can stimulate a free discussion between the members about service innovation strategies, creating innovation synergies for all of the participants and generate relevant knowledge that may be disseminated across service areas. Finally, a suggestion is that a center for services innovation should provide resources for testing service innovations throughout various stages of the service innovation process. The idea is not that this should be a physical center with a defined location. Rather, it can be a virtual center where service innovating companies can get access to resources and competences for making valid tests of the potential of their service innovations before it is launched in a market. It is considered an important part of the scientification of service innovation to make it more in accordance with other forms of innovation. The difference in this case is that the sciences involved and the principles for what may and should be made scientific differ for service innovation and other types of innovation. For example, social sciences like marketing, economics, social

psychology and sociology may be more relevant to the scientification of service innovation than technological and natural sciences are.

4.2.3 Organization

Innovation is a multi-subject discipline. The importance of recruiting people with a heterogeneous background as staff for a service innovation center is underlined by many of the respondents. The heterogeneity perspective is also relevant for recruitment of companies as partners of such a center. To be able to illuminate all relevant research perspectives of service innovation satisfactory, a service innovation center should include people representing a breadth of disciplines and professions.

An input to the organization of a center for service innovation is to cooperate closely with knowledge intensive business services (KIBS) and actively use such companies as actors to bridge the activities and research results from the service innovation center to companies working on service innovations. KIBS and knowledge intensive service activities (KISA) more generally, has been shown to play a significant role in innovation in general, but even more so, it is believed, for service innovation (Miles, 2007). The interaction between knowledge intensive service providers and other service providers is, however, not well understood and it is seldom that research and innovation projects directly incorporate this interaction into the projects. In general, KIBS are unique because they are actively working to support companies and have a relatively high knowledge about companies' needs and challenges. In addition, given the knowledge intensive character of KIBS, they also have a relatively well developed ability to take advantage of relevant research and to make this available and relevant for companies. They may, consequently also be used as interpreters of research. Furthermore, cooperation with KIBS may be an idea

for more effectively disseminating the knowledge and competence developed in the center to companies working on service innovation.

An important condition for establishing a service innovation center is the inclusion of private companies with an interest in service innovation. An important ponderation is what type of companies to include to stimulate interaction. It is important to include companies that have a real and high motivation for participating and who has service innovation as an area of priority in their business activities. One idea is to recruit partners that are part of the same value chain and try to develop synergies within these value chains. One potential problem in such a group is the diverging interests among participants and the potential for strategic positioning in the group for example in discussions of structural service innovations. An alternative is recruitment of partner companies from a service network. For example, this can be actors taking part in a product – service ecology. Based on the opinion of the respondents, the potential for growing synergies between participating companies seem to be considered as higher in a consortium based on a service network group when compared to a value chain based group.

4.3 Business level challenge findings

Most of our interviews were conducted with representatives of private service provider companies. Consequently, this is reflected in the feedback from the respondents, and ideas and views at the business level are dominating the empirical material from our interviews.

Stimulating conditions for service innovation is critical to increase the volume of service innovation among companies and the rate of service innovation success. The importance of adapting appropriately to the antecedents of service innovation is therefore critical.

4.3.1 Antecedents of service innovation

In addition to antecedents of service innovation mentioned at the policy and industry level, several business specific antecedents were also brought up by the respondents. Not very surprisingly, customer orientation was mentioned by many of the respondents and university professors as a critical success factor for service innovation. Customer orientation is also related to specific types of innovations, in particular innovations in the customer experience which are particularly focused but which we treat under innovation types below. In addition, global orientation was also pointed out as a critical factor among some of the respondents. A global orientation gives insights and ideas about new and creative innovations and stimulates service innovation in domestic organizations. In addition, being present in international markets may also help the company to attract both capital and competence, two critical factors for service innovation activities. Regulatory initiatives in larger markets as US and EU often influence domestic regulations over time. Consequently, being internationally oriented gives the company access to relevant information and decision processes at an earlier point of time, making it easier to make necessary and appropriate service innovation adaptations. Also, some of the companies interviewed are present in global markets and are conducting service innovations in various international markets. Understanding of cultural differences and strategies for how to maneuver service innovations in different international markets are underlined by representatives from these companies. The importance of organizational changes is not mentioned explicitly by many of the respondents as an antecedent for service innovation. However, many of the informants tell stories about how they have redesigned the organization of their innovation process and that this has influenced their service innovation capabilities and activities. Examples are organizations that have moved the

