

Toward a Management Control System for Service Innovation Activities

**Doctoral thesis by
Tor Helge Aas**

Thesis submitted to the Department of Strategy and Management at the Norwegian
School of Economics and Business Administration in partial fulfilment of the
requirements for the degree of Philosophiae Doctor (PhD)

June, 2010

Preface

My interest for management control of innovation activities arised during the years I worked as a project manager for some capital-intensive innovation projects in the Norwegian defence sector. During these years I experienced the challenges related to managing and controlling innovation activities that have a predominance of intangible effects. From a practitioner's point of view I sensed that more research in this area would be helpful, and with this practical foundation I started the research work that has resulted in this doctoral thesis.

Many individuals and organisations have contributed to my work on the thesis and made it possible for me to contribute to the research community. Therefore, I want to express the following gratitude:

First of all, I would like to express my gratitude to my supervisor professor Per Egil Pedersen at the University of Agder for his professional supervision, professional skills, positive attitude to my work, and marvellous ability to put me on the right track. I also express my gratitude to my co-supervisor professor Herbjørn Nysveen at the Norwegian School of Economics and Business Administration for his constructive comments.

During my work with the thesis I have been engaged as a research fellow at the University of Agder and I have been a PhD student at the Norwegian School of Economics and Business Administration. I have also been affilitated with the TIPVIS project (Service Innovation Research Project in the Norwegian Graphic Arts Industry), funded by the NFR (Research Council of Norway), and led by the NHO (Confederation of Norwegian Enterprises). I gratefully acknowledge these organizations for their support. I also express my gratitude to all the firms that have participated in different case studies during the research work.

Lastly, my sincerest thanks to my wife Helene and to our children Haakon and Henrik for their patience and support during these years.

Tor Helge Aas
Høvåg, June 2010

Abstract

The doctoral project reported in this thesis was carried out as an integral part of the larger TIPVIS project (Service Innovation Research Project in the Norwegian Graphic Arts Industry). This project aimed to improve the participating firms' ability to carry out service innovation activities. Several managers participating in TIPVIS emphasized the importance of ex-ante value assessment, and were concerned about the paucity of guidance offered by the extant research literature on the design of value assessment tools. The aim of this thesis was therefore to propose a design of a value assessment tool for service innovation ideas.

Knowledge of relevant existing best practices and of the potential effects of service innovation are necessary when constructing a value assessment tool. However, these topics have not been discussed much in the service innovation literature. Four studies were undertaken to help fill these literature gaps. An exploratory study provided insights about best practices. A literature review produced an overview of the potential effects of service innovation. A conceptual study explored the relationship between service innovation and sustained competitive advantage, and an explanatory study detailed the relationship between service innovation and financial performance.

By combining the findings of the four studies with general insights from the research stream on innovation investment appraisal, this thesis develops a value assessment tool for service innovation ideas, called the QSI (tool for pre-Qualification of Service Innovation projects). The proposed QSI design is composed of three modules that combine business strategy methods, scenario analysis, capital investment-appraisal techniques, scoring models, and foresight methods. The tool was tested with real service innovation ideas in three firms using an interventionist research approach, and the QSI implementation was found to provide considerable assistance to the managers.

The findings of this study thus have evident implications for ex-ante management control of service innovation activities. This thesis further suggests that the findings may also have implications for the design of developmental, ex-post, and strategic management control systems for service innovation activities. The thesis contributes theoretically to the research streams on innovation effects and on management control of innovation activities. These contributions establish a foundation for further research in these areas.

Table of contents

Preface	3
Abstract	5
Table of contents	7
List of appended papers.....	9
<i>Part I – Thesis Summary</i>	11
1 Introduction	13
2 Research scope	15
2.1 Research aim	15
2.2 Research questions	18
2.3 Theoretical perspectives	22
3 Research approach and methodology.....	27
4 Findings	29
4.1 RQ1 – Management control best practices for service innovation activities	30
4.2 RQ2 – The effects of service innovation.....	31
4.3 RQ3 – The impact of service innovation on financial performance	34
4.4 RQ4 – Service innovation and sustained competitive advantage	35
4.5 RQ5 – Requirements for a value assessment tool	36
4.6 RQ6 – The compliance of existing tools.....	38
4.7 RQ7 – Proposed design for a value assessment tool.....	39
4.8 RQ8 – Managerial effects of implementation	40
5 Discussion	41
5.1 Theoretical contributions.....	41
5.2 Methodological contributions	42
5.3 Managerial contributions (interactive vs. diagnostic performance measurement systems).....	42
5.4 Limitations and suggestions for further research	45
5.4.1 Service innovation effects	45
5.4.2 Management control of service innovation activities	46
6 Concluding remarks	47
7 References	48
<i>Part II – Papers</i>	59
Paper I	61
Paper II	87
Paper III.....	129
Paper IV.....	163
Paper V	203
Paper VI.....	227

List of appended papers

- Paper I Aas, T.H. (2010), “Management Control of Service Innovation Activities: An Exploratory Investigation of Best Practice”, in Eiglier, P., Fitzsimmons, J., Lemon, K. and Pugh, D. (Eds.), *Proceedings of the 11th International Research Seminar in Service Management*, La Londe, France, May 25-28, pp. 1-25.
- Paper II Aas, T.H. and Pedersen, P.E. (2009), “The Firm-level Effects of Service Innovation: A Literature Review”, Accepted for publication in *International Journal of Innovation Management*.
- Paper III Aas, T.H. and Pedersen, P.E. (2010), “The Impact of Service Innovation on Firm Level Financial Performance”, Accepted for publication in *Service Industries Journal*.
- Paper IV Aas, T.H. (2008), “Service Innovation and Sustained Competitive Advantage: A Resource-based Analysis”, in Timmermans, H.J.P (Ed.), *Proceedings of the 15th Recent Advances in Retailing and Services Science Conference*, ISBN: 978-90-6814-172-6, Zagreb, Croatia, July 14-17, (the paper won “Highly Commended Paper Award”).
- Paper V Aas, T.H. (2009), “Service Innovation Management: Designing an Ex-ante Value Assessment Tool”, in Huizingh, K.R.E., Conn, S., Torkkeli, M. and Bitran, I. (Eds.), *Proceedings of the 2nd ISPIM Innovation Symposium*, ISBN: 978-952-214-864-3, New York City, the USA, December 6-9.
- Paper VI Aas, T.H. (2010), “Implementing a Value Assessment Tool for Service Innovation Ideas”, in Huizingh, K.R.E., Conn, S., Torkkeli, M. and Bitran, I. (Eds.), *Proceedings of the 21st ISPIM Innovation Conference*, ISBN: 978-952-214-926-8, Bilbao, Spain, June 6-9, (the paper won “The Conference Best Student Paper Award”).

Part I – Thesis Summary

1 Introduction

Research suggests that, “*innovation is a powerful explanatory factor behind differences in performance between firms,*” and that, “*firms that succeed in innovation prosper, at the expense of their less able competitors,*” (Fagerberg, 2005, p. 20). Given these desirable consequences, many successful business leaders invest, often substantially (e.g., Lazonick, 2005), in a variety of innovation activities. The management control (e.g., Merchant and van der Stede, 2007; Simons, 2000) literature has stressed the importance of the management and control of strategically significant activities, such as innovation activities, to avoid financial losses and organizational failure. However, the nature of innovation complicates the management and control of its activities. Many innovation scholars (e.g., Al-Dabal, 1998; Hargadon and Sutton, 2000; Peters, 1988; Zider, 1998) have emphasized that innovation success comes from ‘failure’: “*Innovation involves encouraging the generation of ideas and putting promising concepts to the test. One does not expect new concepts necessarily to work – indeed, if one is trying really new and unknown and hence, risky approaches, most should not work*” (Perrin, 2002, p.14). Thus, innovation is inherently risky and unpredictable; the usefulness, beneficiaries, and timing of the effects of a given activity cannot be predetermined (Perrin, 2002).

The uncertainties associated with innovation have led some authors (e.g., Amabile, 1998; Tushman, 1997) to argue that the implementation of management control systems often inhibits managers from achieving successful innovation results. However, this view has been rejected in several studies of product innovation activities (e.g., Barczak, Griffin and Kahn, 2009; Bart, 1991) and the current prevailing understanding posits that the implementation of reasonable management control systems, designed in accordance with the nature of product innovation, is an important factor in achieving successful innovation results (Akroyd, Narayan and Sridharan, 2009). Moreover, the findings of product innovation studies (e.g., Barzacak, Griffin and Kahn, 2009; Cooper and Edgett, 2008; Cooper, Edgett and Kleinschmidt, 1999, 2002a, 2002b, 2004a, 2004b, 2004c; Griffin, 1997) and insights from handbooks provided by product innovation management associations (e.g., Belliveau, Griffin and Somermeyer, 2002, 2004; Kahn, 2005) offer normative management control guidance to product innovation managers.

Innovation at the firm level can take forms other than product innovation, such as process and service innovation (e.g., Tidd, 2001). Although these three innovation types share several

similarities (e.g., Coombs and Miles, 2000; Drejer, 2004), the service innovation process has been found to be more complex than other innovation processes because, “*new services often go together with new patterns of distribution, client interaction, quality control and assurance, etc.*” (de Jong et al., 2003, p. 17). Research has also suggested that the results of service innovation differ in nature from those of product innovation. Tether (2003), for example, argued that the firm-level effects of service innovation were more qualitative than those of other innovation types, and de Jong et al. (2003) suggested that the impacts of service innovations are harder to trace than those of process and product innovations. Furthermore, Djellal and Gallouj (2001) found that it was more difficult to test the outcomes of service innovations than those of product innovations. Management control of service innovation activities may thus be particularly challenging.

Despite the differences between service and product innovation, previous studies of management control have focused primarily on product innovation activities (e.g., Barzecak, Griffin and Kahn, 2009; Cooper, Edgett and Kleinschmidt, 1999). With some exceptions (e.g., Nysveen, Pedersen and Aas, 2007), little research has touched upon the extent and manner in which the normative management control theory for product innovation activities may be applicable to the management of service innovation, and has provided recommendations for the design of management control systems for service innovation activities. Given the potential benefits of service innovation for service and manufacturing firms (e.g., Grönroos, 2007; Miles, 2005; Page and Schirr, 2008), this literature gap is concerning. This thesis therefore focused on the management control of service innovation activities.

The topic of the thesis is the management control of service innovation activities

In the next section of this thesis summary, we present a theoretical review to define the research aim, scope, and questions. The research approach and the methodology used to answer these research questions are then detailed. Our principal results are highlighted in the subsequent section. Thereafter, we discuss the theoretical, methodological, and managerial contributions of the thesis, acknowledge the research limitations, and provide suggestions for further research. The final section of the thesis summary contains our concluding remarks.

2 Research scope

2.1 Research aim

Management control may be defined as, “*the process by which managers assure that resources are obtained and used effectively and efficiently,*” (Anthony, 1965, p. 17). Control mechanisms and collections thereof are often referred to as management controls or management control systems (Merchant and Van der Stede, 2007). Merchant and Van der Stede (2007) divided these controls into three categories: 1) result controls¹ focusing on the results produced; 2) personnel and cultural controls focusing on the types of people employed and their shared norms and values; and 3) action controls focusing on the actions taken. These management control types are associated with various advantages and disadvantages, depending on the circumstances. For example, while result controls can be effective when required behaviors are unidentified and are, “*particularly desirable when creativity is required,*” (Merchant and Van der Stede, 2007, p. 223), they are not effective when the desired results are unknown (Merchant and Van der Stede, 2007). Personnel and cultural controls are adaptable and provide effective management control, but the degree of their effectiveness, “*can vary significantly across individuals, groups and societies,*” (Merchant and Van der Stede, 2007, p. 92) and, “*many examples are available to show the dangers of relying excessively on personnel and cultural controls,*” (Merchant and Van der Stede, 2007, p. 221). Action controls are the most direct form of control, but they, “*often discourage creativity, innovation, and adaption,*” (Merchant and Van der Stede, 2007, p. 223). We argue that result controls, and to a lesser degree personnel and cultural controls, may be relevant elements in a management control system for innovation activities, whereas action controls may be irrelevant.

Moreover, we suggest that the result controls for innovation activities may be further divided into sub-categories based on innovation process stages and business unit levels. De Jong et al. (2003) suggested that the innovation process may be divided into, “*a search stage in which ideas are gathered and screened, and a development stage in which promising ideas are transformed into new services,*” (p. 12). We suggest that result controls may be introduced in both stages; those introduced in the search stage may be called ex-ante management controls, and those introduced in the development stage may be called development management controls. De Jong et al. (2003) also suggested that innovation may have effects on both a project level and a more strategic business-unit level. We suggest that result controls may be

¹Result controls are often called performance measurement systems (e.g., Simons, 2000).

introduced at both levels; those introduced at the project level may be called ex-post management controls, and those introduced at the business-unit level may be called strategic controls.

To summarize, we suggest that innovation management controls may be divided into the following categories (Figure 1): 1) strategic management controls, referring to the result controls introduced to assess the performance of the business’s total innovation effort; 2) personnel and cultural management controls, which focus on the types of people employed and their shared norms and values; 3) ex-ante management controls, referring to the result controls implemented during the search stage; 4) development management controls, referring to the result controls implemented for innovation projects under development; and 5) ex-post management controls, referring to the result controls introduced to assess the performance of completed innovation projects.

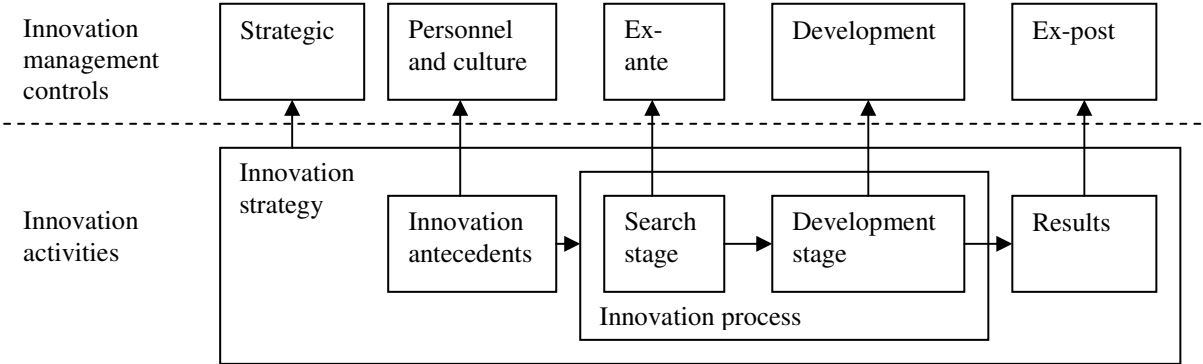


Figure 1: Types of innovation management controls

The product innovation literature has examined all five types of management controls, and has recommended that firms implement multiple performance measures to assess the outcomes of isolated product innovation projects and the total product innovation effort against the objectives of these activities (Cooper, Edgett and Kleinschmidt, 2004b). Scholars have also suggested that firms implement a variety of personnel and cultural controls to manage and control product innovation activities (e.g., Barzecak, Griffin and Kahn, 2009), and use multiple methods, preferably a combination of strategic approaches, scoring approaches, and financial methods, for the ex-ante management and control of product innovation projects (e.g., Cooper, Edgett and Kleinschmidt, 1999). Finally, product innovation studies have recommended that firms implement go/kill gates in new product

development processes, whereby all projects are scrutinized against a set of absolute standards (e.g., Cooper, Edgett and Kleinschmidt, 2002b).

The extant literature contains some discussion of the relevance of these recommendations to service innovation activities (e.g. Nysveen, Pedersen and Aas, 2007), and this thesis aims to expand this discussion. Because the development of design recommendations for all five types of innovation management control systems for service innovation activities is beyond the scope of one thesis, we focused on ex-ante management controls implemented in the search stage. De Jong et al. (2003) stated, *“In the search stage the activities of idea generation, screening and evaluation are likely to overlap in time. It is a more or less continuous process of gathering ideas and assessing their suitability and economic potential.”* (p. 34). Thus, the major management control task in the search stage is arguably the value assessment of innovation ideas. For several reasons, ex-ante value assessment is a fundamental management control activity for innovation processes. For example, ex-ante value assessment is needed to select and prioritize new ideas during portfolio management (e.g., Cooper, Edgett and Kleinschmidt, 2001a), and required to define targets for new projects and to control their development and implementation (e.g., Irani and Love, 2002). The implementation of ex-ante management controls in the form of suitable value assessment tools may thus be considered a prerequisite for the successful implementation of other innovation management controls.

The doctoral project reported in this thesis was carried out as an integral part of the larger TIPVIS project (Service Innovation Research Project in the Norwegian Graphic Arts Industry) led by the the NHO (Confederation of Norwegian Enterprises). Researchers from three institutions and managers from 13 firms participated in this project, which aimed to improve the participating firms' ability to carry out service innovation activities. Before the initiation of the TIPVIS project, none of the participating firms had implemented any specific tools for the value assessment of service innovation ideas. However, several participating managers emphasized the importance of ex-ante value assessment, and were concerned about the paucity of guidance offered by the extant research literature on the design of value assessment tools. This concern may be exemplified by the following statement made by one CEO: *“I often have a feeling that we are not able to realize all the potentials of a project, but since we have not evaluated this beforehand it is very difficult for me to pinpoint exactly what we are missing. Thus, we need to identify the potentials, and derive the project targets*

beforehand and thereafter manage the projects according to these potentials. It is important that an evaluation tool is able to assist me in this task.” To help fill the literature gap related to the ex-ante management control of service innovation ideas, and to provide assistance to the managers participating in TIPVIS, this doctoral project aimed to propose a design of a value assessment tool for service innovation ideas.

