Managing service innovation: firm-level dynamic capabilities and policy options

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Section 9.4 is to a large degree based on chapter 7 of the RENESER-report (see den Hertog et al., 2000). I am indebted to the co-authors of this chapter Professors Luis Rubalcaba and Ian Miles.
9.1 Main conclusions

This PhD thesis deals with the switch from a goods and manufacturing dominant innovation paradigm to a services-dominant innovation paradigm at both the firm and policy-level. This paradigm switch is much needed as the future competitiveness, economic growth and quality of life is largely dependent on how well firms, industries and more widely innovation systems are equipped to benefit from and facilitate service innovation. Below we present our three main conclusions on respectively service innovation, service innovation management and service innovation policy. For each of them we will indicate the exact core problems, how we addressed these and in doing so, how we contribute to the debate on respectively service innovation, service innovation management and service innovation policy making.

9.1.1 Main conclusion on service innovation

A key problem which we outlined in section 1.2 is that our current understanding of service innovation, service innovation processes and service innovation policies is still biased towards the still predominant goods and technological paradigm. With regard to service innovation this means that comprehensive approaches and frameworks that are sensitive to the multi-dimensional, inter-disciplinary, multi-party and multi-site character of service innovation are largely lacking. This was already underlined by various service (innovation) management scholars (see e.g. Edvarsson, 2007; Ganz, 2007; Howells, 2010, Toivonen, 2010).

In this thesis we addressed the problem of a lacking appreciation of the partly idiosyncratic character of services (intangibility, customer intensity) and service innovation (multi-dimensional, inter-disciplinary, multi-party and multi-site) by developing first a four (see chapter 2) and eventually a six dimensional model of service innovation (see chapter 6), emphasizing the multi-dimensionality. This framework is also used for defining service innovation more precisely (see section 1.3.2). In chapter 2 we illustrated mainly through sectoral analyses that this multi-dimensionality can be found in various service industries ranging from retailing, logistics services, financial services, IT services to technical engineering. Having analysed in more detail the Dutch hospitality industry (see chapter 3) and individual European service firms including Randstad (see chapters 3 and 4), we formulated in section 6.4 the 6D-model of service innovation where we extensively illustrated the six dimensions by examples taken from chapters 2-5. The following six dimensions were discerned: (1) new service concept; (2) new customer interaction; (3) new value system/new business partners; (4) new revenue models; (5) new service delivery system (organizational component); and, (6) new service delivery system (technological component). We additionally differentiated between five service innovation patterns (see sections 2.4 and 2.5) highlighting more autonomous and even driving roles service firms
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may have in creating (service) innovations, rather than being predominantly supplier-dominated in terms of innovation (Pavitt, 1984). One of the service innovation patterns which illustrates this point in particular is the ‘innovation through services’ pattern which is characteristic for most KIBS. We analysed how some of these have developed into co-producers of innovation at their clients (chapter 8).

By developing and applying the 6D-model of service innovation we learned that service innovations are quite often new combinations of various dimensions that in themselves do not have to be innovative. In those cases, service innovations are literally new Schumpeterian combinations of individual dimensions or components that are readily available in another context. We further learned that innovation of any one of these dimensions will trigger or necessitate innovations in one or more of the other dimensions as well. Further, we observed that although new technological options might trigger service innovations, the leading dimensions are organizational, most often a new service concept or a new customer interaction. There are hardly any service innovations that can be characterised as purely technological innovations. At the same time we observed that there are hardly any service innovations that do not benefit from new technological options. We further concluded that service innovation is inter-disciplinary as the resources and (dynamic) capabilities to innovate the various dimensions reside in various disciplines such as marketing, ICT, operations and business development spread over the organization. This makes service innovation almost by definition inter-disciplinary. Service innovation was further noted to be quite often multi-party as not only customers co-produce service innovation, but other business partners are mostly needed to create a service innovation. Insourcing of lacking expertise or capabilities is the norm rather than the exception.

Finally, service innovation was found to be often multi-site as service experiences and solutions have to be created over and over again with every single customer. Rolling out a new service innovation consistently, yet attuned to a local context, requires not only considerable ingenuity (especially due to its ‘human touch’ which is hard to standardise), but also the ability to create this new experience and solutions spread through the organization at various locations.

Our 6D-service innovation model answers the call for a more ‘granular’ view (see Howells, 2010) on the components of service innovation, gets rid of the troublesome demarcation between product and process innovations (as these are so hard to differentiate in services, see e.g. Toivonen, 2010, p. 211), and points out the importance of organizational dimensions of service innovation. Other comprehensive models such as the service management...
system (Normann, 2002) and the service model (Frei, 2008) are multi-dimensional as well, but in these models it is hard to differentiate between what is a dimension of the service innovation and an attribute of an innovative service organization. The comprehensive characteristics-based approach as developed in the Lille school (see Gallouj & Weinstein, 1997; Gallouj, 2002; de Vries, 2006 and Toivonen, 2010) presents a rather abstract vocabulary to describe innovations, but in our view most importantly describes various modes of innovation rather than the dimensions of individual (service) innovations. We therefore think the 6D model of service innovation adds to the service innovation debate. In our view the added value of the 6D model of service innovation is that it can be used as a tool for mapping and analysing discrete service innovations as well as for more proactively managing discrete service innovations.

On the basis of the above we formulate our first overall conclusion as follows:

Service innovation is about the creation of new (but reproducible) service experiences and new service solutions in a joint process with customers and is intrinsically multi-dimensional, inter-disciplinary, multi-party and multi-site and therefore tougher to create and manage than mostly anticipated. The 6D service innovation model developed in this thesis differentiates between new service concept, new customer interaction, new value system/business partners, new revenue model, and new organizational or technological service delivery systems. It can be used both as a tool for mapping and analysing discrete service innovations and for systematically creating new service experiences and solutions.