responsibility of service innovation from a central staff activity to a more distributed line activity. Based on this, we conclude that research topics related to customer orientation, internationalization and globalization and organizational changes are highly relevant to stimulate service innovation.

4.3.2 Service innovation processes

Several research questions related to the service innovation process are considered interesting among the respondents. Corresponding what has been underlined in the review of section 2, we have been told several times that service innovation does not follow a linear process like traditional product innovation. Typically service innovation is continually and not a process that starts at a specific date and ends at a specific date one year later. For companies with both service- and product innovation process management procedures, service innovations are often difficult to incorporate into the general innovation process procedures of the firm. As a consequence it is often also more difficult to firmly manifest service innovation processes in the firm's innovation system making it somewhat more easy to neglect, for example by top management. Some of the respondents claim that a most important factor is the understanding of the value driver(s) of the service and an understanding of the fundamental value drivers of the service sector. The intangible character of services makes an understanding of the value drivers challenging, and respondents claim that service innovation is more complex and difficult to manage than product innovation. Relevant research challenges are related to the understanding of effective organization of service innovations and service innovation processes, and to the development or adaptations of service innovation methodologies to support service innovation activities within companies. This topic is brought up as interesting and relevant both by representatives from companies and by university professors.

An issue mentioned by many of the respondents is the importance of having a well defined origin of the service innovation activities or process. It is important that service innovations are based on the vision and strategy of a company, but this can be done in many ways. One way is to anchor service innovations to the fundamental service value – like for example when insurance companies are anchoring their innovation activities to safety or protection as a service value. Other ideas are that service innovations may be rooted in consumers' preferences and needs. Further, and perhaps more compelling ideas presented are that service innovations can be developed on the basis of specific technologies – like those we see in the telecom market where a lot of services are innovated on a technological platform like the cell phone platform. In this case, the technology is seen as an enabler of service value and innovations may be based on this enabling capability of the technology or it may, as seen above, be based more directly on the original value of the service where technological capabilities are used as a stage-gating criterion for pursuing specific ideas. A company's brand can be very valuable, and companies can take advantage of brand associations when innovating new services. If a primary positive association to a brand is femininity, service innovation may focus on this association when innovating new services. Finally, many of the companies are conscious about their social responsibility. Innovations based on social and altruistic motives are pointed out as important among many of the companies. Research to increase our understanding of using various value-sources as a basis for service innovation seems to be highly relevant.

4.3.3 Service innovation methodologies

Somewhat to our surprise, the interviews did not reveal a need for more innovation methodologies. However, some of the respondents missed a more active and systematic usage of methodologies when working with service

innovation. A more relevant challenge, therefore, is to make it more common to take advantage of existing methodologies in service innovation. It is important to inform about available methodologies, and there may also be a need for more instruction and education on how to use existing methodologies in a useful manner. Also, the issue of how to anchor the use of specific methodologies firmly in the service organizations was considered an issue. In fact, some respondents indicated that there is no lack of methodologies, what we are lacking is the systematic and management supported use of innovation methodologies in service organizations. Research on adapting methodologies to service innovation and activities related to informing and training companies in using service innovation methodologies more systematically is perceived as relevant among the respondents.