The aim of the thesis was to propose a design of a value assessment tool for service innovation ideas

2.2 Research questions

Cooper, Edgett and Kleinschmidt (2001) proposed a procedure for the design and implementation of management control systems for innovation activities. Requirements are defined in stage 1, the system is designed in stage 2, then provisionally implemented in stage 3, and implemented throughout the entire business in stage 4. We deployed stages 1, 2, and 3 of this method as a framework for the definition of our research questions and to obtain the overall aim of this thesis. In addition, since this doctoral project was part of the TIPVIS project, we strove to develop research directions that could provide immediate, early-stage assistance to the managers of the participating firms.

System requirements are developed in stage 1 of Cooper, Edgett and Kleinschmidt's (2001) procedure. General requirements for ex-ante value assessment tools for innovation activities may be derived by combining insights from the normative management control (e.g., Merchant and Van der Stede, 2007; Malina and Selto, 2004), normative financial management (e.g., Haka, 2007), foresight (e.g., Conway, 2008), and normative innovation management literatures (e.g., Tidd and Bessant, 2009; Perrin, 2002). These literature streams, however, do not take the specific characteristics of service innovation into account. We found two topics to be particularly relevant for the construction of requirements specific to tools for service innovation: 1) the management control best practices for service innovation activities; and 2) the potential effects of service innovation.

Most studies that have investigated management control best practices related for innovation activities have focused on product innovation (e.g., Barzecak, Griffin and Kahn, 2009; Cooper, Edgett and Kleinschmidt, 1999) rather than on service innovation. Given the differences between these innovation types (e.g., Droege, Hildebrand and Forcada, 2009),

they do not necessarily share best practices for management control systems. Further investigation of management control best practices for service innovation activities is necessary to fill this literature gap and to enable the derivation of requirements for an ex-ante value assessment tool. The development of more knowledge about best practices could also provide immediate guidance to the managers participating in TIPVIS, and was therefore a natural point of departure for this doctoral project. Our first research question (RQ1) was thus: *What are the characteristics of the management control best practice for service innovation activities, and may this practice be recommended to other firms?*

The design of an appropriate ex-ante value assessment tool also requires knowledge of the potential effects of service innovation, but little research has focused on these effects. De Jong et al. (2003), for example, found that “... *the amount of literature which focuses on the effects of innovation in service firms is surprisingly low ...*” (p. 51). Similarly, Nysveen and Pedersen (2007) found no focused descriptive research articles that aimed to identify or categorize the effects of service innovation. A theory of firm-level service innovation effects is thus lacking, and further research is necessary. Although such research could provide only limited immediate guidance for the managers participating in TIPVIS, knowledge about service innovation effects is a prerequisite for the derivation of requirements for an ex-ante value assessment tool. We therefore gave this topic high priority in the early stages of the research process.

A theory of firm-level service innovation effects may begin with an overview that identifies potential effects. Our second research question (RQ2) was thus: *What are the potential firm-level effects of service innovation, and how may these effects be categorized?* The innovation management literature (e.g., Tidd, 2001; Tidd, Bessant and Pavitt, 2001) has defined two general types of innovation effects: 1) financial benefits and 2) strategic success. The degree to which these effects are relevant for service innovation, however, remains unclear. We therefore developed two subsequent research questions. Our third research question (RQ3) was: *Do firms that focus on service innovation activities perform better financially than firms that do not focus on such activities?* Our fourth research question (RQ4) was: *Can service innovation lead to sustained competitive advantage?*

The requirements that an ex-ante value assessment tool for service innovation activities should fulfill have not been defined. We sought to develop a theoretical foundation for the

definition of these requirements by combining the answers to RQ1 through RQ4 with insights from the management control, financial management, foresight, and innovation management literatures. To complete the first stage of Cooper, Edgett and Kleinschmidt's (2001) design method, we therefore developed a fifth research question (RQ5): *What requirements should an ex-ante value assessment tool for service innovation projects fulfill?*

The ex-ante value assessment tool is designed in stage 2 (Cooper, Edgett and Kleinschmidt, 2001). While no tools have been specifically designed for service innovation, several have been suggested for product innovation (e.g., Cooper, Edgett and Kleinschmidt, 1997, 1999). To avoid de novo development of a design, we evaluated the degree to which available ex-ante value assessment tools for product innovation complied with the requirements developed in response to RQ5. Such an evaluation could contribute to the literature and could potentially have immediate managerial implications. We therefore developed a sixth research question (RQ6): *To what degree do existing ex-ante value assessment tools comply with the requirements of such a tool for service innovation?*

After obtaining answers to RQ5 and RQ6, the final step in stage 2 is to suggest how an ex-ante value assessment tool could be constructed. The construction of this tool would help to fill the literature gap on the value assessment of service innovation ideas and could provide an immediate managerial contribution. Thus, research question seven (RQ7) was: *How may an ex-ante value assessment tool satisfying the requirements of such a tool for service innovation be constructed?* The ex-ante value assessment tool proposed in response to RQ7 is hereafter referred to as the QSI (tool for pre-Qualification of Service Innovation projects).

In stage 3 of Cooper, Edgett and Kleinschmidt's (2001) design procedure, the system is implemented on a trial basis. In this stage we explored the degree to which the implementation of the QSI improved managerial decision-making on service innovation projects and investments. The eighth research question (RQ8) was therefore: *How does the implementation of the QSI affect managers' ability to: 1) assess the value of service innovation ideas; 2) manage service innovation projects; 3) manage the portfolio of service innovation projects; and 4) manage innovation activities in general?*

To summarize, this thesis aimed to propose a design for a value assessment tool for service innovation ideas. Eight research questions based on Cooper, Edgett and Kleinschmidt's

(2001) design procedure were defined to achieve this goal. The answer to each question will provide an independent contribution to service innovation knowledge, as well as comprise an essential step toward the goal of the doctoral project. The research questions are characterized by a dependent relationship: the ability to answer RQ5 depended on first developing answers to RQ1 through RQ4, and the answers to RQ6, RQ7, and RQ8 depended on first answering RQ5, RQ6, and RQ7, respectively. The research questions, their relationships within the design procedure, and their desired contributions are summarized in Figure 2.



Figure 2: Schematic diagram of the research procedure

2.3 Theoretical perspectives

Traditionally researchers have studied innovation from different perspectives: Some researchers have treated the innovation process as a “black box” and studied the role of innovation in economic and social change, and other researchers have studied what happens within this “black box” (Fagerberg, 2005). Since a profound understanding of service innovation and management control activities within an organizational setting is needed to understand how management control and service innovation affect organizational performance, service innovation is studied from the second perspective in this thesis. Thus, this thesis may, on the whole, be categorized within the broad and interdisciplinary field of organization studies.

The field of organization studies is, according to Pfeffer (1997), developed to understand the effects *of* organizations on individuals and environments, and the effects of individuals and actions *on* organizations and organizational performance. In this thesis the effects of two specific actions (investment in service innovation and implementation and use of service innovation management control systems) *on* organizational performance are discussed, whereas the effects *of* organizations on individuals and environments are given less attention.

Organizations may be studied based on different perspectives on why organizations exist (Scott, 2002) or on how actions in organizations are explained (Pfeffer, 1997). In this thesis, and arguably in most organizational oriented innovation literature, organizations are primarily understood as rational and open systems. This means that it is assumed that organizations are instruments designed to attain specific goals (Scott, 2002), that actions are assumed to be rational (Pfeffer, 1997), and that organizations are influenced by their environments (Scott, 2002). Thus, it is assumed that the decisions both to invest in service innovations and to implement and use management control systems, have a rational nature, and it is acknowledged that such decisions and their results may be influenced by the environment. As a consequence of this perspective on organizations some topics that would have been interesting from other perspectives are not discussed in this thesis. This includes, for example, how informal social structures within organizations affect service innovation and management control decisions and their results. This topic would have been interesting from a natural system perspective on organizations (Scott, 2002).

As evident in the introduction of this thesis and in the discussions in Section 2.1 and 2.2, theory from at least three research traditions within organization studies, i.e. the management control literature, the innovation management literature and the service management literature, formed the theoretical basis for the research.

As discussed in Section 2.1 (see Section 2.1 for details) management control may be defined as *“the process by which managers assure that resources are obtained and used effectively and efficiently...”* (Anthony, 1965, p17), and management controls may be divided into result controls, personnel and cultural controls, and action controls (Merchant and Van der Stede, 2007). Traditionally management control has often been described as a cybernetic process where managers monitor the organizational outcomes and correct deviations from preset standards of performance (Simons, 2000). Recent management control literature (e.g. Simons, 2000; Merchant and Van der Stede, 2007), however, highlight that planning systems are another important element of management control systems since *“planning systems essentially produce written plans that clarify where the organization wishes to go (goals), how it intends to get there (strategies), and what results should be expected (performance targets)”* (Merchant and Van der Stede, 2007, p. 329). Planning processes, often called feedforward control (Merchant and Van der Stede, 2007) or interactive control (Simons, 2000), make management control systems proactive, not just reactive (Merchant and Van der Stede, 2007).

Innovation may be defined as the *“process of turning opportunity into new ideas and of putting these into widely used practice”* (Tidd and Bessant, 2009, p. 16), and as discussed in Section 2.1 de Jong et al. (2003) have suggested that the innovation process in general has two stages; a search stage and an development/implementation stage. The innovation management literature (e.g., Tidd and Bessant, 2009) discusses how the innovation process may be managed, and aims to answer questions like for example how firms can find opportunities, how firms can select ideas, how firms can manage innovation projects, and how firms can make sure that they capture value from their efforts at innovation (Tidd and Bessant, 2009). Out of the extensive research on innovation management, *“three schools of thought have developed that aim to help practitioners with advice on the areas on which they need to focus to achieve the best results from their innovation efforts”* (Brophey and Brown, 2010, p. 2). The three schools may, according to Brophey and Brown (2010), broadly be described as: 1) “manage knowledge in order to innovate” (e.g. Daneels, 2002; Nonaka and

Takeuchi, 1996), 2) "develop a culture of innovation" (e.g. Amabile, 1988; Drucker, 2002), and 3) "develop your innovation processes into routines" (e.g. Griffin and Page, 1996; Tidd and Bessant, 2009).

Services may be defined in several ways. Kotler (1994) for example suggests that a service is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything. The majority of service management researchers (e.g. Kotler, 1994; John and Storey, 1998; Vermeulen, 2001) have suggested that services differ in some respects from physical products, using the four differences suggested by Zeithaml, Parasuraman and Berry (1985): intangibility, heterogeneity, simultaneity, and perishability. Information intensity (Porter and Millar, 1985; Miles, 2005) has often been included as an additional important service characteristic. The service management literature often uses these specific characteristics of services as a starting point to provide advice on how firms should manage service operations and service marketing (e.g. Fitzsimmons and Fitzsimmons, 2000).

To be able to answer the RQs raised in this thesis, four interdisciplinary empirical research streams that go across these research traditions are of particular relevance: 1) The research stream describing the *characteristics of service innovation*, 2) the research stream discussing *firm-level innovation effects*, 3) the research stream discussing *innovation management control best practice*, and 4) the research stream discussing *innovation investment appraisal*.

Several authors that have contributed to the research stream describing the *characteristics of service innovation* have suggested that the differences between services and products lead to differences between service innovation and product innovation: "*These differences pertain mainly to the specific characteristics of services, i.e. their intangibility, co-production with customers, simultaneity, heterogeneity and perishability (Fitzsimmons and Fitzsimmons, 2000) that affect the development process of services and make them to a certain degree unique.*" (Nijssen et al., 2006, p. 242). As discussed in the introduction of this thesis empirical evidence has supported this distinction (e.g. Djellal and Gallouj, 2001; Hipp and Grupp, 2005; Tether, 2003). Further research is however necessary to investigate the ways in which the characteristic features of service innovation affect the management and control of service innovation activities.

The outcome of the research stream discussing *firm-level innovation effects* constitutes a heterogeneous body of knowledge. For example, Tidd (2001) has suggested two broad classes of innovation effects: 1) accounting and financial performance effects; and 2) market performance effects. Tidd, Bessant and Pavitt (2001) suggested that innovation may result in financial benefits and strategic success. Griffin and Page (1996) have further proposed that effects on customer, financial, and technical performance success be distinguished. The effects of innovation have also been discussed in other research traditions, for example in the economics literature and in the organizational change literature. However, the economics literature (e.g. Verspagen, 2005) has primarily considered the effects of innovation on society, whereas the organizational change literature (e.g. Armenakis and Bedeian, 1999) has primarily discussed effects at the individual level in organizations. Thus, based on the extant literature it is difficult to construct an overview of the potential firm-level effects of innovation.

The research stream discussing *innovation management control best practice* (e.g. Barzeczak, Griffin and Kahn, 2009; Cooper, Edgett and Kleinschmidt, 1999; Cooper and Edgett, 2008; Griffin, 1997) has, as discussed in Section 2.1., focused mainly on product innovation activities, and has found major differences between the practices of top-performing firms and those of other firms. Given the differences between service and product innovation, however, the management control systems of top performers for these innovation types may differ. Further research on service innovation in this stream is thus necessary.

Most authors discussing *innovation investment appraisal* (e.g. Chan, 2005; Tidd, Bessant and Pavitt, 2001) highlight the importance of evaluating the performance of innovation activities both *ex-ante* and *ex-post*. Scholars (e.g. Sangster, 1993) have suggested several capital budgeting or investment-appraisal techniques for the analysis of expected incremental cash flows for innovation projects. These techniques account for a variety of factors, including time horizons, project and market risks, time value of money, weighted average cost of capital, option values, value chain analysis, game theories, and simulations (Haka, 2007). Commonly used techniques are the payback period, present value, internal rate of return, and real options (Haka, 2007). Some authors (e.g. Merchant and Van der Stede, 2007), however, have warned that such techniques might cause managers to ignore intangible assets with predominantly future payoffs. Several solutions to this investment myopia problem have been proposed. For example, Merchant and Van der Stede (2007) suggested that financial measures

be complemented by non-financial value drivers of performance. However, the outcome of this research stream does not provide any consistent managerial guidance on which measures firms should consider.

Insights from the four research streams were used as a theoretical foundation to answer the RQs. To answer RQ1, innovation management control best practice findings formed a baseline to which service innovation management control best practices could be compared, and service innovation characteristics guided the discussion of whether the identified practices should be recommended to other firms. The answer to RQ1 was expected to help fill the service innovation research gap in the innovation management best practices literature. To answer RQ2 through RQ4, insights from the innovation effects literature and the characteristics of service innovation formed a starting point for discussion (RQ2 and RQ4) and hypothesis development (RQ3). The answers to these research questions were expected to improve the understanding of the firm-level effects of service innovation. The new insights about service innovation effects and management control best practices were combined with existing innovation investment appraisal insights to answer RQ5 through RQ8. The answers to these questions were expected to improve the investment appraisal theory for service innovation. The theoretical contributions to investment appraisal theory and management control best practices for service innovation were both expected to contribute to knowledge about management control of service innovation.

To summarize, theoretical insights from four research streams (characteristics of service innovation, innovation effects, innovation management control best practices, and innovation investment appraisal) were used as a foundation to answer the RQs. These answers were expected to help fill literature gaps related to service innovation in these research streams by improving the knowledge of service innovation effects and management control of service innovation. The theoretical foundations and desired contributions are illustrated in Figure 3.

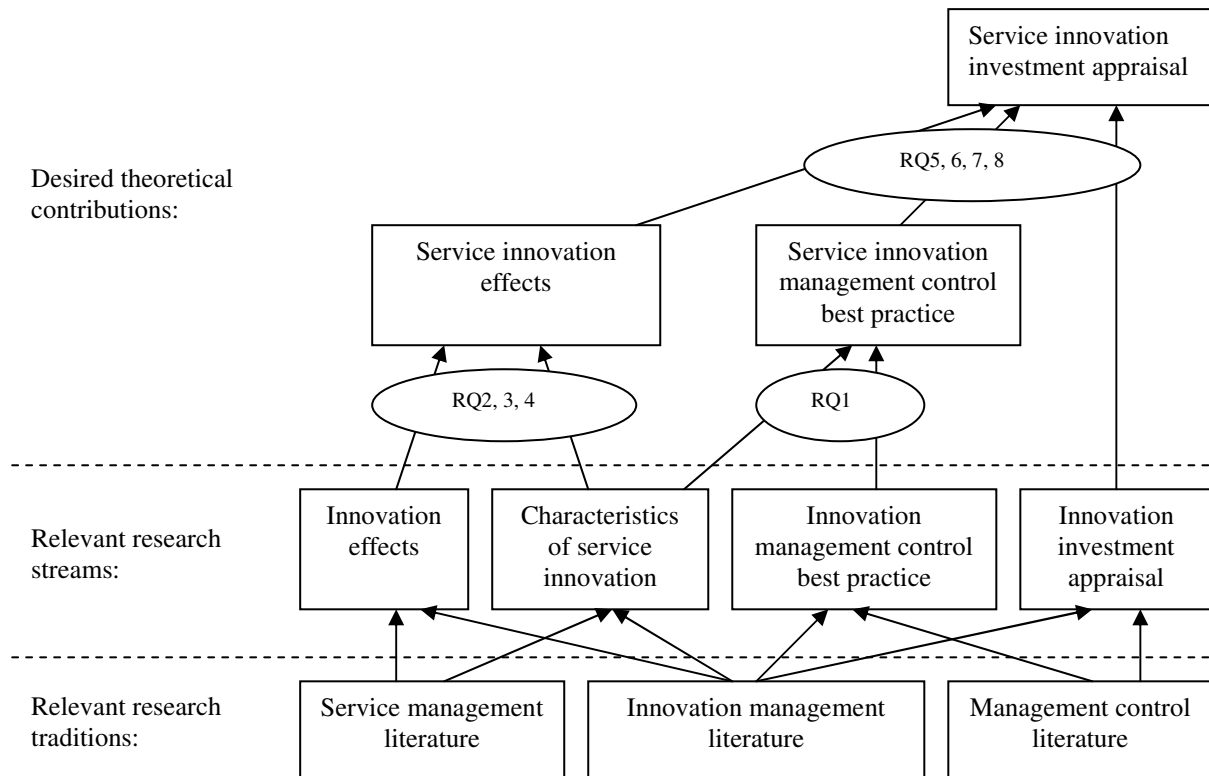


Figure 3: Theoretical foundations and desired contributions of this research

3 Research approach and methodology

Social science research may use observational and/or experimental approaches (e.g., Gerring and McDermott, 2007) to generate and analyze qualitative and/or quantitative data (e.g., Creswell, 2003). Each of these approaches is associated with advantages and disadvantages, depending on the nature of the research question (e.g., Yin, 2003; Johnson and Harris, 2003). Since the eight research questions asked in this thesis differed in nature, they were addressed with several types of methodological approaches.