9.1.2 Main conclusion on service innovation management

A second core problem addressed in this thesis is that, due to a weakly developed organizational, firm-level perspective on service innovation in most of the service (innovation) management literature, we lack insight into effective organizational routines and thus prescription of how to manage service innovation at firm level in a more sustained fashion. We do not know well enough what organizational routines or higher-order firm-level capabilities are effective in order to successfully introduce and roll out new service experiences and service solutions on the market repeatedly. Other scholars are pointing out the need to better understand the drivers for successful innovation, including the organizational routines (see e.g. Droege et al., 2009; Howells, 2010; Miles, 2008 and Ostrom et al., 2010).

We addressed the issue concerning the lack of a firm-level managerial perspective on service innovation by infusing the service (innovation) management perspectives with those of the RBV/DCV of the firm (see sections 1.7, 6.1 and 6.3). In chapter 5 when discussing
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Service innovation at Randstad in detail, we already concluded that over the years this firm has developed organizational routines that have helped Randstad to introduce and roll out innovative service concepts in their markets repeatedly. In the case of Randstad, we identified nine elements that together result in a fine combination of a non-formalised strategic focus, semi-structured organization and embedded decision-making processes which resulted in sustained innovativeness. In chapter 6 we then introduced a more formalised set of six what we have labelled dynamic service innovation capabilities. These are: A) signalling user needs and technological options; B) conceptualising (or service design); C) bundling and unbundling; D) co-producing and orchestrating; E) scaling and stretching; F) learning and adapting. They were defined as hard to transfer and imitate higher-order service innovation capabilities – including the ability to adapt them in time where needed – firms possess to eventually develop and diffuse new service experiences and solutions repeatedly. We found support for these dynamic capabilities when linking these specifically in chapter 6 to the empirical results of the case and sectoral analyses as presented in chapters 2-5.

In line with Eisenhardt and Martin (2000, p. 1108), we further concluded that there are commonalities in the key features of these six dynamic service innovation capabilities (otherwise there would be no best practice to learn from in the first place), but idiosyncrasies in the details. This means that an innovative service-dominant firm can develop these dynamic service innovation capabilities over time, but will have to deliberately adapt and specify a particular mix of dynamic service innovation capabilities in which it wants to excel. This process needs to be informed by the chosen firm strategy. The firm then has to develop and detail these individual dynamic service innovation capabilities further in order to be competitive in a sustainable fashion. Therefore simply copying and implementing dynamic service innovation capabilities from other firms without adaptation and specification (and thus not developing a truly unique, firm-specific set of dynamic service innovation capabilities) is insufficient for becoming a sustained and successful service innovator.

We also learned that these dynamic service innovation capabilities are spread over the firm organization (and beyond, as indeed most service innovations are multi-party). We therefore conclude that not only discrete service innovation has a distributed character (i.e. is multi-dimensional, inter-disciplinary, multi-party and multi-site), but that dynamic service innovation capabilities and thus service innovation management are spread over the firm organization as well. To create, develop and roll out new service experiences

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166 Eisenhardt and Martin (2000, p. 1108) remark in this context that: “Yet, while dynamic capabilities are certainly idiosyncratic in their details, the equally striking observation is that specific dynamic capabilities also exhibit common features that are associated with effective processes across firms ... there are more and less effective ways to execute particular dynamic capabilities ... there is best practice”. Similarly Winter and Szulanski (2001) indicate that there is a lot of specificity in how dynamic capabilities are translated and implemented in a particular firm.
and solutions, dynamic service innovation capabilities are needed that reside in a varied set of professionals spread over the firm. This distributed model of service innovation management is in stark contrast to the archetypal central R&D management models that we know from technological R&D in manufacturing settings. The generic set of six dynamic service innovation capabilities provides a helpful tool for firm management (see also section 9.2) to reflect on the mix of dynamic service innovation capabilities needed to become a sustained service innovator.

We not only contribute to the service (innovation) literature by infusing it with the firm level perspectives, but directly add to the RBV/DCV of the firm as well. Generic RBV/DCV frameworks have neither been specified for a service context, nor do they start from the specificities of service innovation (Kindström et al., 2009). Other more focused contributions to the RBV/DCV literature look at particular resources or capabilities (Salomo et al., 2007; Bruni & Verona, 2009) but to our knowledge not at the business process of service innovation. We further add to the RBV/DCV of the firm by proposing a specific output or performance measurement, in line with the approach as adopted by Ray et al. (2004), and link these directly to the service innovation business process. Hereby, we link the six dynamic service innovation capabilities (derived mostly from the RBV/DCV tradition) to dimensions of service innovation as identified in the 6Dmodel of service innovation (derived mostly from the service innovation tradition). In doing so, we address one of the key challenges regarding the RBV/DCV of the firm as articulated by Priem and Butler (2001) i.e. provide insight into the “causal hows and whys” i.e. the missing causal relationship between firms (management) actions and competitive advantage.

Our overall conclusion on service innovation management reads as follows:

Service innovation is a process that can be steered and managed consciously and systematically. Service-dominant firms that want to develop into sustainable service innovators may draw on six dynamic service innovation capabilities notably: A) signalling user needs and technological options; B) conceptualising (or service design); C) bundling and unbundling; D) co-producing and orchestrating; E) scaling and stretching; F) learning and adapting. They should invest in distributed, firm-specific, idiosyncratic mixes of these dynamic service innovation capabilities and align them with firm strategy. The generic set of six dynamic service innovation capabilities is a tool

167 See section 1.7 and particularly sections 6.1 and 6.3 for more details of how the notion of dynamic service innovation capabilities and the framework for the strategic management of service innovation (both chapter 6) extend the literature and more in particular how some of comments on the RBV/DCV of the firm as articulated by Priem and Butler (2001) are addressed.