Open innovation has received a lot of attention the last few years, and some of the respondents look at open and social processes as vital for successful service innovation. Open innovation and co-creation involves consumers – and other stakeholders – more systematically and continually than what is typical for traditional consumer involvement. Examples of co-creation we see so far usually take advantage of the web as a platform for co-creation, typically inviting consumers into the service innovation activities through dedicated sites on the web. There are many challenges related to the coordination and collaboration of stakeholders in such a close manner. We may also see challenges related to consumers requiring a share of the service revenue if they actively have taken part in the service innovation activities and obviously has contributed significantly to the new service introduced on the market. Similarly, we may see situations where consumers or other participants in the open service innovation process claim their right to property right or patents that are part of the service innovation. Also, the lack of patenting or other IPR-mechanisms for

service innovations may be a further obstacle in applying open innovation methodologies just because it is more difficult to protect the results of these open processes for service innovation than for more tangible types of innovation. Such situations calls for new business models and in particular new models for how to share revenue among the actors involved in service innovation. So far, the companies we have interviewed have not started to use web based or other forms of co-creation methodologies as a systematic part of their service innovation activities, but many of the companies are using social media for the purpose of observing and learning for potential future systematic usage of such media in service innovation. Consequently, there is a lot of interesting research topics related to co-creation as a new methodology for service innovation.

4.3.4 Service innovation types

Some types of service innovations are pointed out as particularly important by many of the respondents. Business model innovations are one of the service innovation types that many of the respondents consider to be important in the future. At the same time, the respondents admit that business model innovation is a difficult concept and that they do not have a clear and unambiguous understanding of what it is. However, based on the discussion with the respondents, value proposition and revenue models seem to be relevant elements of what many of the respondents define as parts of their business model. Anyway, research challenges here are both to establish a clear understanding of the business model and business model innovation constructs and thereafter to study the potential for successful business model innovations for different types of companies operating in various markets. For example, a number of principles and methodologies have been developed for business model analysis and innovation (e.g. Osterwalder and Pigneur, 2009), but the

relationship between business model design and performance is hardly captured by any empirical studies (for a noteworthy exception, see Zott and Amit, 2007, 2008). Pricing is also brought up by professors as a potentially important issue in business model innovations. We have seen examples of pricing innovation for example on the Internet as well as in airline transport, just to mention a few examples. However, pricing innovations may also be used in contracts with cooperating companies to stimulate innovation incentives, such as in mobile content service markets. Thus, pricing innovations are a category of revenue model innovations which are regarded a component of business model innovations.

A second type of service innovation is related to scalability. Many companies experience that when introducing new services, they have to design these as customized or tailor made services to each of their consumers. For example, many new business services are introduced as a response to individual customer's demand. This is typical for example of software based services and many knowledge based services. Due to the customization it may be more difficult to make these services profitable, resulting in an underinvestment in service innovations in some of these service areas. Developing principles and capabilities for scaling services to various needs and preferences is therefore highly desirable. One suggestion for how this can be done is through module-based service innovations so that different standardized modules can be added to a basic service to individualize services to fit consumers various needs and preferences. This is a principle for customization that is often used in product development that may also apply to service innovations. Research on how to develop scalable service innovations and potential effects of such types of innovations are considered relevant by the respondents.

An interesting type of service innovation brought up by some of the respondents is product- and service ecologies. Services are often part of a larger totality, and service innovations often interoperate with tangible products or other services. An implication of this is that a lack of matching interoperability innovations following separate service innovations limits the possibilities for innovation in the service system or product/service ecology. On the other hand, changes in products and other services part of the service ecology may also enable and stimulate further service innovations. Standardization of a product may also make it easier to standardize services that interoperate with the product. Consequently, interoperability with related products and services is an important factor when developing innovative product/services ecologies. Research can focus on how to stimulate interoperability and the simultaneous innovation of interoperable products and service of the product/service ecologies.