RQ1 is exploratory in nature, and was addressed with a qualitative observational approach. The managers of ten top-performing firms with exceptional records of service innovation were interviewed. Each semi-structured interview lasted between one and two hours, and was recorded and transcribed. This approach allowed us to gain a broad and in-depth understanding of the management control practices for service innovation activities in these firms.

RQ2 is descriptive in nature and may be answered through observational empirical studies with survey or case-study designs. Alternatively, existing research may be used as the empirical source to answer this question. Although service innovation has traditionally been

given less research attention than product innovation (de Jong et al., 2003), the number of research articles on this topic has increased considerably in recent years. We therefore addressed RQ2 by conducting a search for peer-reviewed articles that included the terms “new service development” or “service innovation” in the abstract in two EBSCO databases, Academic Source Premier and Business Source Complete. This search yielded 325 hits, of which 73 were peer-reviewed research articles that included a discussion of the effects of service innovation. These 73 articles were reviewed and analyzed to answer RQ2.

RQ3 is explanatory in nature and was addressed with a traditional quantitative hypothetico-deductive approach. Based on extant theory, we developed six hypotheses to explain the relationship between service innovation and financial performance. We then designed a data set by matching Norwegian CIS (Community Innovation Survey) data and economic accounting data from The Norwegian Register of Company Accounts. The sampling frame of the Norwegian CIS study was designed to represent the population of all Norwegian firms with more than 5 employees. Our final analysis was based on a sample of 4707 firms for which we obtained valid innovation and accounting data. Non-parametric Mann-Whitney-Wilcoxon tests were used to test the hypotheses.

While RQ4 is also explanatory in nature and should be addressed with an approach similar to that of RQ3, we did not find sufficient extant theory to develop hypotheses. We therefore treated this question in a conceptual manner, using theoretical analysis to propose answers.

The answers to the first four research questions, in combination with insights from other research streams, formed a theoretical basis from which to address RQ5. Due to the exploratory nature of RQ5, we also used a qualitative approach to obtain empirical data from focus groups established in four firms participating in the TIPVIS project. In-depth interviews were carried out with these focus groups, each of which consisted of one to four managers.

To answer RQ6, we searched for existing ex-ante value assessment tools described in the product innovation literature and evaluated the degree to which they fulfilled the derived requirements. Based on the answers to RQ5 and RQ6, we suggested a design of an ex-ante value assessment tool to answer RQ7. To avoid de novo development, we aimed at reusing relevant elements from the product innovation value assessment tools as much as possible.

While the first seven research questions were observationally addressed (Gerring and McDermott, 2007), the novelty of the value assessment tool proposed in response to RQ7 prohibited such an observational approach to RQ8. An experimental or interventionist research approach was instead necessary, and we applied a multiple case study within an interventionist framework (see Jönsson and Lukka, 2007). We conducted field experiments in which a researcher undertook active participant observation while working with the management of three case organizations. These organizations were for-profit firms with a service innovation focus that were participating in the TIPVIS project. An implementation- and test-team consisting of one to four managers and a researcher was appointed in each firm, and this team implemented and evaluated the ex-ante value assessment tool by applying it to real service innovation ideas².

To summarize, the RQs asked in this thesis differed in nature. Some were deductive and explanatory, whereas others were more inductive and exploratory. We therefore applied observational, experimental, and conceptual approaches, and used quantitative and qualitative methods to generate and analyze data. Figure 4 illustrates this methodological diversity.

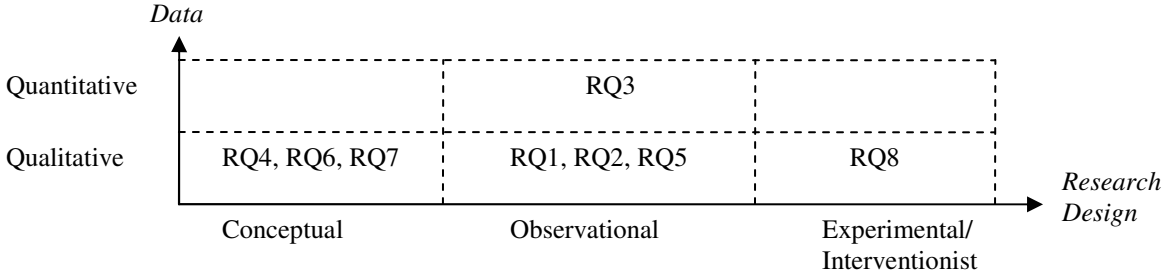


Figure 4: Research methodologies used to answer the RQs

4 Findings

We carried out six studies to answer the research questions. The results of these studies are reported in detail in the six papers appended to this thesis (Figure 5). RQ1 through RQ4 are answered in Papers I through IV, respectively. RQ5 through RQ7 are answered in Paper V, and RQ8 is answered in Paper VI. The following sections summarize our answers to the RQs, some of which (e.g., RQ2 and RQ4) are somewhat further developed than in the

² The service innovation project ideas on which the QSI was applied all had a technological aspect

corresponding paper. However, in general we refer the reader to the appended papers for additional details of our analysis.

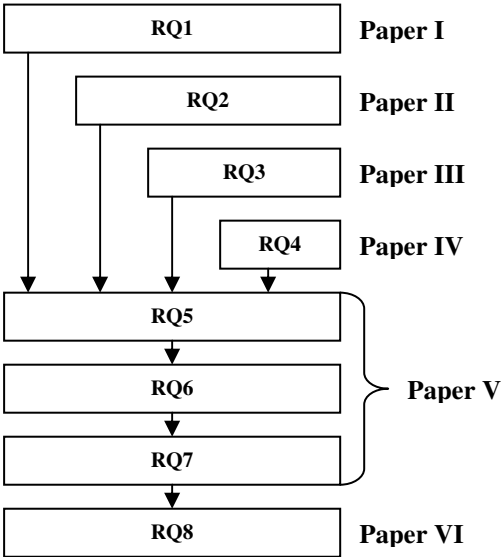


Figure 5: The research questions addressed in the papers appended to this thesis

4.1 RQ1 – Management control best practices for service innovation activities

Our analysis of the interviews with the managers of ten top-performing firms revealed that the management control systems implemented by these firms for service innovation activities were simplistic, one-dimensional, and dominated by financial measures (see Paper I). We observed that: 1) the implemented ex-ante and ex-post management control systems emphasized financial measures, while non-financial measures, such as those measured by scoreboards or checklists, were used only to a limited extent; 2) portfolio management was not incorporated into the management control systems of the development stage; 3) strategic management control systems that measured the businesses’ total service innovation portfolio performance were rarely implemented, and only took financial impact into account; and 4) cultural management control systems were not implemented.

Our sampling procedure provided us with representative firms with exceptional service innovation records and our qualitative approach allowed us to identify the true practices of these firms. We therefore believe that the main tendencies reported in Paper I may be replicated in a similar study, and that the identified practice may be perceived as best practice.

However, we question whether this best practice should be generally recommended. The differences between the practice we identified and those that have been identified in empirical product innovation studies (e.g., Barzecak, Griffin and Kahn, 2009; Cooper, Edgett and Kleinschmidt, 1999) were surprising and unexpected. For example, the service innovation ex-ante and ex-post management controls that we identified placed less emphasis on non-financial measures than the best practice controls found in product innovation studies. We found this difficult to explain because previous service innovation research (e.g., de Jong et al., 2003) has suggested that service innovation effects are often qualitative, with long-term rather than short-term financial payoffs. Furthermore, the normative management control literature (e.g., Merchant and Van der Stede, 2007) has suggested that non-financial measures should be used to capture qualitative effects, and that implementation of only financial measures may cause managers to focus on, and invest in, activities with short-term profits rather than strategically more important activities. As a result, we did not have sufficient knowledge to decide whether the best practices we identified should be generally recommended to managers in firms focusing on service innovation.

4.2 RQ2 – The effects of service innovation

Our literature review identified 278 firm-level service innovation effects (see Paper II) that had been measured in empirical studies or described in theoretical studies. Inspired by the bottom-up grouping technique utilized by Griffin and Page (1993), we sought patterns among these effects and grouped them into 27 service innovation effect categories. The grouping procedure was then repeated with the 27 categories, resulting in the following main effect categories: 1) business process effects; 2) capability effects; 3) relationship effects; 4) financial performance effects; and 5) competitiveness effects.

The business process effects shared the common element of embracing changes in the firm's business processes. This category contained the following six sub-effect categories: 1) internal business process effects; 2) service delivery capacity effects; 3) internal cost effects; 4) productivity effects; 5) flexibility effects; and 6) risk reduction effects.

The capability effects improved or strengthened the innovator's internal capabilities. This effect category contained the following sub-effect categories: 1) learning effects; 2) culture effects; 3) employee growth effects; and 4) employee satisfaction effects.

The relationship effects encompassed the effects of service innovation on the innovator's relationship with other stakeholders, primarily customers. In turn, such relationship effects may also affect the innovator's financial performance or competitiveness. This category contained the following sub-effect categories: 1) effects on customer's perceived value; 2) customer satisfaction effects; 3) customer loyalty effects; 4) lock-in effects; 5) image effects; 6) business partner relationship effects; and 7) service quality effects.

Many of the reviewed articles emphasized service innovation's potential to increase a firm's financial performance. This fourth category of effects consisted of the following sub-categories: 1) general financial performance effects; 2) market share effects; 3) sales (of new services) effects; 4) sales (of existing goods or services) effects; and 5) effects on the market value of the firm.

Several of the reviewed articles examined the ways in which service innovation could improve the innovator's competitiveness. This fifth effect category contained four sub-categories: 1) effects on competitive position; 2) effects on the ability to survive; 3) creation of new markets effects; and 4) strategic performance effects.

Several reviewed articles additionally discussed the external effects of service innovation, such as environmental, industry structure, and political advantage effects (see Paper II). While such effects may be relevant for the innovating firm and may indirectly influence the innovator's performance, they are arguably not firm-level effects and were not allotted an effect category in Paper II.

To summarize, the bottom-up grouping technique resulted in the conceptual service innovation effect hierarchy illustrated in Figure 6.

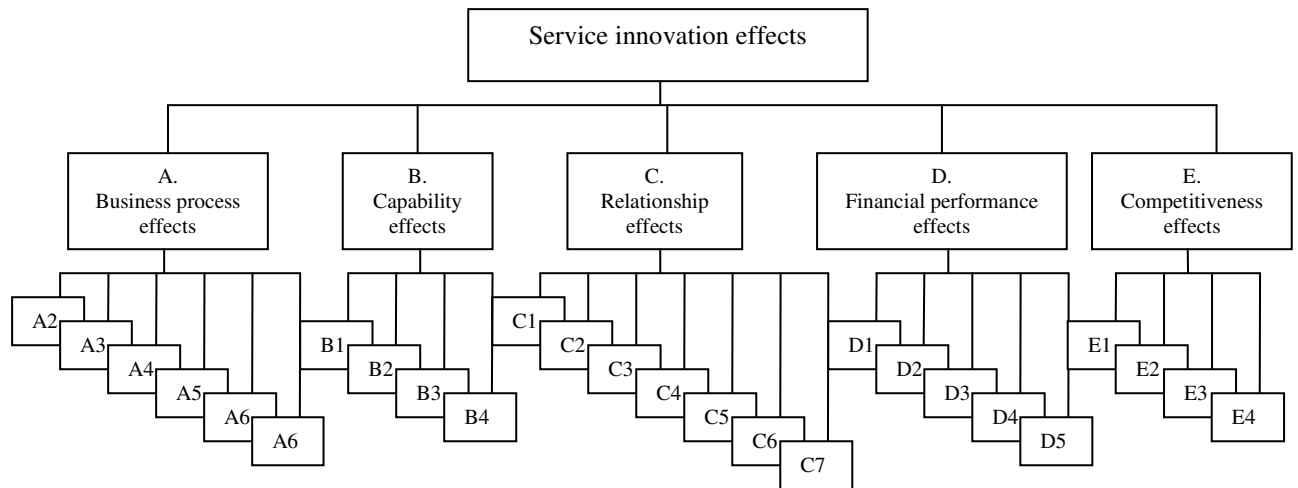


Figure 6: Conceptual service innovation effect hierarchy

A few of the reviewed articles (e.g., Matear, Gray and Garrett, 2004) indicated that relationships may exist between effect categories. However, since the vast majority of the reviewed research treated service innovation effects as dependent variables without considering their potential mediating roles, we were unable to firmly establish any such relationships. Nevertheless, the findings did provide a basis for *discussing* potential relationships among the effect categories.

One study (Matear, Gray and Garret, 2004) found that financial performance effects were caused by business process (reduced cost) and relationship (improved customer relationships and firm image) effects. Resource-based analyses of competitive advantage (e.g., Barney, 1991) have suggested that valuable and rare resources are sources of competitive advantage.³ Since several relationship (e.g., loyalty and lock-in effects) and capability (e.g., learning effects) effects may be perceived as such valuable and rare resources, we may posit a relationship between competitiveness and relationship/capability effects. In addition, several strategic management studies (e.g., Fahy, 2000; Ma, 2000) have suggested a relationship between competitive advantage and financial performance. Thus, we may also propose a relationship between financial performance effects and competitiveness effects.

These proposed relationships are illustrated in Figure 7. The model in Figure 7 may be interpreted in two ways: as a refinement of the conceptual effect hierarchy in Figure 6, or as a

³Barney (1991) also suggested that if the resources were additionally non-substitutable and imperfectly imitable, they were potential sources of *sustained* competitive advantage. We refer the reader to Paper IV for a discussion of this topic.

first step in the development of a causal model of service innovation effects. Further research is needed to investigate these potential interpretations in more detail.

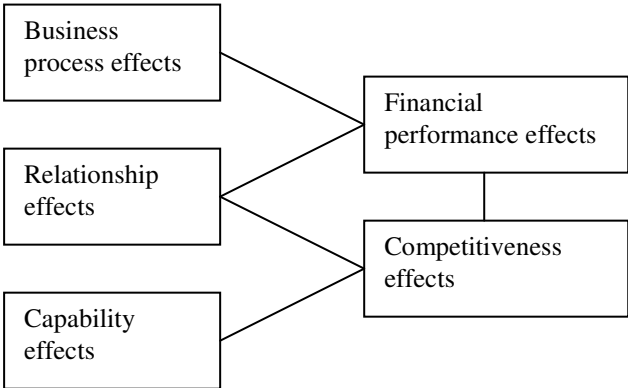


Figure 7: Suggested relationships between service innovation effect categories

4.3 RQ3 – The impact of service innovation on financial performance

Our discussion in Paper II of the relationships between service innovation effect categories suggested that firm-level service innovation effects may impact the financial performance of the firm. Paper III presents an empirical investigation of this suggestion by addressing RQ3.

We developed six hypotheses related to RQ3. We proposed that the financial performance effects of service innovations would be reflected in increased operating results, profitability, or productivity. We further posited that these effects could be observed either through financial performance indicators at a specific point in time, or through measures of diachronic change in financial performance. Three financial performance indicators reflecting the level of a firm’s financial performance and three indicators reflecting the growth of a firm’s financial performance were used to test the hypotheses.

Manufacturing and service industry firms were investigated. Three of the six indicators showed significant effects among manufacturing firms, whereas only one indicator significantly affected service firms. Two conclusions may be drawn from these observations. First, the financial performance effects of service innovation activities are not obvious, but depend on the indicators used to capture these effects. Further investigation of this issue is required before it can be generally concluded that service innovation activities positively affect financial performance. Second, manufacturing firms seem to better transform service innovation activities into observable financial performance effects. The causes of this difference also require further investigation.

4.4 RQ4 – Service innovation and sustained competitive advantage

While Paper II identified the competitiveness effects of service innovation, it did not discuss their sustainability. The aim of RQ4, reported in Paper IV, was thus to explore whether service innovation could produce a *sustained* competitive advantage.

Although the sustainability of competitive advantage has been intensively discussed in the strategic management literature (e.g., Porter, 1980; Teece, Pisano and Shuen, 1997), the relationship between service innovation and sustained competitive advantage has received little attention. We therefore addressed RQ4 with a theoretical approach using a framework of resource-based perspectives (e.g., Barney, 1991). Barney (1991) proposed that sustained competitive advantage could be drawn from strategic resources that are valuable, rare, imperfectly imitable, and impossible to substitute. The relationship between service innovation and sustained competitive advantage may be governed by such resources, as suggested in Paper IV. Service innovation may produce strategic resources, such as image and knowledge, that may in turn be used to develop further service innovations and provide sustained competitive advantage. Based on the theory of first-mover disadvantages (Lieberman and Montgomery, 1988), Paper IV further suggested that this cycle could be threatened by the resolution of technological or market uncertainty, shifts in technology or customer needs, and incumbent inertia.

The resource-based framework and the ideas presented in Paper IV form the foundation for an alternative categorization of service innovation effects. Paper II identified 278 service innovation effects and categorized them based on similarities, resulting in a conceptual service innovation effect hierarchy. As an alternative to this we may use resource-based reasoning (e.g., Barney, 1991) to define three alternative service innovation effect categories: 1) effects that may be perceived as strategic resources; 2) effects that may be perceived as rare and valuable resources; and 3) effects that may not be perceived as resources. The first category includes learning and image effects (see Paper IV), the second includes customer and employee satisfaction and culture effects (see Paper IV), and the third category includes internal cost and productivity effects (see Paper IV).