168 However, we also acknowledge that: (1) the business process of service innovation needs to be interpreted fairly broadly as managing service innovation is a distributed activity; and, (2) eventually service innovation should contribute to a better overall firm performance.
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for firm management to reflect on the firm-specific mix of distributed service innovation capabilities that reside in a varied set of professionals spread over the firm. The resulting distributed model of service innovation stands in stark contrast to the archetypal central R&D management models that we know from technological R&D in manufacturing settings.

The set of six dynamic service innovation capabilities developed in this thesis contribute to an overall integrated framework for the strategic management of service innovation. This framework is a combination of the 6D-model of service innovation (see section 9.1.1) and the set of six dynamic service innovation capabilities (this section). It may help those involved in managing service innovation in three important ways. First, as a tool for mapping and analysing discrete service innovations and for systematically creating new service experiences and solutions. Second, as a tool for firm management to reflect on the mix of dynamic service innovation capabilities needed to become a sustained service innovator. Third, the 6D model can be used as a basis for assessing the performance of the service innovation business process or service innovation management of a firm.

9.1.3 Main conclusion on service innovation policies

With regard to service innovation policies (and with e.g. the European Commission, 2009), we observed that in most countries and regions standing service innovation policies as well as discussions on the need for service innovation policies are biased towards the still predominant goods and technological paradigm. A related, key issue is that an innovation systems approach or systemic approach to the role of services in innovation systems and service innovation policies to facilitate these was largely absent until recently. Such approaches are in our view much needed to better understand how services and service innovators are embedded in and benefit from innovation systems on the one hand and contribute to their overall innovativeness and competitiveness on the other.

At policy level, we have addressed this myopic view on service innovation in various ways, mostly in chapter 7. Firstly, we extended and applied the well known three approaches to service innovation i.e. assimilation, demarcation and synthesis or systemic (see Boden & Miles, 2000; Coombs & Miles, 2000; and originally Gallouj, 1994) to service innovation policy as well. Secondly, we reviewed the possible rationale for service innovation policies differentiating between macroeconomic or contextual arguments, market failures and systemic failures. Thirdly, we reviewed systemic failures that might give rise to (systemic) service innovation policies as part of developing a rationale for service innovation policy. Finally, we conceptualised and illustrated more specifically in chapter 8 the various

169 Recent exceptions are analytical studies by for example Cruysen and Hollanders (2008), den Hertog et al. (2006), Rubalcaba (2006, 2007) and TEKES (2007).
roles KIBS play in supporting innovation at their clients and in the wider functioning of innovation systems.

We concluded that extending the three basic approaches to service innovation to service innovation policy helps considerably in discussing the latter, the more so as they can be used for systematically formulating service innovation policy options. When discussing a rationale for service innovation policies, we differentiated between categories of arguments i.e. market failure argumentation, systemic failure argumentation and more pragmatic macro-economic and contextual argumentation. We concluded that the more pragmatic macro-economic/contextual arguments are put aside too easily and that it is too easy to take for granted that market failure argumentation does not apply to service innovation. Additionally, we found that systemic failures are highly relevant when discussing the rationale for service innovation policies. We suggested that systemic rather than (solely) market failures should be the point of departure when defining a rationale for service innovation policies and in doing so counterbalance the myopic view referred to above. With regard to this systemic policy perspective, we identified two main challenges. First, facilitate the development of innovation systems that are well enough attuned to supporting service innovation. Second, use the innovation potential of innovative service providers much more pro-actively in order to increase the overall competitiveness and adaptation capability of innovation systems. We noticed a specific role here (though not exclusively) for a certain subcategory of service industries, notably KIBS that may play a role as knowledge intermediaries in innovation systems. We observed that from a systemic perspective, KIBS may also function as an alternative (private) knowledge infrastructure next to the formal (public) one.

However, as service innovation policies do not start from a blank sheet, we also signalled that it will be difficult to define systemic service innovation policies from the outset. Therefore, policy options based on the so-called assimilation and demarcation approach will have to be used as well (at least temporarily) as these are stepping stones towards a more integrated understanding of service innovation. Overall this resulted in a rich and varied menu with service innovation policy options (see figure 7.4). The development towards service innovation policies will therefore in our view be more gradual and evolutionary than revolutionary. In these policies there should be more room for what we have labelled ‘non-innovation policies’ as well. These we defined as policy actions in policy domains such as education policy, environmental policy, procurement policy and competition policy to name a few, that impact on (the room for) service innovation and can be actively used to spur service innovation, without necessarily investing in (costly) dedicated R&D and innovation schemes.

We have added to the systemic literature and hence discussion on the topic of service innovation and service innovation policy in a number of ways. Firstly, by suggesting to extend the original differentiation of Gallouj (1994) between assimilation, demarcation and systemic
perspective to service innovation policy. It fits into a chain of scholars using, extending and refining these three approaches (see Boden & Miles, 2000; Coombs & Miles, 2000; Drejer, 2002; Nahlinder, 2002; den Hertog et al., 2006; Rubalcaba, 2007). Furthermore, we were among the first to systematically discuss the rationale for service innovation policies (see van Ark et al., 2003; den Hertog et al., 2003; den Hertog et al., 2006). Earlier van Dijk (2002) analysed in a fine study whether various categories of market failure applied to (various categories of) service industries, but did not link this directly to policy options. Partly in parallel, Cruysen and Hollanders (2008) discussed the rationale for service innovation policies as well, including an analysis of systemic failure, although slightly differently (see chapter 7). We further contributed to the development of the systemic perspective on service innovation and service innovation policy (den Hertog, 2000; den Hertog et al., 2006) together with scholars such as Miles (1993, 1996), Rubalcaba (2006, 2007), Kuusisto (2007) and Cruysen and Hollanders (2008). More recently, especially the European Commission (2009) started to take notice and seem to have adopted a more systemic perspective to (furthering) service innovation. Finally, we pointed out the role of KIBS in innovation systems since the mid 90s (see Miles et al., 1995 and den Hertog, 2000), which has evolved by now into an important subfield within especially the service innovation tradition.