Other types of service innovations brought up as important are social innovations and innovations in the consumer experience. Many of the respondents recognize the general increased importance of social activities and –services. Looking at the web, we have seen many examples of social media services that have succeeded the last years, as for example Facebook, YouTube, and Twitter. While these examples are very general, the potential of social innovations for smaller segments are probably huge. The main point is to serve groups of people and accommodate a meeting place for consumers with common interests and with a need to interact in new forms. The term social innovations have also been extended to the general innovations in social behavior and to the use of social media and other forms of social interaction in innovation. Relevant research may seek to increase our understanding of success factors of social services and social innovation in general.

The last, but definitely not least mentioned service innovation type in the interviews is innovations in the consumers' experience. In general there is a tendency to focus more on the consumer experience from using or consuming the services rather than on the attributes and characteristics of the service itself. An example is the co-creation of value that results from a service as proposed in the service dominant logic paradigm. Consequently, the type of services innovated should strive to improve, extend and enrich the consumer experience to increase the chance of being a winner at the marketplace. Service dominant logic is a rather new, but interesting, perspective on services that is particularly relevant for this service innovation challenge. Another perspective on innovations in the customer experience is that these innovations only partly results from the value proposition of the service provider and depends on a number of experience factors outside the service provider's control. Generally, there is a lot of interesting research that can be conducted with relevance for service innovation in the customer experience by applying the principles of service dominant logic and by exploring the contexts that co-exist in co-created customer experiences.

4.3.5 Effects of service innovation

Because of the intangibility of services, identifying service innovation effects on company financial performance is somewhat more difficult. Given the inseparability of services, service innovations often influence the interaction between the service and the consumer directly, leading to changes in consumer perceptions and behavior towards the service. Thus, financial performance effects of service innovation are mediated by these more qualitative effects (Aas and Pedersen, 2010a, b). Some of the respondents we have interviewed point to the importance of measuring many of these mediating effects, such as emotional effects of service innovation. Their point is that innovations leading

to changes in the interaction between consumers and the company typically create emotional responses. Emotional responses influence variables as adoption of service innovations, satisfaction with the service, perception of brand value, perception of service quality, loyalty to the service and the service provider, etc. All of these variables are supposed to mediate the financial performance of the firm, market share, etc. However, it is important to understand *how* financial results are influenced by service innovation – the mechanisms through which financial results are strengthened. This is important for the understanding of what kind of mediating effects that should be stimulated to improve companies' financial performance. An area of research that is pointed out as important is to measure the effects of service innovation with a broader set of variables and to increase the understanding of how service innovation influences financial performance – through which variables financial performance is influenced. The importance of using a broader set of variables for studying the effects of immaterial service innovations are highlighted both by respondents from companies and university professors.

Open innovation and co-creation has gained a lot of attention in innovation literature recently. Co-creation implies a social interplay between the co-creating partners. Typically, co-creation depends on deep involvement from both the company and the consumers and a well organized and –functioning social interaction between the involved actors. Given the belief that co-creation will have a continually more important role in service innovation in the years to come, some of our respondents calls for research on how the social mechanisms in co-creation influence consumers adoption of co-created services, satisfaction with co-created services, perceived value of co-created services, etc. Thus, adoption effects have also been suggested as an important issue relating to service innovation effects.

5 IMPLICATIONS

Our empirical findings are summarized in table 1. The table is organized by research problems, activities and organization findings and by the level affected. We focus here on the implications of these findings for the establishment of a center for service innovation.

	Policy level	Industry level	Business level
Research problems	Regulations and policy role in service innovation Competence and organization of the innovation system Capital markets, government innovation policy and business level innovation dynamics	Establishing an unambiguous vocabulary Structural actions	Customer orientation Globalization Organizational change
Antecedents			How to organize service innovation “processes”. Value sources for service innovation
Process			Anchoring of relevant methodologies General research on co-creation as an innovation methodology
Methodologies			Business models Scalability Product-service ecologies Social innovations Consumer experience
Typologies			Financial results Consumer perceptions Emotional responses
Effects			
Activities	Initiating a service innovation center Reference milieu	Sector relevant innovation research Service innovation in educational programs Monitoring trends Establish and coordinate innovation panels Database of relevant statistics	Innovation projects Best practices Measurement and test resources Concept development and dissemination at firm level
Organization	Government agencies interested in partnering	Multi-disciplinary org. Partnering with KIBS to bridge center research and activities with businesses Business partners (service networks and ecologies)	KIBS interactions directly in innovation projects