Based on Barney (1991), we may further suggest that effects in the first and second categories are sources of sustained competitive advantage and competitive advantage, respectively. Our literature review (see Paper II) indicated that effects in the third category are sources of

financial performance (Matear, Gray and Garret, 2004). Given the relationship between competitive advantage and financial performance proposed in the strategic management literature (e.g., Fahy, 2000; Ma, 2000), we may also suggest a relationship between these resource-based effect categories. This alternative organization of service innovation effects is illustrated in Figure 8.

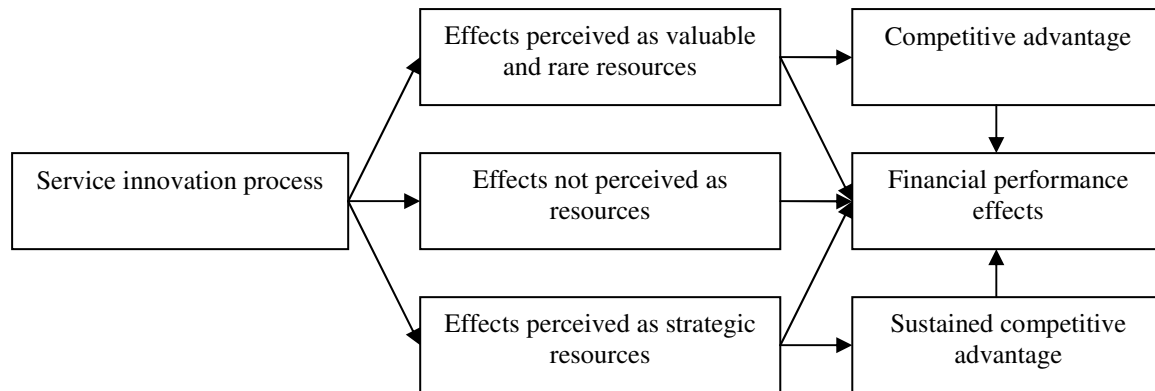


Figure 8: An alternative resource-based categorization of service innovation effects and the relationships between them

4.5 RQ5 – Requirements for a value assessment tool

We found the existing management control best practice for service innovation activities, identified in response to RQ1 (see Paper I), to be dominated by financial measures. We therefore questioned whether it should be generally recommended. Our answers to RQ2 (see Paper II) and RQ4 (see Paper IV) substantiated this doubt. We identified a large number of potential service innovation effects, many of which were strategic in nature and conveyed competitive advantage rather than short-term financial payoffs. In Paper V we therefore argued that despite the relevance of the financial effects of service innovation (Paper III), an ex-ante value assessment tool that focused solely on financial measures would be insufficient for service innovation activities. An appropriate ex-ante value assessment tool should account for the entire range of potential non-financial and financial effects of service innovation, identified as answers to RQ2 through RQ4. The first requirement for an ex-ante value assessment tool was therefore:

***Requirement 1:** Financial measures should be complemented with measures of non-financial service innovation effects.*

This first requirement was also supported by the management control (e.g., Merchant and van der Stede, 2007) and innovation management (e.g., Cooper, Edgett and Kleinschmidt, 2001)

literatures, which have warned that the use of exclusively financial indicators to evaluate investments may cause managers to act myopically.

A review of the capital budgeting literature (e.g., Drury and Tayles, 1997; Haka, 2007; Sangster, 1993) provided a general list of factors that should be considered when valuating investments. From this research, we derived the second requirement for an ex-ante value assessment tool:

Requirement 2: *The ex-ante value assessment tool should take several factors, including cost, benefit, risk, and time value of money, into consideration.*

Malina and Selto (2004) listed a number of preferred attributes that non-financial measures should fulfill. These attributes are also relevant for the ex-ante value assessment tool proposed in this paper. Our third requirement was therefore:

Requirement 3: *The non-financial measures of the ex-ante value assessment tool should ideally be: 1) diverse and complementary; 2) objective and accurate; 3) informative; 4) more beneficial than costly; 5) causally related; 6) strategically communicative; 7) incentive; and 8) supportive of improved decisions.*

The potential effects of a given service innovation project may vary considerably among firms due to differences in the firms' missions and strategic intentions. The value assessment tool should therefore include a top-down element. This view is supported by the innovation management literature (e.g., Cooper, Edgett and Kleinschmidt, 1999), which has suggested that an ex-ante value assessment tool should consist of multiple valuation methods (e.g., strategic approaches in combination with scoring models). We therefore developed the fourth requirement:

Requirement 4: *The ex-ante value assessment tool should consist of multiple valuation methods, including bottom-up and top-down elements.*

In addition to deriving requirements from our answers to RQ1 through RQ4 and from previous research, we conducted in-depth interviews with managers of four firms. Three additional requirements were derived from these interviews (for details see Paper V):

Requirement 5: *The measures chosen for ex-ante value assessment should also be measurable in ex-post evaluations.*

Requirement 6: *The ex-ante value assessment tool should assist managers in determining the value of different prospective commercial situations.*

Requirement 7: *The evaluation tool should be scalable.*

4.6 RQ6 – The compliance of existing tools

We evaluated the compliance of existing ex-ante value assessment tools (see Paper V) with the requirements developed in response to RQ5. Since we found no previously developed tools that were designed specifically for service innovation, we evaluated those described in the product innovation and foresight literatures. The product innovation literature (e.g., Cooper, Edgett and Kleinschmidt, 1997, 1999, 2001) has frequently grouped ex-ante value assessment tools into four broad categories; 1) financial methods; 2) business strategy methods; 3) bubble diagrams; and 4) scoring models and checklists. Table 1 summarizes our evaluation of the compliance of these tools (see Paper V).

Table 1: Evaluation of the compliance of ex-ante value assessment tools described in the product innovation literature

<i>Tools/Requirement</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Financial methods	no	yes	no	partly	yes	no	no
Business strategy methods	no	no	no	partly	no	no	no
Bubble diagrams	no	no	no	no	no	no	no
Scoring models and checklists	yes	no	yes	partly	yes	no	no
Foresight methodologies	no	no	no	no	no	yes	no

As seen in Table 1, none of the evaluated tools were found to comply with all requirements. Nevertheless, all requirements, except requirement 7, could be met by at least one product innovation tool. This implies that a value assessment tool for service innovation ideas could be constructed by combining several existing tools.

4.7 RQ7 – Proposed design for a value assessment tool

The QSI was constructed by combining existing tools, based on the answer to RQ6 (see Table 1). We used scoring models to comply with Requirements 1, 3, and 5, financial methods to comply with Requirement 2, and a combination of financial methods, business strategy methods, and scoring models to comply with Requirement 4. We proposed the use of foresight methods to comply with Requirement 6, and suggested that the QSI be built from three modules to comply with RQ7 (see Paper V): 1) a business strategy module to assess the compliance of the service innovation idea; 2) a scenario assessment module to analyze prospective commercial situations for the new service; and 3) a value assessment module to determine the value of a service innovation idea in each scenario. These modules are illustrated in Figure 9.

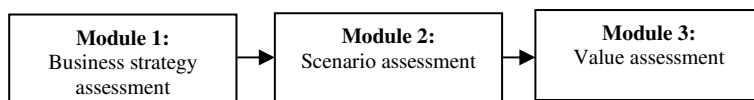


Figure 9: Component modules of the QSI

A firm's business strategy can serve as a basis for the creation of company-specific checklists in Module 1, and Schoemaker's (1995) method for scenario construction may be used in Module 2. The categorization of service innovation effects developed in response to RQ2 (see Paper II) can serve as a framework in Module 3. This framework, discussed in Section 4.2, suggests that the value of a service innovation project has financial and competitiveness value dimensions.

While these dimensions constitute the potential upside of investments in service innovation activities, the downsides of investments, that is costs and risks, should also be taken into account during the assessment of new ideas (e.g., Haka, 2007). Investment and future operational costs evidently affect the financial value dimension, and should be incorporated therein (e.g., Haka, 2007). Risks may be related to the external market, addressed in Module 2 of the QSI, and to the internal development process, addressed in Module 3. While internal risks may affect both financial and competitiveness value, we suggested that they be expressed as a separate value dimension given the complexity of these relationships. The value of a service innovation idea may thus be expressed in three dimensions: 1) financial performance; 2) competitiveness; and 3) risk (Figure 10).

We developed scoreboards for each dimension to further guide the value assessment. These scoreboards were based on the list of potential effects developed in response to RQ2, and are included as an appendix to Paper VI.

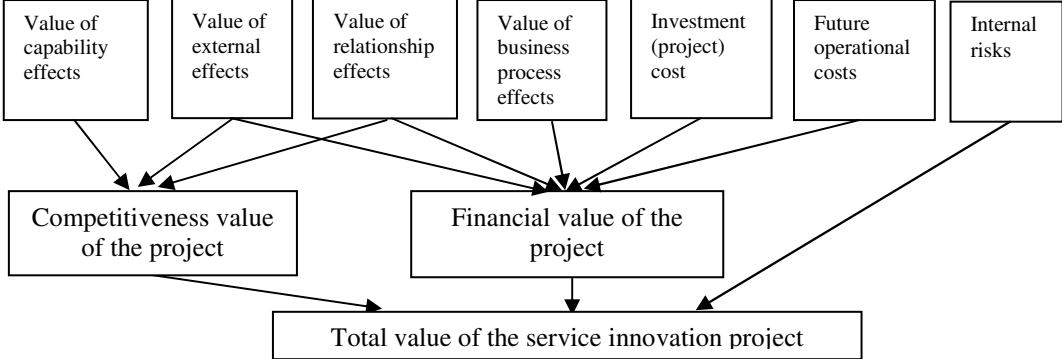


Figure 10: Proposed value dimension components of Module 3

4.8 RQ8 – Managerial effects of implementation

We implemented the QSI in three firms⁴ and noted its effects from both project management and portfolio management perspectives (see Paper VI). From the project management perspective, the QSI enabled participating managers to identify and valuate potential qualitative service innovation effects, such as learning, culture, employee satisfaction, and image effects; they had previously been unable to do so. The managers also appreciated the insight they gained, by combining scenario construction with value assessment, into the relationship between a new service’s prospective commercial situation and its value. This improved perspective enabled them to define more relevant, realistic, and ambitious targets for service innovation projects than they were able to achieve without the QSI. These improvements also laid the foundation for the earlier identification of any corrective requirements in the subsequent service development stage.

From the portfolio management perspective, the QSI’s improvement of project value provided the opportunity to optimize project prioritization and selection. Some participating managers, however, found it difficult to prioritize projects using the complex multidimensional value expression provided by the tool. The implementation and test teams therefore proposed some improvements to the conceptualization of value in the QSI.⁵

⁴ The three firms were participants in the TIPVIS project.
⁵ See www.qsi.no for more details.

5 Discussion

5.1 Theoretical contributions

This thesis has contributed theoretically to the service management literature, the innovation management literature and the management control literature. In particular the contributions are connected to the four interdisciplinary research streams discussed in Section 2.3 (characteristics of service innovation, innovation effects, innovation management control best practices, and innovation investment appraisal).

By answering RQ2, RQ3 and RQ4 the thesis has contributed both to the research stream discussing innovation effects and to the research stream describing the characteristics of service innovation. While the effects of innovation have been widely discussed, we lack a consistent body of knowledge on the firm-level effects of innovation (see Paper II). The lack of an overview, typology, or taxonomy for these effects is particularly relevant to the field of service innovation. By identifying and categorizing the potential service innovation effects (see Paper II), and by investigating the relationship between service innovation and financial performance empirically (see Paper III), this thesis has significantly contributed to our knowledge base.

The thesis has also provided a discussion of the relationship between service innovation effects, and based on a literature review a causal model was suggested (see Paper II). Furthermore, by drawing on the theoretical insights from the resource based view in the strategic management literature (e.g. Barney, 1991), the thesis proposed that some service innovation effects (e.g., image effects and learning effects) may have the potential to improve firms' ability to conduct new service innovations, and continuously stay ahead of competitors, and enjoy sustained competitive advantage (see Paper IV). While more empirical research on the relationship between service innovation effects is clearly necessary, this thesis has built a theoretical foundation for future investigations and for the proposal of result-oriented management control systems for service innovation activities.

While management control best practices of innovation activities have been explored, few authors have specifically considered service innovation. Therefore by exploring management control best practice of service innovation activities, and by answering RQ1, this thesis has contributed to the research stream discussing innovation management control best practice. However, the findings in this thesis (see Paper I) and also the findings in related studies (e.g.,

Storey and Kelly, 2001) have demonstrated the difficulty of providing guidance to managers on the control of service innovation activities based on existing best practice.

Therefore, by adjusting the insights from the research stream discussing innovation investment appraisal with the specific characteristics of service innovation effects (see Papers II-IV), the thesis followed an alternative path to propose a design for an ex-ante value assessment tool (see Paper V). The tool represents in itself a contribution to the research stream on innovation investment appraisal. However, the empirical testing and evaluation of this tool (see Paper VI) has further contributed to our knowledge base by demonstrating that service innovation management may benefit from the adoption of management control systems based on those developed for product innovation management.

5.2 Methodological contributions

This thesis aimed to propose a design for an ex-ante value assessment tool for service innovation activities. A variety of methodologies were used to achieve this aim. Quantitative and qualitative observational and conceptual research approaches were used to establish the theoretical foundation necessary to define requirements for the tool. Such approaches, however, were insufficient to determine whether the proposed tool was beneficial from a managerial perspective (RQ8). We therefore used an interventionist approach, conducting field experiments in several firms. This approach allowed us to explore the managerial effects of the tool and to propose improvements, which would not otherwise have been possible. This thesis has therefore demonstrated that the application of a suite of observational, conceptual, and interventionist research approaches may be useful when the research aims to develop, adopt, or test new innovation management methodologies.

5.3 Managerial contributions (interactive vs. diagnostic performance measurement systems)

Recent management control studies (e.g., Simons, 2000 and Tuomela, 2005) have examined the diagnostic (top-down) and interactive (bottom-up) uses of performance measurement systems. Diagnostic systems monitor the achievement of goals, and interactive systems ensure that indicators of the need to change a value proposition or business strategy flow from subordinates to management. Performance measurement systems for innovation activities should include both aspects. The interactive dimension would allow managers to estimate the value of service innovation ideas, select the most valuable projects, and define the targets for innovation projects and portfolios. The diagnostic dimension would allow them to assess

whether the targets of ongoing and finished projects have been achieved and whether the total portfolio of innovation projects has delivered the expected results.

Section 2 of this thesis summary presented our categorization of performance measurement systems for innovation activities based on innovation process stages (see also Paper I). Strategic management controls are typically both interactive and diagnostic, ex-ante management controls, such as the QSI, are usually used interactively, and development and ex-post management controls are typically diagnostic. The integration of these two classification schemes therefore produces an alternative framework for a complete performance measurement system for innovation activities (Figure 11).

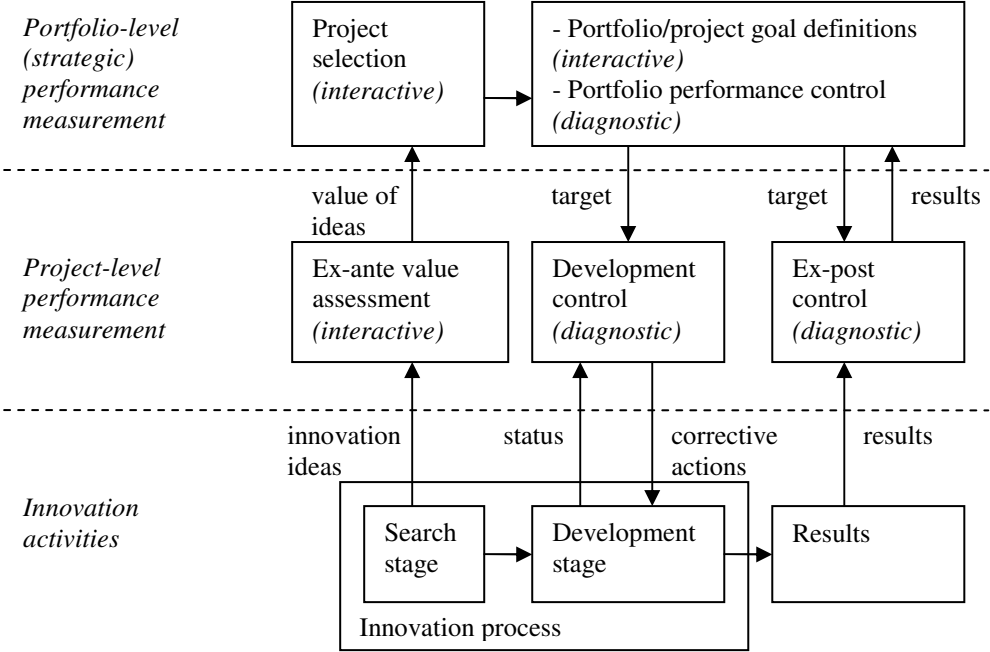


Figure 11: A holistic framework for the performance measurement of innovation activities

Our field implementation of the QSI produced positive project and portfolio management effects (see Paper VI), enabling managers to estimate the value of service innovation ideas, define targets for service innovation projects, and select the most valuable projects. The results of this thesis have thus provided immediate assistance and guidance to managers for the design and implementation of the *interactive* components of a service innovation performance measurement system (see Figure 11).

The managerial implications of this thesis for the interactive performance measurement of service innovation activities are broader than expected. One participating manager stated, “It

is not only important to evaluate new service ideas before development. It is likewise important to evaluate during and after development, and also after a period in operation. Therefore I appreciate that the output from QSI prepares us for such evaluations by telling us what to measure and what the targets should be.” We may thus understand the service innovation effect categories and their suggested interrelationships (see Paper II) as a foundation for the creation of a *diagnostic* performance measurement system at the project and portfolio levels, and we may understand the output from the QSI (see Paper VI) or other ex-ante value assessment tools as important input for the diagnostic performance measurement process.