Our overall conclusion on service innovation policies is the following:

*Service innovation policy lacks an innovation systems perspective. When defining a rationale for service innovation policies, systemic failures in addition to (rather than solely) market failures should be the starting point. Current service innovation policies are too largely dominated by assimilation and demarcation perspectives. They lack vision as to how services can be better embedded in innovation systems, and how innovative services can contribute to the overall innovativeness and competitiveness of these innovation systems. Knowledge Intensive Business Services (KIBS) may play a key role as intermediaries in these more service-dominant innovation systems.*

In sections 9.2-9.4, we present future implications that can be derived from this thesis for various categories of actors, notably service innovation managers (section 9.2), service (innovation) scholars (section 9.3), and innovation policy makers (section 9.4). For the latter we differentiate between (pure) policy implications and ten suggestions for future policy research.

### 9.2 Managerial implications

The 6D-model of service innovation as developed in this thesis can be used as a tool for mapping discrete service innovations and for more proactively working on new discrete service innovations (see section 6.4). It offers a framework for systematically assessing
what dimensions are involved in providing a particular new service experience and how the various dimensions interact. However, successful service innovators are in our opinion those firms that have introduced innovative service experiences and service solutions repeatedly. In our view they master a mix of partly idiosyncratic dynamic service innovation capabilities that is relevant for their type of firm or industry and is aligned with their particular firm strategy. Although the whole idea of the six dynamic service innovation capabilities outlined in chapter 6 is that creating service innovations is a business process that can be steered and managed, we observed that they need to be parallel and do not necessarily follow a linear pattern. The latter is the case in the stylized generic innovation value chain concept as articulated by Hansen and Birkinshaw (2007) and many New Service Development models (see section 1.7). In practice, mainly due to their multi-dimensional and distributed character, new services can be initiated from various parts of the organization and do not necessarily follow a fixed, linear order. In our view it is realistic and probably more productive to develop the ‘distributed innovation capability’ at the organizational level, rather than pushing tools that are basically still following the goods and manufacturing based logic of linear innovation processes. Typically the six dynamic service innovation capabilities discussed in chapter 6 involve different disciplines and actors within an innovative service firm. The signalling user needs capability may reside in marketing, new business departments or innovation management if present (den Hertog et al., 2006). The signalling technological options capability is often part of a business development function or an ICT department. In practice, the conceptualisation dynamic capability is mostly in the hands of a multi-disciplinary project team responsible for bringing an initial idea for an innovative service to life (den Hertog et al., 2006). The scaling and stretching dynamic capability may involve a different set of people. Rolling out new service propositions and integrating them in regular business operations most likely involves operational management in back office activities such as ICT systems and logistics. Brand stretching is typically in the hands of business developers and marketing managers as well as top-management for final decision-making. Finally, the meta-capability of leaning and adapting is key for reflecting on experiments with new services and improving the overall service innovation process. Here, in our view, senior management has a special responsibility. Another way of making sure the knowledge on service innovation in a firm comes together and lessons learned are shared, is through installing a multi-disciplinary (service) innovation team that oversees the distributed efforts and constantly reflects

170 Toivonen (2010) introduced the model of rapid application and the practice-driven model of service innovation next to a modified version of the orthodox R&D model. Sundbo (2010) characterised the service innovation process as “labile, unpredictable and fluid” (p. 283), suggesting that it is not a clear cut linear process with clear stages. We do not deny that some service innovation processes could benefit from a more systemic or even a more linear approach, for example the tools being developed in the service engineering tradition. See for example the contributions in Part I on service engineering in Spath and Fähnrich (2007).
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upon the service innovation and how its management can be improved. This team has to have direct access to and preferably involves top management of the service firm. One of the most productive ways in which this dynamic service innovation capability can be expanded is through systematically training middle management in service innovation management.

Below we present a checklist with some ‘prescriptive questions based on the six dynamic service innovation capabilities (see table 9.1). This set is by no means an exhaustive listing. It is aimed at supporting those in charge of the service innovation process to assess how a firm is doing in each of the dynamic service innovation capabilities and where they want to improve in order to become a sustained service innovator.

9.3 Research implications

Stimulating service innovation and “capturing the ways in which companies are innovating services” is regarded as one of the top-10 research priorities for the Science of Services (see Ostrom et al., 2010, p. 12). Other programming efforts also highlight the need to not only address service innovation at organizational level, but to discover the underlying logic of dynamic service systems spanning the boundaries of various organisations (see for example IfM and IBM, 2008). In this thesis we touched upon many service innovation related topics at various levels of aggregation that require (closer) attention by service researchers in the years ahead. We mention a few of these here and then in the remainder of this section focus on possible research avenues that may open up when combining service (innovation) management and RBV/DCV of the firm (see chapter 6 in particular). Additionally, in section 9.4.2, after discussing policy implications, we identify some research themes on another core topic i.e. service innovation policy.

At the level of discrete service innovations there is still a lot of ground to be covered. We do need to understand and measure more precisely the organisational dimensions of service innovations in various sectoral (knowledge intensive and knowledge extensive services) and topical (for example innovative green services) domains. We also need to analyze more closely how the various dimensions of service innovation interact and shape innovative service business models and how these are linked to firm strategy. Another research challenge is to include service design professionals and their thinking in service (innovation) management so that their views and methods can be applied to better understand how to create new service experiences and solutions.