From table 1 we see that most of the research problems identified are at the business level. This is partly due to the approach applied but it also reflects the need for actions at this level. At the policy and industry level, the main challenges are related to the antecedents of service innovation. Important challenges at the policy level are the importance of regulation and general policy to service innovation, the lack of understanding of service logic and the unsettled role of capital markets versus government institutions in supporting service innovation. Also, we found that the innovation dynamics of service innovation seemed to differ from the traditional conception of research driven innovation typical for product innovations and instead seemed to result from interactions between knowledge intensive service providers, capital market institutions and other service providers. At the industry level we identified a similar challenge in understanding and developing concepts for services logics as well as a challenge in understanding the importance of interactions and structural changes to service innovation. At the business level, which includes both the firm and network level in our study, we identified challenges in the antecedents of successful service innovation in the importance of a customer orientation, the influence of a global orientation and the importance of organizational change. While these are considered antecedent-relevant challenges, most of the other challenges identified also represent antecedent-relevant challenges. For example, better anchoring of service innovation methodologies in organizations may be considered a success factor and thus, an important antecedent of service innovation. Among the other challenges, we found the difficulties in organizing and managing service innovation processes and the identification of relevant value sources that may be used to organize these processes around as two important challenges for service innovation processes. For service innovation methodologies we found the anchoring of

methodologies in service organizations, the use of open and co-creation methodologies of service innovation to be particularly challenging. Among the specific service innovation types that were found to be particularly challenging are business model innovations, scalable service innovations, in particular scalable business services, innovations in product/service ecologies or in ecologies of services spanning traditional service boundaries and innovations in the customer experience. Among the challenges we identified, the challenges related to these specific innovation types were among those most frequently mentioned by our informants. Finally, we identified a number of challenges related to the effects of service innovations. In particular, it is challenging to understand the complexity of the causal relationship between service innovations, intermediating qualitative effects and quantitative financial performance effects.

After having identified the challenges summarized above, we also asked what this implied for the establishment of a center for service innovation. An obvious implication is that since the main resources of such a center are research resources, research on the relationships clarifying these challenges is a main activity. It was, however, stressed that such research should take a different approach from traditional innovation studies. It should focus business level challenges which are overrepresented and it should have an applied approach where the innovation implication of the research results should lead directly to or directly affect service innovations at the business level. Often research institutions in behavioral and social sciences like marketing and economics stop at the implications of their findings or give recommendations mainly to operational management rather than innovation management. An alternative approach could, thus, be to organize research activities as integrated innovation projects where scientification of the innovation activities is used as a

basic principle and were the innovation projects are organized with interactivity between service providers, researchers AND knowledge intensive innovation enablers being responsible for much of the implementation and dissemination of results. This is also just what was suggested as a principle for project organization by our informants at the business level. In addition, relatively few organizational guidelines were given except suggesting that representatives of the innovation policy system should also be represented in the center organization.

Among the additional activities suggested by our respondents are the inclusion of service innovation topics in educational programs at the master and doctoral level, the establishing a trend monitoring activity for service innovation challenges, collect and share datasets, organize conferences, seminars and other dissemination activities, establish databases and services giving easy access to best practices in the area of service innovation methodologies, service innovation process organization and business model innovations, establish a set of measurement and test resources, partly in the form of visual or tangible examples of successful service innovations but mostly in the form of measurement tools and test resources that may easily be implemented in business organizations, for example as online services. An important activity is also that of developing and disseminating applicable concepts based on service logic that bridges the gaps between silo disciplines of relevance to service innovation.

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