The diagnostic component of a service innovation performance measurement system may be constructed using a multidimensional service innovation performance scorecard (SIPSC), analogous to Kaplan and Norton’s (1992, 1993, 1996a, 1996b) balanced scorecard (BSC). The service innovation effect categories (see Paper II) can define the performance perspectives in a SIPSC, allowing managers to diagnostically assess their service innovation activities from six perspectives: 1) business process; 2) capability; 3) relationship; 4) external; 5) financial performance; and 6) competitiveness. The measures and targets for each perspective would be the output from the interactive component of the system (e.g., the QSI). Figure 12 illustrates a proposed SIPSC.

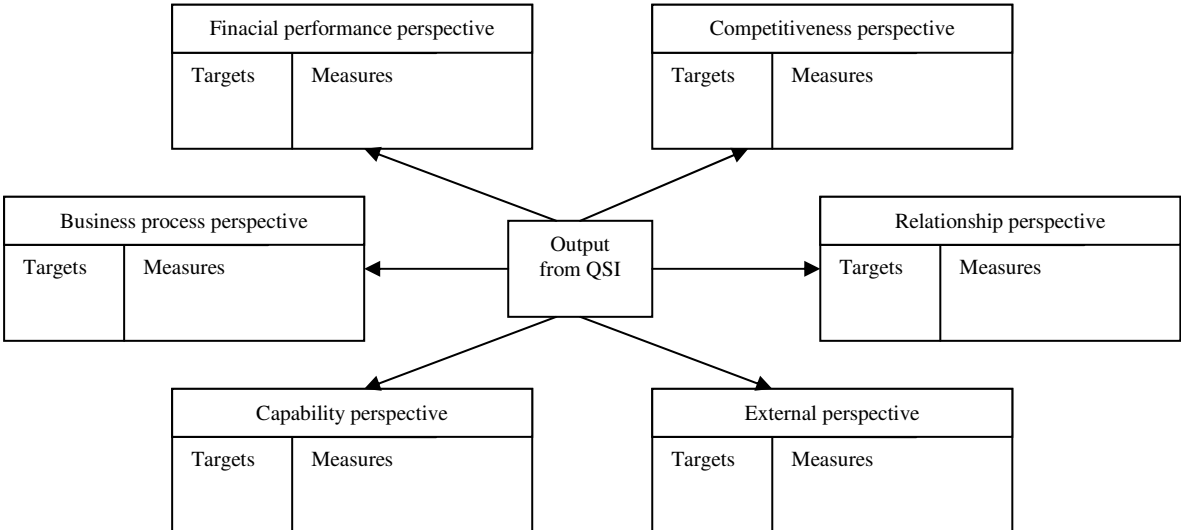


Figure 12: A proposed diagnostic service innovation performance scorecard (SIPSC) for service innovation activities

The BSC literature (e.g., Van Grembergen and Saull, 2001) has often recommended the cascading implementation of BSCs, which may also be suitable for SIPSCs. Each SIPSC

would be implemented at the project and portfolio levels, with the diagnostic results from the project level incorporated into the SIPSC at the portfolio level (Figure 13).

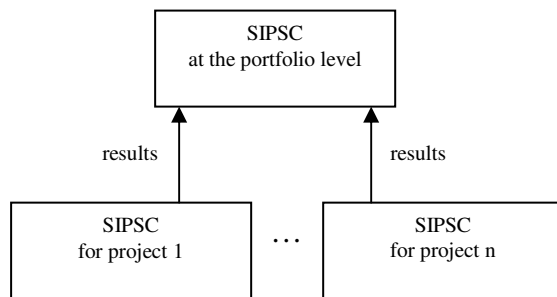


Figure 13: Suggested cascade of SIPSCs for diagnostic control of service innovation

5.4 Limitations and suggestions for further research

5.4.1 Service innovation effects

The potential effects of service innovation were categorized in response to RQ2 (see Paper II), potential relationships among these categories were considered, and a model that could be interpreted as either a conceptual hierarchy or a causal map was developed (Figure 7). The ideas presented in Paper IV also allowed the exploration of relationships among service innovation effects, leading to the development of an alternative categorization and causal map (Figure 8). Both models posited causal relationships between service innovation and competitiveness and financial performance, respectively. Our answer to RQ3 empirically supported this hypothesis for financial performance effects.

The empirical investigation presented in Paper III did not, however, include an analysis of the potential mediating roles of the remaining effects. Further empirical research is thus necessary to explore and test causal relationships among all potential service innovation effects. The proposed models (Figures 7 and 8) may be used as theoretical foundations for such research.

Another limitation of our contribution to the study of service innovation effects lies in the limited attention given to potential moderating influences. While firm size and sub-sector membership did not moderate financial performance effects (see Paper III), previous research has suggested additional variables that may moderate the effects of service innovation. These moderators include: cross-functional involvement (Avlonitis, Papastathopoulou and Gounaris, 2001); market orientation (Matear, Gray and Garrett, 2004); formality and standardization of

the new service development process; corporate synergy; market competitiveness; service innovativeness and complexity; service and market newness to the firm; effectiveness of new service development management; and quality of service experience (De Brentani, 1991). Further empirical research may reveal the effects of such moderating variables on service innovation effects.

To summarize, the accumulation of more primary data and the application of further deductive analyses would significantly improve our understanding of the complex causal chain linking service innovation activities to measurable financial results.

5.4.2 Management control of service innovation activities

Our observational study of the management control best practice for service innovation activities (see Paper I) yielded results that were difficult to understand in comparison to product innovation best practices (e.g., Cooper, Edgett and Kleinschmidt, 1999) and normative management control theory (e.g., Simons, 2000; Merchant and van der Stede, 2007). We questioned the general applicability of the observed best practice, and followed an interventionist approach (see Papers II–VI) that sought better solutions for the management and control of service innovation activities. Given the limitations of both our observational and interventionist approaches, however, further research is needed to derive a normative theory of service innovation management control.

Our observational best practice study (Paper I) included only top-performing firms with an exceptional record of service innovation, which did not provide sufficient insight into the relationship between management control of service innovation and firm success. We therefore suggest that our study should be followed up with broader observational studies that include high- and low-performing firms with exceptional records of service and product innovation. Such studies may better explain the manner, degree, and circumstances in which differences in service innovation management and control practices explain firm performance differences.

The interventionist approach used to design and test the QSI (see Papers V and VI) also had limitations. The QSI was tested on a limited number of firms and service innovation ideas, and involved a limited number of researchers and managers. The tool was only tested in firms belonging to the graphic arts industry on service innovation project ideas with a technological

aspect. However, since the QSI was based on general theories of management control, innovation management, and service innovation effects (see Papers II–IV), we assume that it is generally relevant to for-profit firms. Further research with other types of firms and service innovation activities is necessary to substantiate this assumption. Such studies may produce further recommendations for adjustments to the QSI to maximize its managerial effects in other environments and under other circumstances.

Our approach was also limited by our focus on ex-ante management control. As discussed, our findings may also have implications for development, ex-post, and strategic management controls (see Section 5.3), but further conceptual and interventionist studies are necessary to explore these implications. The design of personnel and cultural management control systems for service innovation also requires more attention, since such systems may have important managerial effects.

To summarize, we suggest that further research on management control of service innovation be carried out in parallel observational and interventionist research streams. Insights provided by such research may provide normative guidance on management control to service innovation managers. This suggestion is illustrated in Figure 14.

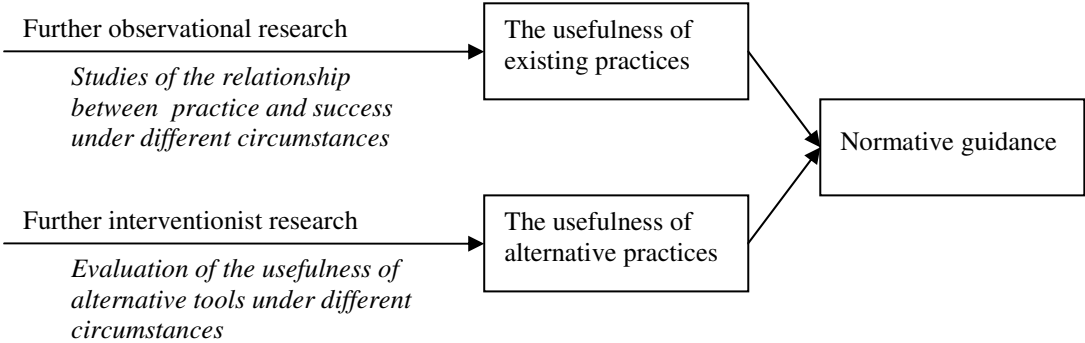


Figure 14: Suggested research streams for further research on management control of service innovation activities

6 Concluding remarks

Perrin’s (2002) statement that innovation comes from ‘failure’ exemplifies the challenges facing the management control of all innovation activities. These uncertainties have led some authors (e.g., Tushman, 1997; Amabile, 1998) to argue that the implementation of management control systems generally hinders managers’ efforts to produce successful innovation results. This argument has, however, been rejected in a number of product

innovation studies (e.g., Barczak, Griffin and Kahn, 2009) and the implementation of reasonable management control systems is understood to be important to the attainment of successful product innovation results (Akroyd, Narayan and Sridharan, 2009).

The management control challenges identified by Perrin (2002) are more relevant for service innovation activities than for product innovation activities, since the impacts of service innovations are arguably more difficult to trace (de Jong et al., 2003). It was therefore important to determine the feasibility of constructing reasonable management control systems for this type of innovation. The findings of this thesis indicate that the management control challenges for service innovation activities are not prohibitive. The thesis has determined that it is possible to design reasonable management control systems for service innovation activities when the long list of potential short- and long-term service innovation effects is taken into account. Furthermore, the thesis has demonstrated that the implementation of such management control systems may convey managerial benefits. Further research should use these findings as a foundation for the construction of a holistic theory of service innovation effects, and the development of management control systems for service innovation activities.

7 References

Akroyd, A., Narayan, S. and Sridharan, V.G. (2009), "The use of control systems in New Product Development Innovation: Advancing the 'Help' or 'Hinder' Debate", *The IUP Journal of Knowledge Management*, Vol. 7, No. 5/6, pp. 70-90.

Al-Dabal, J.K. (1998), "Entrepreneurship: Fail, Learn, Move On", unpublished paper, Management Development Centre International, The University of Hull, Hull.

Amabile, T.M. (1988), "A model of creativity and innovation in organizations", *Research in Organizational Behavior*, Vol. 10, pp. 123.

Amabile T.M. (1998), "How to Kill Creativity", *Harvard Business Review*, September-October, pp. 76-87.

Anthony, R.N. (1965), *Planning and control systems: A framework for analysis*, Division of Research, Graduate School of Business Administration, Harvard University, Boston.

Armenakis, A.A. and Bedeian A.G. (1999), "Organizational change: A review of theory and research in the 1990s", *Journal of Management*, Vol. 25 No. 3, pp. 293-315.

Avlonitis, G.J., Papastathopoulou P.G. and Gounaris S.P. (2001), "An empirically-based typology of product innovativeness for new financial services: Success and failure scenarios", *Journal of Product Innovation Management*, Vol. 18 No. 5, pp. 324-342.

Barney, J (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.

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

Bart C. (1991), "Controlling New Products in Large Diversified Firms: A Presidential Perspective", *Journal of Product Innovation Management*, Vol. 8 No. 1, pp. 4-17.

Belliveau, P., Griffin, A. and Somermeyer, S. (2002), *The PDMA ToolBook 1 for New Product Development*, John Wiley & Sons, New York.

Belliveau, P, Griffin A. and Somermeyer S. (2004), *The PDMA ToolBook 2 for New Product Development*, John Wiley & Sons, New Jersey.

Brophey, G. and Brown, S. (2010), "Prioritizing Innovation Practices in a Context that is "Controllable" by the Firm", in Huizingh, K.R.E., Conn, S., Torkkeli, M. and Bitran, I. (Eds.), *The Proceedings of The XXI ISPIM Conference, Bilbao, Spain, 6-9 June 2010*.

Chan, A. (2005), "Using an effective metrics program to support business objectives", in Kahn, K.B. (Ed.), *The PDMA Handbook of New Product Development*, John Wiley & Sons, New Jersey, pp. 445-454.

Conway, M. (2008), "An Overview of Foresight Methodologies: An Introduction to the Range of Methods Available to Explore the Future", Thinking Futures, Australia, available at: <http://www.thinkingfutures.net/downloads> (accessed 2 June 2010).

Coombs, R. and Miles, I. (2000), “Innovation, measurement and services”, in Metcalfe, J.S. and Miles, I. (Eds), *Innovation Systems in the Service Economy. Measurement and Case Study Analysis*, Kluwer Academic, Boston, MA, pp. 85-103.

Cooper, R.G. and Edgett, S.J. (2008), “Maximizing Productivity in Product Innovation”, *Research Technology Management*, Vol. 51, pp. 47-58.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (1997), “Portfolio Management in New Product Development: Lessons from the Leaders-I”, *Research Technology Management*, Vol. 40 No. 5, pp. 16-28.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (1999), “New Product Portfolio Management: Practices and Performance”, *Journal of Product Innovation Management*, Vol. 16, pp. 333-351.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2001), *Portfolio Management for New Products*, Basic Books, New York

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2002a), “Optimizing the stage-gate process: What best-practice companies do-I”, *Research Technology Management*, Vol. 45, pp. 21-27.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2002b), “Optimizing the stage-gate process: What best-practice companies do-II”, *Research Technology Management*; Vol. 45, pp. 44-49.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2004a), “Benchmarking best NPD practices-I”, *Research Technology Management*, Vol. 47, pp. 31-43.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2004b), “Benchmarking best NPD practices-II”, *Research Technology Management*”, Vol. 47, pp. 50-59.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2004c), “Benchmarking best NPD practices-III”, *Research Technology Management*, Vol. 47, pp. 43-55.

Creswell, J.W. (2003), *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage Publications, London.

Daneels, E. (2002), "The Dynamics of Product Innovation and Firm Competences", *Strategic Management Journal*, Vol. 23, pp. 1095-1121.

De Brentani, U. (1991), "Success factors in developing new business services", *European Journal of Marketing*, Vol. 25 No.2, pp. 33-59.

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

Djellal, F. and Gallouj, F. (2001), "Patterns of innovation organisation in service firms: postal surveys results and theoretical models", *Science and Public Policy*, Vol. 28 No.1, pp. 57-67.

Drejer, I. (2004), "Identifying innovation in surveys of services: a Schumpeterian perspective", *Research Policy*, Vol. 33, pp. 551-62.

Droege, H., Hildebrand, D. and Forcada, M.A.H. (2009), "Innovation in services: present findings, and future pathways", *Journal of Service Management*, Vol. 20 No. 2, pp. 131-55.

Drucker, P.F. (2002), "The Discipline of Innovation", *Harvard Business Review*, Vol. 80, pp. 95.

Drury C. and Tayles M. (1997), "The misapplication of capital investment appraisal techniques", *Management Decision*, Vol. 35 No. 2, pp. 86-93.

Fagerberg, J. (2005), "Innovation: A Guide to the Literature", in Fagerberg, J., Mowery, D.C. and Nelson R.R. (Eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 1-26.

Fahy, J. (2000), "The Resource-based view of the Firm: Some Stumbling-blocks on the Road to Understanding Sustainable Competitive Advantage", *Journal of European Industrial Training*, Vol. 24 Nos. 2/3/4, pp. 94-104.

Fitzsimmons, J.A. and Fitzsimmons, M.J. (2000), *New Service Development: Creating Memorable Experiences*, Sage, Thousand Oaks, CA

Gerring, J. and McDermott, R. (2007), “An experimental Template for Case-Study Research”, *American Journal of Political Science*, Vol. 51 No. 3, pp. 688-701.

Griffin, A. and Page, A.L. (1993), “An interim report on measuring product development success and failure”, *Journal of Product Innovation Management*, Vol. 10 No.4, pp. 291-308.

Griffin, A and Page, A.L. (1996), “PDMA success measurement project: recommended measures for product development success and failure”, *Journal of Product Innovation Management*, Vol. 13 No. 6, pp. 478-496.

Griffin, A. (1997), “PDMA Research on New Product Development Practices: Updating Trends and Benchmarking Best Practices”, *Journal of Product Innovation Management*, Vol. 14, pp. 429-58.

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

Haka, S.F. (2007), “A Review of the Literature on Capital Budgeting and Investment Appraisal: Past, Present and Future Musings”, in Chapman, C.S., Hopwood A.G. and Shields M.G (Eds.), *Handbook of Management Accounting Research Vol. 2*, Elsevier, Oxford, pp. 697-728.

Hargadon, A. and Sutton, R.I. (2000), “Building an Innovation Factory”, *Harvard Business Review*, Vol. 78 No. 3, pp. 157–166.

Hipp, C. and Grupp, H. (2005), “Innovation in the service sector: the demand for service-specific innovation measurement concepts and typologies”, *Research Policy*, Vol. 34, pp. 517-535.

Irani Z. and Love, P.E.D. (2002), “Developing a frame of reference for ex-ante IT/IS investment evaluation”, *European Journal of Information Systems*, Vol. 11, pp. 74-82.

Johne, A., and Storey C. (1998), "New Service Development: A Review of the Literature and Annotated Bibliography", *European Journal of Marketing*, Vol. 32 No. 3/4, pp. 184-252.

Johnson, P. and Harris, D. (2003), "Qualitative and Quantitative Issues in Research Design", in Partington, D. (Ed.), *Essential Skills for Management Research*, Sage Publications, London, pp. 99-134.

Jönsson S. and Lukka K. (2007), "There and Back again: Doing Interventionist Research in Management Accounting", in Chapman, C.S., Hopwood, A.G. and Shields, M.G. (Eds.), *Handbook of Management Accounting Research Volume 1*, Elsevier, Oxford, pp. 373-397.

Kahn, K.B. (2005), *The PDMA Handbook of New Product Development*, John Wiley & Sons, New Jersey.