At intrafirm-level more insight is needed for example in how corporate entrepreneurship in service firms characterized by more distributed service innovation processes develop, the way mixed, multi-disciplinary (temporary) service innovation project teams function, and the role of senior management in supporting service innovation and creating a service
### Table 9.1: Some key prescriptive questions to assess firm level dynamic service innovation capabilities (DSIC)

<table>
<thead>
<tr>
<th>DSIC A: Signalling user needs &amp; technological options</th>
<th>DSIC B: Conceptualising</th>
<th>DSIC C: (Un-)bundling</th>
<th>DSIC D: Co-producing and orchestrating</th>
<th>DSIC E: Scaling and stretching</th>
<th>DSIC F: Learning and adapting</th>
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<tr>
<td>Is there a systematic approach/strategy in place to...</td>
<td>Is there a systematic approach/strategy in place to...</td>
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<td>... pick up signals that point at unmet service needs?</td>
<td>... translate initial ideas into distinctive concepts and new service configurations?</td>
<td>... think about new service experiences and solutions by (un-) bundling? (and for whom)</td>
<td>... engage in and manage the alliance of co-designers and co-producers needed for bringing about a new service?</td>
<td>... scale new service operations in a uniform way?</td>
<td>... learn from failed and successful service innovation efforts?</td>
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<tr>
<td>... identify problems for which (potential) clients possibly search for new solutions?</td>
<td>... design and prototype integrated service processes?</td>
<td>... decide whether to customize and enrich our service offer further?</td>
<td>... identify innovative service concepts internally &amp; diffuse these consistently?</td>
<td>... make clear to the firm and to the outside world who is responsible for service innovation management?</td>
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<tr>
<td>... assess what opportunities technology X offers for providing new solutions to our clients or for producing services in a new way?</td>
<td>... decide with whom we like to collaborate to experiment and test new service prototypes?</td>
<td>... decide whether to develop into a full service provider or supplier of specialized services?</td>
<td>... assess how we can be part of various coalitions for new services next to each other?</td>
<td>... assess what new services we can launch, building on our service brand?</td>
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<td>... operate in open service innovation systems?</td>
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innovation culture. Further, especially in larger service firms operating on a global scale, we need to understand much better how decisions on where to invest in service R&D and innovation are made and how innovative service concepts are codified and rolled out within the firm.

At firm level we are still measuring (service) innovation fairly crudely. For example we hardly measure (service) innovation intensity and as a result cannot differentiate between marginal and highly innovative service firms. We also do not link service innovation and the need for it to be related to a firm’s strategy. Service firms adopting a differentiation, fast follower or cost-based strategy will most likely need and invest in different types of service innovation. Further, although the topic of service infusion is on the rise, we still need to analyse more extensively how manufacturing firms switch from goods-dominant to service-dominant business models and the related service innovation strategies.

At interfirm level we especially need to invest in research on how service innovators cooperate when innovating with various actors such as customers and communities of users, other firms, intermediaries and the public knowledge infrastructure. So far, research in open innovation has mostly concentrated on high tech and manufacturing industries and hardly on service industries and firms. There is in our view a need to analyse if and if so how, forms, strategic considerations and capabilities for managing open service innovation differ from technology dominated industries.

At macro-level there are many issues which need to be looked at by service innovation researchers. As available statistics on most service industries are not on a par with those for manufacturing industries or are less well suited to measure their peculiarities (as is still the case in R&D and innovation statistics), we miss insights on many macro-indicators. Measuring productivity in services for example is notoriously difficult (also due to improvements in service quality) and international trade statistics or statistics on the role of service multinationals are less developed for service industries.

Below we discuss in more detail some research topics stemming from the combined service (innovation) management and RBV/DCV of the firm, which we feel are promising, but underutilized so far. We are not the first to flag this potential. Sundbo (1996), combining the RBV and service (innovation) management perspective, concluded that there are not that many prescriptive service innovation models available. Gallouj and Weinstein (1997) were among the first to link competencies of both service provider and its clients in their characteristics-based framework. Similarly, Möller et al. (2008) focus on the role clients’ experiences and capabilities play in client-provider value creation. Based on the integrated framework for the strategic management of service innovation as introduced in chapter 6, we already proposed to take the six dimensions of service innovation as a specific output measures for the service innovation business process. We see two additional sets of potential research issues.
A first set of research challenges has to do with understanding in more detail how the dynamic service innovation capabilities relate to each other as well as to the dimensions of service innovation. In chapter 6 we already articulated eight propositions (see also table 9.2). The hypothesized links need to be tested in explorative case study research as well as survey research.

A second set of research challenges is linked to the need to further contextualise our conceptual framework for the strategic management of service innovation (see section 6.6). Different types of firms will most likely master a particular mix of dynamic service innovation capabilities that is relevant for their type of firm, their type of industry, their size and aligned with the particular service strategy chosen. However, this again requires rigorous formal testing of the proposed conceptual framework in case studies as well as large scale surveys. Especially for the latter a more formalized research model is needed to essentially form a service innovation management concept. In figure 9.1 below such a simple research model is proposed. The three boxes in the centre against the light blue background are the core of the service innovation process. The actual creation of new services takes place through leveraging, creating and dismantling “regular” resources and zero-order capabilities. These processes are steered by varying sets of dynamic service innovation capabilities and result in new service experiences and solutions that can be characterised using the six dimensions of service innovations. For this core process we can already start formulating more detailed hypotheses. We can for example hypothesize that highly innovative service firms introduce new service concepts more frequently; show higher levels of customer interaction; co-innovate with new business partners more frequently; identify new revenue models more often; introduce (organizationally) new service delivery systems and are characterized by a more open, entrepreneurial culture allowing for bottom-up innovation; and/or introduce or renew their technological service delivery systems more often.