Kaplan, R. and Norton, D. (1992), "The balanced scorecard: measures that drive performance", *Harvard Business Review*, Vol. 70 No. 1, pp. 71-79.

Kaplan, R. and Norton, D. (1993), "Putting the balanced scorecard to work", *Harvard Business Review*, Vol. 71 No. 5, pp. 134-142.

Kaplan, R. and Norton, D. (1996a), "Using the balanced scorecard as a strategic management system", *Harvard Business Review*, Vol. 74 No. 1, pp. 75-85.

Kaplan, R. and Norton, D. (1996b), *The balanced scorecard: Translating strategy into action*, Harvard Business School Press, Boston.

Kotler, P. (1994), *Marketing Management: Analysis, Planning, Implementation and Control*, Prentice Hall International, London.

Lazonick, W. (2005), "The Innovative Firm", in Fagerberg, J., Mowery, D.C. and Nelson R.R. (Eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 29-55.

Lieberman, M.B. and Montgomery, D.B. (1988), "First mover advantages", *Strategic Management Journal*, Vol. 9, pp. 44-58.

Ma, H. (2000), “Competitive Advantage and Firm Performance”, *Competitiveness Review*, Vol. 10 No.2, p.16.

Malina M.A and Selto F.H. (2004), “Choice and change of measures in performance measurement models”, *Management Accounting Research*, Vol. 15, pp. 441–469.

Matear, S., Gray B.J. and Garrett T. (2004), “Market orientation, brand investment, new service development, market position and performance for service organisations”, *International Journal of Service Industry Management*, Vol. 15 No. 3, pp. 284-301.

Merchant, K.A. and Van der Stede, W.A. (2007), *Management Control Systems: Performance Measurement, Evaluation and Incentives*, Pearson Education Limited. Edinburgh.

Miles, I (2005), “Innovation in services”, in Fagerberg, J., Mowery, D.C. and Nelson, R.R. (Eds.) *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 433-458.

Nijssen, E.J., Hillebrand, B., Vermeulen, P. and Kemp, R.G.M. (2006), “Exploring product and service innovation similarities and differences”, *Research in Marketing*, Vol. 23, pp. 241-251.

Nonaka, I. and Takeuchi, H. (1996), “A theory of organizational knowledge creation”, *International Journal of Technology Management*, Vol. 11 No. 7/8, pp. 833.

Nysveen, H. and Pedersen P.E. (2007), *Service innovation methodologies I: What can we learn from service innovation and new service development research?* Agder University College, Kristiansand, Norway (available at: http://idtjeneste.nb.no/URN:NBN:no-bibsys_brage_2238 (accessed 29 July 2008)).

Nysveen, H., Pedersen, P.E. and Aas, T.H. (2007), *Service innovation methodologies II: How can new product development methodologies be applied to service innovation and new service development?* University of Agder, Kristiansand, Norway (available at: http://brage.bibsys.no/hia/handle/URN:NBN:no-bibsys_brage_2583 (accessed 15 June 2010)).

Page, A.L. and Schirr G.R. (2008), “Growth and development of a body of knowledge: 16 years of new product development research, 1989-2004”, *Journal of Product Innovation Management*, Vol. 25 No. 3, pp. 233-248.

Perrin, B. (2002), “How to – and How Not to – Evaluate Innovation”, *Evaluation*, Vol. 8 No. 1, pp. 13-28.

Peters, T. (1988), *Thriving on Chaos: Handbook for a Management Revolution*, Pan Books, London.

Pfeffer, J. (1997), *New Directions for Organization Theory*, Oxford University Press, New York.

Porter, M.E. (1980), *Competitive Strategy*, Free Press, New York.

Porter, M.E. and Millar, V.E. (1985), “How Information Gives You Competitive Advantage”, *Harvard Business Review*, July-August, pp. 149-160.

Sangster, A. (1993), “Capital investment appraisal techniques: A survey of current usage”, *Journal of Business Finance & Accounting*, Vol. 20 No. 3, pp. 307–332.

Schoemaker, P.J.H. (1995), “Scenario Planning: A Tool for Strategic Thinking”, *Sloan Management Review*, Winter, pp. 25-40.

Scott, W.R. (2002), *Organizations: Rational, Natural, and Open Systems (5th edition)*, Prentice Hall, New Jersey.

Simons, R. (2000), *Performance Measurement & Control Systems for Implementing Strategy*, Pearson Education International, New Jersey.

Storey, C. and Kelly, D. (2001), “Measuring the Performance of New Service Development Activities”, *Service Industries Journal*, Vol. 21 No. 2, pp. 71 – 90.

Teece, D.J., Pisano, G. and Shuen, A. (1997), “Dynamic capabilities and strategic management”, *Strategic Management Journal*, Vol. 18, pp. 509-533.

Tether, B. (2003), "The sources and aims of innovation in services: Variety between and within sectors", *Economics of Innovation & New Technology*, Vol. 12 No. 6, pp. 481-505.

Tidd, J (2001), "Innovation management in context: environment, organization and performance", *International Journal of Management Reviews*, Vol. 3 No. 3, pp. 169-183.

Tidd, J. and Bessant, J. (2009), *Managing Innovation: Integrating Technological, Market and Organizational Change*, (4th edition), John Wiley & Sons, Chichester.

Tidd, J., Bessant J. and Pavitt K. (2001), *Managing Innovation - Integrating Technological, Market and Organizational Change* (2nd edition), John Wiley & Sons, Chichester.

Tushman M.L. (1997), "Winning Through Innovation", *Strategy & Leadership*, Vol. 25 No. 4, pp. 14-20.

Tuomela, T.S. (2005), "The interplay of different levers of control: A case study of introducing a new performance measurement system", *Management Accounting Research*, Vol. 16, pp. 293–320.

Van Grembergen, W. and Saull, R. (2001), "Information Technology Governance through the Balanced Scorecard", in Van Grembergen, W. (Ed.), *Information Technology Evaluation Methods and Management*, Idea Group Publishing, Hershey, PA., pp. 199-211.

Vermeulen, P. (2001), *Organizing Product Innovation in Financial Services*, Nijmegen University Press, Nijmegen.

Verspagen, B. (2005), "Innovation and economic growth", in Fagerberg, J., Mowery, D.C. and Nelson, R.R. (Ed.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 487-513.

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

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

Zider, B. (1998), “How Venture Capital Works. The Discipline of Innovation”, *Harvard Business Review*, Vol. 76 No. 6, pp. 131–139.

Part II – Papers

Paper I⁶

⁶ Aas, T.H. (2010), "Management Control of Service Innovation Activities: An Exploratory Investigation of Best Practice", in Eiglier, P., Fitzsimmons, J., Lemon, K. and Pugh, D. (Eds.), *Proceedings of the 11th International Research Seminar in Service Management*, La Londe, France, May 25-28, pp. 1-25.

Management Control of Service Innovation Activities: An Exploratory Investigation of Best Practice

Tor Helge Aas
University of Agder

Abstract

This paper explores management control best practice related to service innovation activities. This is done by conducting qualitative in-depth interviews with managers in ten top performing firms that have an exceptional focus on service innovation. We found that the management control systems implemented for service innovation activities in these firms were simplistic, one-dimensional and predominated by financial measures. This means that the service innovation management control systems we identified were different from the management control systems that have been identified in empirical studies of product innovation best practice. The management control systems prescribed to product innovation management are multi-dimensional, relatively complex and are focusing both financial and non-financial measures. We suggest that further research should investigate if the management control practices identified in this paper should be recommended for service innovation activities, or if service innovation management may benefit from adopting management control systems based on those prescribed to product innovation management.

Key words: Service management; Service innovation; Management control

1 Introduction

Service innovation is a complex and resource-demanding activity with potential long-term benefits for firms in the service and manufacturing industries (e.g. Berry et al., 2006; de Jong et al., 2003; Matear, Gray and Garrett, 2004; Miles, 2005; Tidd and Hull, 2003; Bryson and Monnoyer, 2004; Lu, Lin and Wu, 2005). The management control literature (e.g. Simons, 2000; Merchant and Van der Stede, 2007) suggests that strategically important activities, like for example product and service innovation activities, should be managed and controlled to avoid financial losses and organizational failure. Thus, the implementation of reasonable management control systems may enable firms to manage their service innovation activities and achieve long-term success based on these activities.

It is, consequently, somewhat surprising that most studies investigating management control best practice related to innovation activities focus primarily on physical product innovation (e.g. Barzecak, Griffin and Kahn, 2009; Cooper, Edgett and Kleinschmidt, 1999), whereas the management control best practice of service innovation activities has not been investigated correspondingly. Although the service innovation process and the physical product innovation process do have several similarities (e.g. Coombs and Miles, 2000; Drejer, 2004), it has been argued that the service innovation process is more complex than the process of developing new physical products because *“new services often go together with new patterns of distribution, client interaction, quality control and assurance, etc.”* (de Jong et al., 2003, p. 17). It has also been argued that the firm-level effects of service innovation have a more qualitative nature than the effects of other types of innovation (e.g. Tether, 2003; Aas and Pedersen, in press), and that *“due to the nature of services (intangibility, heterogeneity), the impact of service innovations is harder to trace than in manufacturing”* (de Jong et al., 2003, p. 61). Due to these differences it may be premature to argue that the best practice management control systems for physical product innovation activities are equal to the best practice management control systems for service innovation activities.

Empirical studies of physical product innovation best practice (e.g. Cooper, Edgett and Kleinschmidt, 1999) have found that top performing firms implement explicit, formal, multi-dimensional and relatively complex management control systems focusing both financial and non-financial measures to manage and control their physical product innovation activities. But

do top performing firms deploy similar management control systems to manage and control service innovation activities? Or more explicitly: What does the management control best practice for service innovation activities look like? Driven by these questions, the present study examines the practices of ten top performing firms that have an exceptional focus on service innovation. We specifically address whether the management control best practices prescribed by prior studies of product innovation are employed in a similar fashion to manage and control the service innovation activities in these firms. If not, what are the differences between the best practice management control systems prescribed to product innovation activities and the management control systems implemented to manage and control service innovation activities in these ten top performing firms?

To answer these questions we first establish a set of baseline management control best practices prescribed by prior studies to product innovation activities⁷. Based on the findings of prior empirical studies, service innovation is then distinguished from product innovation to suggest why such management control practices may, or may not, be relevant for service innovation activities. Thereafter, we describe the chosen research method, and we provide the results and conclude on whether the best practice management control systems we identified for service innovation activities are equal to the management control best practice prescribed by prior product innovation studies, or not. The paper ends with a discussion of whether the identified management control best practice should be generally recommended to other firms, or not, and suggestions for further research.

2 Management control of physical product innovation activities: Best practices

Findings from product innovation studies (e.g. Barzacak, Griffin and Kahn, 2009; Cooper, Edgett and Kleinschmidt, 1999, 2002a, 2002b, 2004a, 2004b, 2004c; Cooper and Edgett, 2008; Griffin, 1997) and insights from handbooks provided by product innovation management associations (e.g. Belliveau, Griffin and Somermeyer, 2002; Belliveau, Griffin and Somermeyer, 2004; Kahn, 2005) offer baseline management control best practices for product innovation activities. These practices may serve as a comparison set from which to evaluate the management control best practices for service innovation activities.

⁷ The structure of this article is based on the structure of Barczak, Kahn and Moss (2006).

Merchant and Van der Stede (2007) divide management control systems into four categories named results controls, personnel controls, cultural controls and action controls, where the first three categories are particularly relevant for management control of innovation activities. De Jong et al. (2003) suggest that the innovation process may be divided into a search stage and a development stage. Furthermore, they suggest that innovation may have effects both on the project level and on a strategic level. Based on this we suggest that results controls for innovation activities may be divided into four types: ex-ante, development, ex-post and strategic. Thus, our theoretical discussion is organized along the following five dimensions of innovation management control systems: ex-ante management control systems, management control systems for the development stage, ex-post management control systems, strategic management control systems and personnel and cultural management control systems.

Ex-ante management control systems refer to the systems implemented to manage and control activities conducted in the search stage (de Jong et al., 2003). In this phase, project ideas are evaluated, selected and prioritized (e.g. Cooper, Edgett and Kleinschmidt, 1999), and targets for the selected projects are defined (e.g. Irani and Love, 2002). In a study of product innovation management practices, Cooper, Edgett and Kleinschmidt (1999) found that there were major differences related to the ex-ante management control systems used by top performing firms and other firms. Top performers used more formal and explicit methods to evaluate projects ex-ante than others. Their methods had very clear and well-defined rules and procedures, and they treated all projects as parts of a portfolio and compared them against each other. The ex-ante evaluation tools identified by Cooper, Edgett and Kleinschmidt (1999) were: financial methods, business strategy methods, bubble diagrams, scoring models and checklists. Cooper, Edgett and Kleinschmidt (1999) found that the top performing firms placed less emphasis on financial approaches and more on strategic methods, and that they used multiple methods more than other firms. They also found that strategic methods, along with scoring approaches, yielded the best portfolios, and that financial methods yielded poorer portfolio results.

Management control systems for the development stage refer to the systems implemented to manage and control projects in the development phase. A formal process for new product development is now the norm (Barzecak, Griffin and Kahn, 2009), and top performers have clearly defined gates and specific criteria for evaluating projects at each gate (Cooper, Edgett and Kleinschmidt, 2002b). According to Cooper, Edgett and Kleinschmidt (2002b) the best

practice firms are building critical go/kill gates into the new product development process. At these gates all on-going projects are scrutinized against an absolute set of standards (e.g. strategic fit, net present value, etc.), and weak projects are terminated. Top performers integrate portfolio management into the gates by evaluating the impact of keeping the project in the portfolio. At each gate, top performers assess if the project has a greater value to the business than other projects underway, if it improves the balance of the projects, if resources are available and if the project improves the strategic alignment of the portfolio (Cooper, Edgett and Kleinschmidt, 2002b).

Ex-post management control systems refer to the performance measurement activities conducted after the completion of an innovation project. Griffin (1997) found that top performers more often explicitly measured the outcomes of physical product innovation projects against objectives, and Cooper, Edgett and Kleinschmidt (2004b) found that top performing firms used multiple performance measures like measures of profitability, revenue, customer satisfaction and market share.

Strategic management control systems refer to the measures introduced to gauge how well the business's total innovation effort performs. Griffin (1997) found that top performing firms are more likely than other firms to set a target for the portion of revenue growth to come from new physical product development. Cooper, Edgett and Kleinschmidt (2004b) found that top performing firms used multiple performance measures like for example percent of the business's revenue from new products, percent of growth in sales from new products, overall profits generated by new products and number of major launches per year to measure the total product innovation performance against objectives.

Personnel and cultural management control systems refer to the controls focusing on the types of people employed and their shared norms and values (Merchant and Van der Stede, 2007). In a study of product innovation best practice Barzeczak, Griffin and Kahn (2009) found that *“the best firms develop better project teams than the rest by using multiple organizational processes”* (p. 17) and that *“they provide leadership training to project managers to enhance their effectiveness”* (p.18). Thus, top performers in the product innovation area implement personnel and cultural controls to a greater extent than the rest.

3 The distinction of *service* innovation

Aside from the obvious distinction that the outcome of a physical product innovation process is a physical product, while the outcome of a service innovation process is a service, service innovation may be further distinguished from product innovation. Tether (2003) for example argues that the firm-level effects of service innovation have a more qualitative nature than the effects of other types of innovation, and de Jong et al. (2003) suggest that the impacts of service innovations are harder to trace than the impacts of process and product innovations.

Research on the development process has also found some differences between service and product innovation. Hipp and Grupp (2005), for example, found that service innovation projects tended to be more incremental than product innovation projects and Djellal and Gallouj (2001) found that it is more difficult to test service innovations than to test product innovations. In other process related areas, however, the research provides contradictory and inconsistent findings (Droege, Hildebrand and Forcada, 2009). For example some authors (e.g. de Brentani, 2001; Martin and Horne, 1993; Henard and Szymanski, 2001) have found that the importance of a structured formal development process is lower for service innovations than for product innovations, while other authors (e.g. de Brentani, 1989; Froehle et al., 2000) have found that the importance of having a formal development process is equally important for service and product innovation.

The literature also argues that human resources and the structure of project teams are equally important to service and product innovation (e.g. Hollenstein, 2003; Froehle et al., 2000). However, some authors have found that the willingness among the employees to change existing routines is more important for service innovation projects than for product innovation projects (e.g. Nijssen et al., 2006).

Thus, based on the literature, it seems clear that service innovation and product innovation are different in some areas. Nevertheless, previous research on service innovation practice has not investigated whether a consequence of these differences is that the best practice management control systems implemented for service innovation activities are different from the best practice management control systems that prior product innovation studies have identified. Therefore, to explore the management control best practices for service innovation activities and provide an initial view of what these best practises look like, relative to traditional best practices prescribed to product innovation, an exploratory research study was undertaken.

4 Methodology

Due to the exploratory nature of the problem, a qualitative approach was undertaken. As discussed in Section 2, several studies of product innovation practice have found that the management control practice of top performing and low performing firms differs considerably. Thus, the management control *best* practice for product innovation activities may be found by studying top performing firms. We assume that this approach is also applicable to service innovation practice, and therefore, to explore the management control *best* practice, we decided to include only top performing firms with an exceptional service innovation focus in the study.

To identify these firms we started by using recent Community Innovation Survey (CIS2006) data from Norway to identify firms that had an exceptional focus on service innovation in various industries. We also verified if the firms had an expressed focus on service innovation stated in the firm's annual report or in other official documents published by the firm. Firms not expressing a particular focus on service innovation in such documents were removed from the list. Then we ranked these firms according to their research and development (R&D) spending. Finally we used accounting data from the Norwegian Register of Company Accounts, to check whether the firms had a positive growth in operating results during the last five years. A negative growth in operating results indicated that the firm was a low-performer and could indicate that the firm's service innovation efforts had been less successful and that their management control practice could not be perceived as representing best practice. Thus, firms with a negative operating result growth were removed from the ranked list.