Similarly we can formulate hypotheses regarding the link between dynamic service innovation capabilities and service innovativeness. We can for example hypothesize that highly innovative service firms develop and use more of each (or combinations thereof) of these six dynamic service innovation capabilities as introduced in chapter 6. However, as argued in section 9.1 already, even successful service innovators will not excel in all dynamic capabilities. It may even be argued that overinvesting in dynamic service innovation capabilities can be counterproductive.172

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171 Firms of course differ in terms of their resource and zero-order capabilities i.e. they do not start from the same base when engaging in service innovation activities.

172 Put differently, a research issue that is still on the table is whether there is some sort of optimum in mastering dynamic service innovation capabilities.
Figure 9.1 Simplified research model for the service innovation management concept (without feedback loops).
As discussed earlier, service innovation does not take place in isolation. It is also dependent on market dynamism and entrepreneurial opportunity. As signalled by Wang et al. (2007) there is a need for a systemic examination of the influence of market dynamism on a firm’s dynamic capabilities. Dynamic service markets can be hypothesized to generate more entrepreneurial opportunity and thus require greater adaptation capability and service innovation capability. In turbulent markets with ample entrepreneurial opportunity it will possibly be new entrants with different sets of dynamic service innovation capabilities who are more successful whereas in markets with lower dynamism the more established firms with other sets of dynamic service innovation capabilities may be particularly successful. This needs empirical testing.

Another factor to take on board is firm strategy. Although firm strategy may inform and affect the actual process of service innovation, other business processes influence competitive advantage and firm performance. Firms that succeed in aligning the development of dynamic service innovation capabilities with firm strategy can for example be hypothesized to be more successful service innovators. Also the reverse seems plausible but needs to be assessed in practice. The set of dynamic service capabilities a firm possesses has serious implications for the strategic options that are open to this particular firm. Competing on differentiated service offers or on the basis of low cost will most likely result in different sets of service innovations and the dynamic capabilities required to realise these.

Further, although we think that service innovation and the capability to manage the process of service innovation are important for gaining competitive advantage and eventually the long term firm adaptation capability and overall performance, there are other ways of achieving these. Put differently: overall firm performance is affected by service innovation as well as other business processes and exogenous factors. In the simplified model given in figure 9.1 we have therefore deliberately visualised that service innovation is not the only way firms can create value for their clients and gain competitive advantage.

Finally, to avoid the model becoming too complicated, we have not included all feedback loops. However, it is evident that performance measures such as increased competitive advantage, increased market shares and overall firm performance not only affect experience levels of managing service innovation (translated into dynamic service innovation capabilities) but also entrepreneurial opportunities. For example a firm's success may attract potential new partners, new customers and affects firm strategy.

\[173\] The first challenge therefore is linking service innovation efforts and results to overall firm performance. This can be seen as a variation in the link between innovation in general and firm performance or productivity development (which is not self evident, see van Leeuwen and Klomp, 2006). Being a successful service innovator is no guarantee for an overall high firm performance, as there are many determinants of firm performance. We therefore proposed in chapter 6 to assess the management of service innovation as a specific business process in future service innovation research and to take the outcome of this individual business process as a measure of its effectiveness.
Also the resources available for investing in the process of service innovation (as well as other objectives) are dependent on overall firm performance.

In conclusion: the research model as sketched in figure 9.1 can in our view be used to refine the integrated framework for the strategic management of service innovation. Key research issues include analysing individual capabilities in relation to innovation performance and differentiating and refining the mix of capabilities required according to firm size, industry and type of market.

9.4 Policy and policy research implications

9.4.1 Policy implications

In chapter 7 we discussed a rationale for service innovation policies. We identified three categories of arguments for having service innovation policies in the first place. We additionally observed the bias in most existing innovation policies against service innovation and suggested policy options along the lines of the assimilation, demarcation and systemic approach to service innovation. The ten observations as given in box 9.1 and derived from a study we performed for the European Commission (DG Internal Market and Services) describe in a nutshell the challenges most policy-makers are still facing when asked to formulate a service innovation policy.

Apart from making an intelligent mix of the policy options already discussed (see chapter 7 and figure 7.4) the following seven, more general policy implications can be identified:

1. The need to create a more pro-service innovation culture at different levels: enterprises, innovation managers, researchers, workers, and policy-makers. The Commission and national governments are well positioned to launch public and policy debates on service innovation by establishing high-level groups, forums, workshops or other types of awareness activities. These interventions would aim amongst other things at making the science base more responsive to the R&D and innovation needs of services.

2. A continuous need to invest in service innovation debate, research and statistics. A major part of the awareness strategy could be linked to the promotion of research and statistics as a means of increasing knowledge, promoting debate, and providing better and more informed policy decision-making on services R&D and innovation. A recent

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For example the European Commission has invested in several of these such as Expert Group on Innovation in Services (2007) and more recently a High Level Expert Panel on Services Innovation in the EU, two staff working papers putting the need for service innovation policy on the agenda (EU, 2007 and 2009) and consortia aimed at service innovation design and learning i.e. the Innovation Policy Project in Services (IPPS, see Tekes, 2007) and its three year successor launched at the end of 2009 - European policies and instruments to support service innovation (EPISIS).
analysis of service innovation policies in four countries (see den Hertog & van der Aa, 2010) showed for example that it is no coincidence that two countries generally regarded as relatively advanced in terms of service innovation policies and service innovation research – Finland and Germany - have made parallel investments in both and in doing so, have created lively multi-disciplinary communities of service researchers. They have also invested in studies for measuring service innovation either in more detailed or alternative ways. In our view these issues could be taken up in the context of policy design, for example when evaluating (ex ante, ex post) innovation programmes.