We ended up with a list of 10 firms from various industries. Each CEO of these firms was informed about the study, and asked if the firm was interested in participating. If interested, the CEO was also requested to point out the preferred employee to be interviewed about the management control practice. The result of these solicitation efforts was that all 10 firms wanted to participate, and in most cases the CEO pointed out him-/herself or another member of the top-management team to be interviewed. More information about the 10 firms constituting our sample is listed in Table 1.

Table 1: The sample

Firm no.	Number of employees	Industry	Annual turnover 2008	Respondent
A	26	Manufacturing industry	NOK* 43 mill	CEO
B	60	Business services	NOK* 101 mill	CEO
C	87	Oil-services	NOK* 451 mill	CFO
D	90	Telecommunication	NOK* 687 mill	CEO
E	100	Wholesale trade	NOK* 276 mill	CTO
F	418	Oil-services	NOK* 721 mill	R&D director
G	495	Information Technology	NOK* 500 mill	Marketing director
H	1400	Manufacturing industry	NOK* 3,479 mill	R&D director
I	2000	Transport	NOK* 6,226 mill	CIO
J	9000	Business services	NOK* 9,522 mill	Senior researcher

* NOK – Norwegian kroner, the Norwegian currency

Field research in the form of in-depth interviews allowed for a broad and in-depth understanding of the management control practices for service innovation activities in these firms. We developed and deployed a semi-structured interview guide, listed in the appendix, where questions about the five management control dimensions were included. The interview guide started with general questions about the firm and its innovation strategy. To get concrete and specific answers about the management control practice, the respondents were given the opportunity to select one successful and one unsuccessful service innovation project that had been carried out in the firm, and they were asked how these projects had been managed and controlled. Thereafter we asked whether the management control practice for these projects were representative for the firm's normal practice in this area, and we asked open questions about the use of strategic, personnel and cultural management control systems. In addition, we asked a number of closed follow-up questions, for example related to whether specific tools or measures were used, or not, to obtain a more in-depth and complete understanding of the management control practice of each firm. Each interview lasted between one and two hours. All the interviews were recorded and transcribed. The data were then mapped onto the aforementioned five management control dimensions, and the data were analyzed and compared to yield cross-firm results.

5 Comparative results

The results indicated that the management control systems implemented for service innovation activities in the studied top performing firms were different from the best practice management control systems that have been identified in empirical studies of product innovation. Table 2 summarizes the findings.

Table 2: Summary of the findings

Firm no.	Management control system – implemented measures				
	Ex-ante	Development	Ex-post	Strategic	Personnel and culture
A	financial (only cost)	time, cost	technical performance	None	None
B	strategic fit	strategic fit	strategic fit, financial	None	none
C	strategic fit, financial	technical performance, time, cost	technical performance, customer satisfaction	None	competency mapping
D	financial	technical performance, time, cost	technical performance, customer satisfaction	None	competency mapping
E	varies	varies	customer satisfaction (not always)	None	none
F	risk, financial, strategic fit	technical performance	financial, technical performance	financial (sales)	competency mapping
G	strategic fit, financial	time, cost, customer satisfaction	Financial	varies	competency mapping
H	financial, gut feeling	market situation	Financial	financial	employee well-being, competency
I	financial	financial	Financial	financial	none
J	varies	varies	Financial	varies	competency, personality mapping

Detailed results organized along the five dimensions of innovation management control systems are now discussed.

5.1 Ex-ante management control systems

Two firms, Firm E and J, did not follow a structured or explicit procedure when new service innovation ideas were evaluated. These firms carried out ex-ante evaluations in an unstructured manner, and the procedures chosen were not the same for all project ideas. Furthermore, the top-management team did not buy into the evaluation process and decisions were taken by middle-management. The following statement from the respondent of Firm J illustrates the practice: *“In our firm the middle-management often has the authority to decide whether to invest in a new service innovation project or not, and my impression is that how the assessment is done is very dependent on the responsible manager. Our firm does not have*

any pre-defined procedures stating how to carry out ex-ante evaluation. I have experienced that one idea was assessed to be of no value by one manager. Then, after a period this manager was replaced, and the new manager assessed the same idea to be valuable enough to start a new development project.”

The remaining eight firms followed a more structured and explicit procedure when new service innovation ideas were evaluated, and the top-management teams were heavily involved in the process. Nevertheless, how ex-ante evaluations were carried out on a more detailed level, varied somewhat between the eight firms. Some firms deployed a rather simplistic evaluation procedure, while others deployed a somewhat more complex methodology. In the simplistic end of this continuum we found Firm A. Here, project ideas were simply evaluated by assessing whether the firm had the necessary resources available to develop the new service. If these resources were available, a project was launched, but if the needed resources were unavailable, the project was rejected.

The remaining seven firms deployed either a financial method or a business strategy method, or a combination of these two methods. Firm B, for example, deployed business strategy methods exclusively, or as stated by the respondent: *“I think it is correct to say that the service innovation projects we have carried out in the past and will carry out in the future are chosen solely because they are in compliance with our strategy.”* Firm D, H and I assessed the value of service innovation project ideas by calculating the expected net present value. Firm C, F and G deployed a combination of financial methods and business strategy methods, where they started by evaluating if the idea was in compliance with the current strategy, or alternatively, if the idea defined a new desired strategy. If so, they calculated the expected net present value to further investigate the potential value of the project.

Furthermore, some firms were occasionally deploying additional informal “tools”. For example the respondent of Firm H stated that: *“In addition to the present value of the project idea, my own gut feeling is important”*. And the respondent of Firm F stated: *“Sometimes we depart from the required return on investment. Sometimes we develop a new service solely because our competitors offer the service, and our customers expect that this service also is included in our offering.”* Although these practices may be perceived as efforts to evaluate potential intangible effects, our main observation was that the vast majority of interviewed firms did not make a considerable effort to assess or value qualitative and intangible effects,

like a project's learning potential, or its potential to improve the firm's image or competitiveness. Even more striking; none of the firms deployed any form of scoring model or checklist in any structured manner.

Some respondents were satisfied with the ex-ante management control system implemented in their firm. For example the respondent of firm H stated: *"I think the majority of firms spend much time on ex-ante evaluation. But we don't. We only do a quick assessment and start the development as quick as possible. This is a part of our culture. Thus, it is important not to change this practice."* However, the vast majority of respondents reported that the ex-ante control practice in their firm was problematic and inappropriate. They meant that the practice should be improved to ensure that the most valuable project ideas were selected, and to enable reasonable ex-post control and control in the development stage. For example, the respondent of Firm I stated: *"It is often a problem that soft values are omitted, while all emphasis is placed on financial values."* The respondent of Firm E stated that *"we need to gain more knowledge on how a firm like ours should carry out ex-ante evaluations, and we need to implement relevant tools that can assist us in this task."* The respondent of Firm A stated: *"I often have a feeling that we are not able to realize all the potential of a project, but since we have not evaluated this beforehand it is very difficult for me to pinpoint exactly what we are missing. We need to improve our practice in this area."*

5.2 Management control systems for the development stage

All the firms made some efforts to measure and evaluate the status of on-going service development projects. However, how this was accomplished in practice varied. Three firms, Firm F, H and J, had implemented a formal stage-gate process for new service development. Firm F's respondent stated: *"We have defined a development process with four stages. Before a project is allowed to continue to a new stage, the project manager needs my signature."* The respondent of Firm J stated: *"If you ask our top-management they will claim that they have implemented a well defined formal stage-gate process with clear decision points."* In Firm H the stages were not strictly defined, but all projects were evaluated on pre-defined dates. The respondent stated: *"The top-management team evaluate all on-going projects once every month."*

How the projects in practice were evaluated at the gates, however, varied. In firm F the technical solutions were given most attention. The respondent stated: *"It is difficult to*

describe the technical solution ex-ante. Therefore, during development we often find a new solution. When I stop a project on a gate it is usually because the project team is not able to find a good technical solution.” In firm J several factors were given attention. When describing a specific project the respondent stated: *“Primarily the management was assessing cost and time consumption, but they were also assessing the market response. For example they participated on different business conferences and registered to what degree potential customers were interested.”* Firm H also paid most attention to the market potential at the gates. This firm was also very focused on actually terminating on-going projects that did not develop successfully at the gates. The respondent stated: *“We often decide to cancel projects that do not demonstrate a high degree of market fit. We must be willing to do this. This is the price we have to pay for being so quick in the pre-project stage.”*

The remaining firms had not implemented a formal stage-gate process, but still, on-going projects were evaluated. The practice varied to some degree, however. At one end of the continuum firms were evaluating on-going projects rather intensively, and at the other end of the continuum firms were evaluating on-going projects more superficially. Firm A and E belonged to the latter category. Firm A focused solely on time, and evaluated if the project team was able to meet deadlines. However, these evaluations seldom resulted in project terminations or other changes. In Firm E, the evaluation of on-going projects were even more superficial. The following statement from the respondent illustrates this: *“We tried to implement this new service in a period of five years. The involved people became frustrated and sad. We did not analyse properly why this happened, but after five years we decided to cancel the project.”*

The five remaining firms (Firm B, C, D, G and I) had implemented somewhat more complex evaluation mechanisms. In these firms, evaluation of on-going projects often resulted in different actions. Firm G, for example, often tested new services on pilot-users before launching the service to a wider market. Often such testing resulted in re-design of the service. Another example in this category is Firm I. The respondent explained that this firm often implemented small parts of the whole service, and the project team had to demonstrate that these isolated parts had the expected effects. If not, the project may be terminated.

None of the interviewed firms had built portfolio management into the management control systems for the development stage. During the development stage the projects were not

compared with other on-going projects or project ideas. Thus, portfolio considerations were done ex-ante solely.

The vast majority of respondents were satisfied with the process controls implemented in the firm. One exception was the respondent of Firm E. This respondent explained that an improved practice was needed to be able to stop projects earlier when it becomes clear that the project will not succeed.

5.3 Ex-post management control systems

All the firms evaluated the outcomes of service innovation projects ex-post. However, they used a very limited number of measures. Potential qualitative effects, like for example learning effects and image effects, were not gauged.

Firm F, G, H, I and J measured solely the financial impact of the new service. The practice of these firms is illustrated by the following statement of Firm G's respondent: *"We do not focus much on ex-post measures. We want to look forward, instead of focusing on prior projects. So we restrict ourselves to measuring the revenue associated with the new services."*

Firm B and F also included evaluations of other effects, in addition to the financial measures. Firm B combined financial measures with measures related to whether the strategic intentions were fulfilled. Referring to the ex-post evaluation of a service innovation project recently completed, the respondent stated: *"The new service has yielded positive financial return. So it has not been a financial disaster. However, the strategic objectives have not been met."* Firm F combined financial measures with measures of technical performance (up-time).

The remaining three firms had not implemented financial ex-post measures. Firm E had implemented some measures of customer satisfaction, whereas Firm C and D measured both customer satisfaction and technical performance (up-time).

5.4 Strategic management control systems

In all the firms service innovation activities were needed to achieve strategic goals, and they all followed a prospector strategy, meaning that they valued being the first with new solutions. Despite these strategic intentions, the firms made few efforts to gauge how well the

businesses' total service innovation portfolio performed and to evaluate to what degree the service innovation activities contributed to achieving the strategic goals.

Seven firms, Firm A, B, C, D, E, G and J, had not implemented any structured procedure to measure or evaluate the strategic contribution of the portfolio. The efforts made by these firms to control the portfolio performance were not based on explicit measures, but rather on more indirect measures or subjective "gut-feelings". The following statement of Firm D's respondent illustrates the practice in these firms: *"We measure if we achieve our strategic goals every day, and our innovation activities are really nothing else than an instrument to achieve these goals. Thus, if our strategic goals are achieved, this means that our innovation activities as a whole are satisfactory."*

The three remaining firms, Firm H, F and I, measured the overall revenue generated by new services to gauge the total performance of the service innovation activities. The respondent of firm H stated: *"We do not deploy any advanced methods to find out if our innovation goals are achieved. We simply monitor the sales figures. These figures really tell everything. After all, these are the reason for our existence."*

To summarize; none of the firms used multiple measures to gauge the performance of their portfolio, and none of the firms used any specific tool or methodology in this area.

5.5 Personnel and cultural management control systems

Several firms highlighted the importance of having personnel with the right qualifications and an appropriate culture to succeed with their service innovation activities. For example the respondent of Firm H stated: *"My main focus is to create and maintain an innovative culture in the firm. If the culture is present, the innovation process is self-driven."* The respondent of Firm J stated: *"To succeed with an innovation project, it is important that the team-members have different and complementary personalities and knowledge."*

The majority of firms had implemented some controls related to whether the personnel had the right qualifications. However, the formality of the procedure, the measures chosen and the actions taken if knowledge gaps were identified, varied. The following statements of the respondents of firms G and H, respectively, illustrate the variations: *"We continually evaluate if we have the competence we need. If the competence is lacking in some areas, we implement*

actions. In the past, for example, we bought an entire company mainly to fill knowledge gaps in our firm.” ”We use many resources to hire the right people. We will not be able to achieve our goals without the right personnel. An engineer applying for a job in our firm is interviewed by between eight and ten different persons before we hire him.”

This illustrates that even if the practice varied, there seemed to be an awareness related to personnel controls in the majority of firms. This could not be said about cultural controls, however. Only the respondent of Firm H stated that a cultural management control system had been implemented: *“We think that the employees’ job satisfaction is a good indicator to gauge if we have an appropriate culture. We measure job satisfaction frequently, and we score well.”* The remaining nine firms had not implemented any specific measures to evaluate, manage and control their culture.

6 Conclusions

Two key tendencies were found. The first was that the management control systems we identified were different from the management control systems that have been identified in empirical studies of product innovation best practice. The second was that the practice we identified varied somewhat between the studied firms. Thus, we may draw our conclusions along two dimensions:

1. The management control systems implemented for service innovation activities in the ten top performing firms studied were simplistic, one-dimensional and predominated by financial measures. This means that the identified management control systems were different from the management control systems that have been identified in empirical studies of product innovation best practice. The management control systems, prescribed to product innovation management, are multi-dimensional, relatively complex and are focusing both financial and non-financial measures. The following observations substantiate our conclusion in this area: 1) the implemented ex-ante and ex-post management control systems placed most emphasize on financial measures, while non-financial measures, for example measured by scoreboards or checklists, were only used to a limited extent, 2) portfolio management was not built into the management control systems for the development stage, 3) strategic management control systems measuring how well the businesses’ total service innovation portfolio performed, were rarely implemented, and when such controls were implemented, only financial impact was taken into account, and 4) cultural management control systems were not implemented.

2. The management control practice varied somewhat between the firms studied. Some firms had implemented a relatively large number of measures and followed a structured procedure, while other firms were more unstructured and used relatively few measures. Variations were found for all dimensions of management control systems: 1) some firms had implemented either financial methods or strategic methods for ex-ante control, whereas other firms combined these methods, 2) some firms had clearly defined go/kill gates built into the service development process, and other firms evaluated on-going projects more superficially and unstructured, 3) some firms evaluated financial effects, customer satisfaction effects or technical performance ex-post, whereas other firms evaluated two or three of these dimensions, 4) some firms did not measure how well the firm's total service innovation portfolio performed, while other measured its financial impact, and 5) some firms had not implemented any personnel or cultural controls, whereas some had implemented a few personnel controls.

7 Discussion

7.1 Product innovation vs. service innovation best practice

As discussed in Section 3, prior research has found several differences between service and product innovation. Due to this we expected to find some differences between our observations of management control best practice for service innovation activities and management control best practices for product innovation activities as revealed by literature and previous studies. Thus, it was not surprising that differences were identified. However, from our point of view, the character and the direction of the differences were to some degree surprising and unexpected.

For example, the identified service innovation ex-ante and ex-post management control systems, placed less emphasize on non-financial measures than the best practice ex-ante and ex-post management control systems found in product innovation studies. For us, this was surprising because prior service innovation research (e.g. de Jong et al., 2003) has suggested that service innovation effects often have a qualitative nature with predominantly financial payoffs in the long-term, rather than the short-term, perspective. Furthermore, the normative management control literature (e.g. Merchant and Van der Stede, 2007) suggests that non-financial measures should be implemented to capture qualitative effects, and that implementation of only financial measures may cause managers to focus on, and invest in,

activities with short-term profit focus rather than strategically more important activities. Based on this we question whether the best practice we identified in this area should generally be recommended to other firms emphasizing service innovation.

In addition, the identified practices were different from the practices prescribed to product innovation activities in the sense that portfolio management was not built into the management control systems for the development stage, and in the sense that strategic and cultural management control systems were implemented to a lesser degree. These findings are also difficult to explain based on prior research. As discussed in Section 3, prior research has found that service innovation projects tend to be more incremental than product innovation projects and that the willingness among the employees to change is more important for service innovation than for product innovation. We would expect that these differences should increase the need for portfolio management, and strategic and cultural management controls, and not reduce the need for this kind of management control. Thus, also in these areas, we question whether the management control practice observed among our respondents should be recommended.

7.2 Management control variations

All the firms in our sample followed a prospector strategy and had an exceptional focus on service innovation. However, our sample consisted of small and large firms from different industries, and therefore a relevant question is whether these variations resulted in implementation of different management control systems. Our results do indicate some variations in management control practice within the sample. This may imply that a one size fits all management control system, suitable to handle all types of service innovation activities across all firms and industries, may not exist.

Based on our data, however, it was difficult to identify factors that could to explain the observed variations. There seemed to be a relationship between firm size and implementation of strategic management control systems. Large firms had a greater tendency to implement strategic controls than smaller firms. There also seemed to be a relationship between firm size and ex-post controls. Large firms had a tendency to implement financial ex-post measures, while smaller firms had a tendency to implement non-financial ex-post measures. On the whole, however, the variation in management control systems seemed to be relatively unsystematic and independent of factors like firm size, industry and types of service

innovations focused. Thus, we are not able to draw clear managerial implications based on the variations identified.