3. Assessing the sectoral balance of R&D programmes and innovation policies. This may involve, for example, analysing in detail the participation of services, the need for more horizontal actions, or more thematic priorities in R&D and innovation programmes, in order to assess whether existing and new programmes would benefit services.

4. Identifying and promoting best practice – and hence supporting policy learning in services’ R&D and innovation policies. These benchmarking exercises can be aimed

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**Box 9.1 Ten policy challenges facing service innovation policy-makers (den Hertog et al., 2006)**

a. Services are extremely varied; this implies that they should not be treated as a homogeneous category of businesses.

b. There is typically relatively poor integration of (most) services into R&D and innovation systems. Most service firms are poorly linked to the science base and to innovation and R&D programmes. This partly results from (often implicit) manufacturing bias in existing R&D and innovation policies. The formulation of such policies typically fails to reflect the role of services in R&D and innovation systems.

c. There is room for boosting R&D in services in the context of the Lisbon/Europe 2020 strategy. Services do perform classic R&D and use classic R&D performed by others, but across the board, services are still poor performers of classical R&D.

d. Service R&D is still widely underestimated.

e. Formalisation of services R&D in vanguard firms and industries is on the rise.

f. Measurement problems are persistent and obscure the contribution of services to innovation, productivity and economic growth.

g. Apart from some business services, innovation active service firms are less likely to receive public innovation support than their manufacturing counterparts.

h. Furthering R&D and innovation in services requires a systemic perspective.

i. Adopting a systemic perspective also implies going beyond the market failure argumentation that is common to legitimate policy efforts.

j. A more pro-services R&D and innovation culture is essential.
at: 1) identifying areas where cooperation between service companies and academia, universities and other research centres have been successful and could be expanded, and: 2) identifying best examples of services-oriented policies made by EU Member States, regional administrations and local development agencies.

5. Promoting skills, business models and voluntary standards. This could involve the design and implementation of activities aimed at increasing the level of R&D awareness and management skills in services firms (and their trade and professional associations). There are still remarkably few courses (at all levels including executive education) where strategic service innovation management is taught. Another policy area could be in supporting service firms to upgrade their innovation management and encouraging the formalisation of services innovation processes.

6. Screening of relevant policies at various levels (EU, national and regional/local) to assess the contribution to service innovation. We witness a development where various Commission services or national departments and regional organisations are initiating programmes and policies. However, in our view more integrated and coordinated service innovation strategies need to be developed.

7. Government can further spur service innovation in two other capacities: In the first place through its procurement policies and use these – in as varied realms as health care, education, traffic management and environmental protection – to purchase innovative solutions. Secondly in its own role as service provider to citizens, firms and other organisations, government can invest in becoming an innovative service provider itself.

9.4.2 Policy research implication

Apart from the specific research implication of the conceptual framework for the strategic management of service innovation as developed in this thesis (see section 9.2), there are research implications with a clear policy component which can be derived from the analyses as presented in chapters 1-8. We mention ten of these research implications with clear policy relevance below.

175 In recent years for example the earlier mentioned IPPS (see Tekes, 2007) and EPISIS networks of service innovation policy-makers sponsored by DG Enterprise fulfill this need (see http://www.proinno-europe.eu/project/episis). Further in 2008 a CREST R&D in services working group also presented a useful policy comparison (CREST, 2008).

176 An exception is the Amsterdam-Berkeley Leadership Course on Managing Service Innovation that had its first edition in 2009 and is initiated by the Amsterdam Centre for Service Innovation (AMSI).

177 The recent Commission staff working document on service innovation policies is an example of such a document at EU-level (see European Commission, 2009).
1. Defining and measuring service R&D

There is still a considerable lag regarding coverage and detail in the way R&D and innovation in services is defined and measured (both classical and more widely defined R&D and innovation). Although it is first and foremost statistical agencies that need to work on this and redress the result of years of neglect – and this is evidently recognised by many such agencies that have been devoting more effort to this area - the community of service researchers could help by:

a) Providing more consistent definitions and typologies of service R&D and innovation, sticking to the well established classic definition of (technological) R&D and innovation. The reason for sticking (at least partly) to this well established classic definition is to enable firm-level, cross-sectoral, and cross-national comparisons. In that context it would make sense to explore the extent to which international differences in recorded services R&D reflect different sampling, categorisation and measurement approaches, rather than substantive variations in the activities of similar firms.

b) Developing an alternative track with (broader) definitions of service R&D that would include R&D and innovation categories which are more common to service firms (parallel with a). Service researchers should be prepared to critically challenge the assumption that “classic” R&D and innovation is the royal road to improved service performance in terms of quality and productivity. The danger of sticking to the dominant first track is that a bias is being established toward R&D and (technological) innovations that is detrimental to other aspects of services innovation.

c) Setting up experiments with alternative indicators which start, for instance, with the knowledge intensity and characteristics of firms in terms of occupations, innovation intensity or strategic intent regarding innovation, or measuring social science R&D, which is relatively more important in service innovation.

2. The role of firm size in service R&D and innovation

In order to understand services R&D and innovation better, on the one hand we need to look more closely at how large R&D performing service firms are dealt with especially in R&D and innovation statistics. As these firms are so important for the overall picture, it is critical to assess whether all their efforts are attributed to one or more industries. One can even imagine that the R&D and innovation efforts of a couple of mostly multi-trade service firms are attributed to various industries to make the innovation statistics more realistic. An analysis of how both the top-10 R&D performing service firms and the top-10 R&D performing manufacturing firms in individual member states – with R&D still defined
in the classical way – are treated in the statistics would be very informative. On the other hand we have to analyse the numerous smaller scale R&D and innovation intensive service firms that make up the tail of the highly skewed distribution of R&D efforts among service firms and analyse whether their hidden R&D component is significantly greater than in large service firms. This will be difficult as their R&D efforts are less well defined and hard to separate from regular business activities.

3. Forgotten service R&D and innovation categories

One of the major challenges in the coming years will be to analyse in detail how firms that most of us still perceive as product-based manufacturers have changed into service firms and assess how this impacts on the (fading) manufacturing-services dichotomy. Another forgotten service category which needs to be looked into more deeply is R&D services. Their coverage in current statistics is piecemeal, while their role in diffusing knowledge on R&D and innovation towards client firms is – typical for the ultimate KIBS – possibly far greater than anticipated. The development of R&D services also needs to be linked to the wider policy discussion as to how well current intermediaries and R&D institutions are positioned to help service firms become more innovative.

4. Linkages between service R&D, service quality, service productivity and economic performance

A key issue that statisticians and researchers are struggling with is service productivity and linked to this the way to assess (mostly improvements in) service quality. Although this issue has been on the research agenda for some decades now, some basic problems such as Purchasing Power Parities in services or dealing with quality improvements when assessing service productivity are still major problems. These types of problems need to be solved first before we can sensibly analyse how service R&D and innovation efforts, productivity development, and eventually overall firm performance are linked.

5. The international dimension of service R&D and innovation

Analysis is needed of the international dimension of service R&D and innovation, and what the appropriate policy responses to this might be. As increasingly complex manufacturing and service operations are outsourced and off shored, an analysis as to how the future international division of (R&D) labour in service R&D and innovation would look is highly relevant. What sorts of service R&D and innovation activities can be transferred quite easily and what sorts are hard to move around the globe? If R&D and innovation functions are increasingly internationally mobile, what sort of service R&D and innovation functions should Europe/the Netherlands preferably keep, and how? In this context there is a need to analyse in more detail how far services internationalisation (and off-shoring) support...
service R&D and innovation in specific locations and how these are linked to for example concentrations of international headquarters of major international service firms. In a Dutch context a serious research issue is for example to what extent the Greater Amsterdam Region can be developed and marketed as an international hot spot for service innovation that can also attract headquarters of major international service firms.

6. Market failures and their relevance to service R&D and innovation

In chapter 7 we discussed the topic of market failure in relation to service innovation policy. Although we tentatively concluded that market failures exist in services R&D, a detailed practical analysis of especially spill-overs in a number of different service industries would be needed to address this issue more fully. We need to address the controversy as to whether (or more probably, which) service innovations are more readily imitated or actually more challenging for followers. This argument has implications for, amongst other things, the rationale for public R&D support, and for IPR policy and strategy – which suggests yet another topic to research: relations between R&D and IPR issues in services.\textsuperscript{179}

7. Changing roles of services in different innovation systems and networks

Another challenge that the service innovation research community has to address, concerns the changing roles of services in different innovation systems and networks. This is not just a topic for conventional analysis, we would suggest undertaking active research where appropriate to integrate (a wider range of) services more closely into selected networks. For instance, the networks that are being established around emerging technologies (biotechnology, nanotechnology, new generations of ICT, converging technologies) can engage with the service firms that are likely to be their major users, or who will form major intermediaries between hardware suppliers and end-users. It is likely that developments in for example genomics, neurosciences, ambient intelligence and location technologies will have many applications in services (as well as triggering many new services).

8. Involving service firms in public R&D?

Another policy research issue is how to more directly involve services in public R&D. OECD for example observed that “public spending on basic R&D, in both public laboratories and universities, does not typically address the long-term knowledge requirements for

\textsuperscript{179} In this context OECD noticed that “services firms typically do not regard weak protection of intellectual property as a major barrier to innovation: they rely more on secrecy and lead time to protect their competitive advantage. Nevertheless, IPR could become more important as competition increases and market fragmentation declines” (OECD, 2005a, p. 23).
services, e.g. in improving the understanding of how technology should be deployed and used or of how people work in groups. Developing such long-term research needs would benefit from a greater involvement of services firms in the formulation and implementation of research.” (OECD, 2005a, p. 22). What options are available to involve service firms more directly in formulating national and indeed European research agendas? One might also raise even wider questions such as what “open innovation models” might look like in service innovation processes, and what examples are available where such models are actively promoted in services?

9. **Design of service innovation policies and schemes**

What do effective innovation and technology diffusion policies that can overcome barriers to innovation and technological change in the services sector look like? We know of various examples (see Tekes, 2007; CREST, 2008), but a more detailed analysis might help to achieve a better understanding of what are design criteria for such policy programmes and measures. Here we can also raise the issue of policy mixes and development of what have been labelled systemic instruments (Smits & Kuhlmann, 2004) to better address services innovation.

10. **The use of non-innovation policies for spurring service innovation**

Apart from designing services R&D and innovation policy mixes, a separate issue is how non-innovation policies, which are not designed to support R&D and innovation in the first place, can be used to the full in triggering service R&D and innovation. Policy areas that spring to mind as having a direct effect on the scope for R&D and innovation in services, apart from regulation, are policies in the areas of education and research, labour markets, regional development, competition and entrepreneurship.

In this thesis we have dealt in various ways with the lacking appreciation of the partly idiosyncratic character of service innovation and the missing insight in organizational routines for managing service innovation. We hope the analyses and insights offered here contribute to a better understanding as to how service innovation can be defined, measured and managed at both firm and policy level.