7.3 Limitations and further research

We believe that by deploying a qualitative approach we were able to identify the true practice in the studied firms, and we are also confident that the sampling procedure provided us with true top performing firms with an exceptional service innovation focus. Thus, we believe that the main tendencies reported in this paper may be replicated in a similar study. However, as our discussion indicated, the main tendencies are surprising to us when we compare the results with the results of empirical studies of product innovation best practice. As a result, we do not have sufficient knowledge to decide if the best practices identified in this paper should be recommended to service innovation managers.

A limitation with our approach is that the product innovation best practice studies we compare our results with have been carried out in other contexts and to some extent also with different methodological approaches. Thus, there is a risk that the results of our study are not completely comparable with the results of the best practice product innovation studies. Another limitation is that we only include top performing firms in the sample, and for this reason we are unable to explore if the management control practices of low performing firms are different from the practice of the top performers. For this reason, we are also unable to conclude that the excessive performance of the studied firms is caused by their management control practice, or if the performance of these firms has been caused by other factors.

Due to these limitations, we suggest that the management control best practice for service innovation activities should be further investigated in a broader quantitative or qualitative follow-up study where both firms with an exceptional focus on service innovation and firms with an exceptional focus on product innovation are included. We also suggest that both low and top performing firms should be included in this follow-up study. In this way it will be possible to investigate if the management control practice of top-performers differs from the management control practice of low-performers in any systematic manner, and if the management control variations may be able to explain the performance differences. To strengthen the design we also suggest that this follow-up study should control for other factors than management control practices, i.e. organisational structure, innovative culture, innovation strategy, management style etc., that may also explain variations in performance.

In addition, the follow-up study should continue the search for factors that may explain variations in management control practice. More specific knowledge of these areas may have important managerial implications and may provide valuable insight about the type of management control system that should be recommended in different circumstances.

Nevertheless, a general limitation with all non-experimental (observational) research, like ours and the suggested follow-up study, is that it is only able to identify, describe, explain and evaluate the present practice (e.g. Gerring and McDermott, 2007). Thus, this kind of research is not able to find out whether alternative practices would be more beneficial from a managerial point of view. An unambiguous observation in our study was that the management control systems we identified were different from the management control systems that have been identified in empirical studies of product innovation best practice. Furthermore, we were surprised that the best practice management control systems for service innovations were more simplistic and placed less emphasize on non-financial measures than the best practice management control systems found in product innovation studies, since prior service innovation research (e.g. de Jong et al., 2003) has suggested that service innovation effects often have a qualitative nature with predominantly financial payoffs in a long-term, rather than a short-term, perspective. Thus, a relevant question is whether service innovation management may benefit from adopting management control systems based on those prescribed to product innovation management. We therefore suggest that a parallel research stream should investigate this by conducting field experiments or action research where different management control systems prescribed to product innovation are adapted to comply with the specific characteristics of service innovation, and implemented and tested systematically in service innovating firms.

8 References

Aas, T.H. and Pedersen P.E. (in press), "The firm-level effects of service innovation: A literature review", *International Journal of Innovation Management*, forthcoming.

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

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

Belliveau, P., Griffin, A. and Somermeyer, S. (2002), *The PDMA ToolBook 1 for New Product Development*, John Wiley & Sons, New York.

Belliveau, P, Griffin A. and Somermeyer S. (2004), *The PDMA ToolBook 2 for New Product Development*, John Wiley & Sons, New Jersey.

Berry, L.L., Shankar V., Turner Parish J., Cadwallader S. and Dotzel T. (2006), “Creating new markets through service innovation”, *MIT Sloan Management Review*, Vol. 47 No. 2, pp. 56-63.

Bryson, J.R. and Monnoyer C.M. (2004), “Understanding the relationship between services and innovation: The RESER review of the European service literature on innovation, 2002”, *The Service Industries Journal*, Vol. 24 No.1, pp. 205-22.

Cooper, R.G. and Edgett, S.J. (2008), “Maximizing Productivity in Product Innovation”, *Research Technology Management*, Vol. 51, pp. 47-58.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (1999), “New Product Portfolio Management: Practices and Performance”, *Journal of Product Innovation Management*, Vol. 16, pp. 333-51.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2002a), “Optimizing the stage-gate process: What best-practice companies do-I”, *Research Technology Management*, Vol. 45, pp. 21-27.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2002b), “Optimizing the stage-gate process: What best-practice companies do-II”, *Research Technology Management*; Vol. 45, pp. 44-49.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2004a), “Benchmarking best NPD practices-I”, *Research Technology Management*, Vol. 47, pp. 31-43.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2004b), "Benchmarking best NPD practices-II", *Research Technology Management*, Vol. 47, pp. 50-59.

Cooper, R.G., Edgett, S.J. and Kleinschmidt, E.J. (2004c), "Benchmarking best NPD practices-III", *Research Technology Management*, Vol. 47, pp. 43-55.

Coombs, R. and Miles, I. (2000), "Innovation, measurement and services", in Metcalfe, J.S. and Miles, I. (Eds), *Innovation Systems in the Service Economy. Measurement and Case Study Analysis*, Kluwer Academic, Boston, MA, pp. 85-103.

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

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

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

Djellal, F. and Gallouj, F. (2001), "Patterns of innovation organisation in service firms: postal surveys results and theoretical models", *Science and Public Policy*, Vol. 28 No.1, pp. 57-67.

Drejer, I. (2004), "Identifying innovation in surveys of services: a Schumpeterian perspective", *Research Policy*, Vol. 33, pp. 551-62.

Droege, H., Hildebrand, D. and Forcada, M.A.H. (2009), "Innovation in services: present findings, and future pathways", *Journal of Service Management*, Vol. 20 No. 2, pp. 131-55.

Fitzsimmons, J.A. and Fitzsimmons M.J. (2000), *New Service Development: Creating Memorable Experiences*, Sage, Thousand Oaks, CA.

Froehle, C.M., Roth, A.V., Chase R.B., and Voss C.A. (2000), "Antecedents of new service development effectiveness: an exploratory examination of strategic operations choices", *Journal of Service Research*, Vol. 3 No. 1, pp. 3-17.

Gerring, J. and McDermott, R. (2007), "An experimental Template for Case-Study Research", *American Journal of Political Science*, Vol. 51 No. 3, pp. 688-701.

Griffin, A. (1997), "PDMA Research on New Product Development Practices: Updating Trends and Benchmarking Best Practices", *Journal of Product Innovation Management*, Vol. 14, pp. 429-58.

Henard, D.H. and Szymanski, D.M. (2001), "Why some new products are more successful than others", *Journal of Marketing Research*, Vol. 38, pp. 362-75.

Hipp, C. and Grupp, H. (2005), "Innovation in the service sector: the demand for service-specific innovation measurement concepts and typologies", *Research Policy*, Vol. 34, pp. 517-35.

Hollenstein, H. (2003), "Innovation modes in the Swiss service sector: a cluster analysis based on firm-level data", *Research Policy*, Vol. 32, pp. 845-63.

Irani Z. and Love, P.E.D. (2002), "Developing a frame of reference for ex-ante IT/IS investment evaluation", *European Journal of Information Systems*, Vol. 11, pp. 74-82.

Jönsson S. and Lukka K. (2007), "There and Back again: Doing Interventionist Research in Management Accounting", in Chapman, C.S., Hopwood, A.G. and Shields, M.G. (Eds.), *Handbook of Management Accounting Research Volume 1*, Elsevier, Oxford.

Kahn, K.B. (2005), *The PDMA Handbook of New Product Development*, John Wiley & Sons, New Jersey.

Lu, I.Y., Lin L.H. and Wu G.C (2005), "Applying options to evaluate service innovations in the automotive industry", *International Journal of Technology Management*, Vol. 32 No. 3/4, pp. 339-49.

Martin, C.R. and Horne D.A. (1993), "Service innovation: successful versus unsuccessful firms", *International Journal of Service Industry Management*, Vol. 4 No. 1, pp. 49-65.

Matear, S., Gray B.J. and Garrett T. (2004), "Market orientation, brand investment, new service development, market position and performance for service organisations", *International Journal of Service Industry Management*, Vol. 15 No. 3, pp. 284-301.

Merchant, K.A. and Van der Stede, W.A. (2007), *Management Control Systems: Performance Measurement, Evaluation and Incentives*, Pearson Education Limited. Edinburgh.

Miles, I. (2005), "Innovation in services", in Fagerberg J., Mowery D.C., Nelson R.R. (Eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford.

Nijssen, E.J., Hillebrand, B., Vermeulen, P., and Kemp, R.G.M. (2006), "Exploring product and service innovation similarities and differences", *Research in Marketing*, Vol. 23, pp. 241-51.

Simons, R. (2000), *Performance Measurement & Control Systems for Implementing Strategy*, Pearson Education International, New Jersey.

Tether, B. (2003), "The sources and aims of innovation in services: Variety between and within sectors", *Economics of Innovation & New Technology*, Vol. 12 No. 6, pp. 481-505.

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

Appendix: Interview guide

1. Please give an account for the firm's strategy and innovation strategy and explain the role of service innovation.
2. Can you give some examples on new or improved services introduced by the firm lately?
3. Can you please select one service innovation project you consider to have been *successful*, and explain a) how you assessed the value of the project idea, b) why this project was selected, c) how you controlled the project in the development phase, and d) how you measured the performance ex-post?
4. Can you please select one service innovation project you consider to have been *unsuccessful*, and explain a) how you assessed the value of the project idea, b) why this project was selected, c) how you controlled the project in the development phase, and d) how you measured the performance ex-post?
5. Are the control procedures explained for the aforementioned projects representative for your normal practice, or do you usually handle control of service innovation projects in other ways?
6. Do you think that the strategic goals related to service innovation activities are achieved, and how is this measured or evaluated?
7. Do you think your firm is qualified (i.e. is in position of the needed knowledge, personnel, culture, organisation structure etc.) to carry out service innovation activities, and how are such antecedents evaluated or measured?
8. Are you satisfied with the firm's existing management control practice related to service innovation activities? What areas do you think need improvement?

Paper II⁸

⁸ Aas, T.H. and Pedersen P.E. (2009). “The firm-level effects of service innovation: A literature review”, Accepted for publication in *International Journal of Innovation Management*.

The Firm-level Effects of Service Innovation: A Literature Review

Tor Helge Aas
University of Agder

Per Egil Pedersen
University of Agder

Abstract

Despite the importance of service innovation, its effects have been given relatively little explicit attention in the extant literature. Instead researchers often implicitly assume that firm-level service innovation activities result in a number of positive financial and other effects. This paper conducts a systematic review of literature on the firm-level effects of service innovation and attempts to identify and categorize the effects suggested in the literature. The review reveals a considerable number of potential firm-level service innovation effects that have been discussed in extant research. We suggest that they may be divided into five effect categories: 1) business process effects, 2) capability effects, 3) relationship effects, 4) financial performance effects and 5) competitiveness effects. The findings suggest directions for further research that aims to develop a causal model of service innovation effects.

Keywords

Service innovation, Service innovation effects, New service development, New service development effects

1 Introduction

The service industry accounts for more than 70% of the GNP and employment in most developed countries (e.g. Spohrer and Maglio, 2008). Most authors agree that service innovation is critical for both service and manufacturing firms' success, both in the short- and long-terms (e.g. Berry et al., 2006; Bryson and Monnoyer, 2004; de Jong et al., 2003; Lu, Lin and Wu, 2005; Matear, Gray and Garrett, 2004; Miles, 2005; Tidd and Hull, 2003). Managers that consider alternative uses of their financial and managerial resources, however, need knowledge of the potential effects of using their resources on service innovation. It is therefore worrying that a comprehensive theory of the potential firm-level effects of innovation is not readily available, particularly because it has been argued that “*due to the nature of services (intangibility, heterogeneity), the impact of service innovations is harder to trace than in manufacturing*” (de Jong et al., 2003, p. 61). We therefore argue that providing an overview of the potential effects of service innovation represents an important contribution to the service innovation literature.

To develop a more comprehensive theory of service innovation effects, we apply a bottom-up procedure that explores, lists and categorizes the impacts of service innovation as they are found in the innovation research literature. We call this categorized list of potential service innovation effects “the service innovation opportunity set”.⁹ The identification of this opportunity set derives from a systematic review of the service innovation research literature.

2 Theory

2.1 Innovation effects

Innovation research is cross-disciplinary, and “*no single discipline deals with all aspects of innovation*” (Fagerberg, 2005, p. 3). The same applies to the literature on *innovation effects*; at least four research traditions are relevant, including: 1) the economics literature on innovation, 2) the strategic management literature, 3) the organizational change literature, and 4) the innovation management literature.

⁹There may be potential firm-level effects of service innovation that is not manageable. The service innovation opportunity set will thus be a subset of the comprehensive list of potential effects.

The *economics literature on innovation* has largely been engaged with the effects of innovation on society, i.e. on the national or regional level, and is thus of little assistance in identifying the firm-level service innovation opportunity set. In particular, three topics have received considerable attention: 1) the relationship between innovation and economic growth (e.g. Fagerberg, 2005; Verspagen, 2005), 2) the relationship between innovation and employment (e.g. Pianta, 2005), and 3) the relationship between innovation and competitiveness (e.g. Cantwell, 2005).

Competitiveness is also a core topic in the *strategic management literature*, which has focused on firm- and network-level effects. The core question raised in the field of strategic management is how firms achieve and sustain competitive advantage (Teece, Pisano and Shuen, 1997). Porter (1980) suggests that a firm is able to obtain above-normal performance and sustained competitive advantage by implementing a cost-leadership strategy, a differentiation strategy, a segmentation strategy, or a focused strategy. Innovation is a strategy enabler that may increase the competitive advantage. Despite this obvious relationship between the strategy and innovation fields, most relevant research has focused on either innovation or strategy, and several authors (e.g. Adler et al., 1992; Englund and Graham, 1999; Krinsky and Jenkins, 1997) note that there have been relatively few attempts to integrate the two fields. However, a research stream trying to bridge innovation and strategy is now emerging, and the combination of the two concepts is often called strategic innovation (e.g. Geroski, 1998; Schlegelmilch, Diamantopoulos and Kreuz, 2003). Schlegelmilch, Diamantopoulos and Kreuz (2003) suggest that the drivers of strategic innovation are culture, process, people, and resources, and that the potential outcomes or effects are customer value and competitive positioning effects.

The *organizational change literature*, or alternatively the organizational innovation literature, also uses the firm (or organization) as the main unit of analysis. A recent review (Armenakis and Bedeian, 1999) suggests that the outcome (effect) variables employed in this field often involve success/failure criteria such as profitability or market share. Actions required to implement an organizational change, however, may evoke individual responses that are often “*complementary criteria for tracking the likelihood of employees enacting behaviours necessary for achieving desired changes*” (Armenakis and Bedeian, 1999, p. 304). Thus, effects at the individual level in organizations are often given more attention than firm-level effects in this field. Individual-level constructs such as receptivity (Clarke et al., 1996),

resistance (Clarke et al., 1996), commitment (e.g. Becker, 1992), cynicism (Dean, Brandes and Dharwadkar, 1998) and stress (Schabracq and Cooper, 1998) are examples of individual-level effects of organizational change that are often emphasized and measured in the organizational change literature.

The *innovation management literature* focuses on the firm-level effects of innovation and aims to provide normative guidance to innovation managers (Tidd, Bessant and Pavitt, 1997). The effects of innovation are relevant to this field for at least two reasons: 1) to identify the factors behind success or failure of innovative projects, measures of success and failure (i.e. measures of the effect) are needed, and 2) managers need relevant measures of the performance (effects) of their investments in innovation activities to control and manage them. Van der Panne, van Beers and Kleinknecht (2003) review the literature on success and failure of innovation, and identify a number of success factors. When studying the success factors in more detail, however, it seems that success or failure in innovation has been an ambiguous and difficult variable to define and measure. Several authors have addressed different aspects of this variable. Some (e.g. Martin and Horne, 1995) have measured this variable in a simplistic manner, for example by asking managers whether they perceive a specific innovation project to be successful. Others (e.g. de Brentani, 1991; de Brentani, 2001; Lievens and Moenaert, 2000; Van Riel, Lemmink and Ouwersloot, 2004) have deployed more sophisticated measures of success that cover a wider range of innovation effects. Thus, the definition of service innovation success or failure remains unclear, complicating the aggregation of innovation management research on success factors into a more comprehensive theory of innovation effects.

The innovation management literature focusing on performance measurement also constitutes a heterogeneous body of knowledge on innovation effects. Tidd (2001) suggested two broad classes of performance measures: 1) accounting and financial performance measures, and 2) market performance measures. Tidd, Bessant and Pavitt (2001) have suggested that the impact of innovation is threefold, resulting in: 1) financial benefits, 2) increased customer value, and 3) strategic success. Griffin and Page (1996) have further argued that the performance measures of new product development may be divided into three categories: 1) measures of customer-based success, 2) measures of financial success, and 3) measures of technical performance success. Additional performance measurement guidance is provided by innovation handbooks and toolbooks from product development and management associations

(Belliveau, Griffin and Somermeyer, 2002; Belliveau, Griffin and Somermeyer, 2004; Kahn, 2005). This prescriptive literature highlights the “*importance of an effective, efficient product development metrics program*” (Chan, 2005, p. 445). Referring to recent research, Chan (2005) proposed that “...*although many companies are tracking metrics, few are leveraging their full potential...*” (p. 446). She has provided an outline for the development and implementation of an innovation performance measurement system, but has not specifically identified the measurements that firms should consider.

This brief review highlights the difficulty of constructing an overview of potential innovation effects. This problem is especially evident at the firm level, where the strategic management, organizational change, and innovation management literatures do not form a consistent body of knowledge on the firm-level effects of innovation. This deficiency is serious from both managerial and research perspectives. Managers considering alternative uses of their financial and managerial resources need knowledge of the potential effects of using those resources on innovation. Researchers investigating the results (success or failure) of innovation need a more comprehensive theory of innovation effects for comparative analysis and the construction of aggregated explanatory and normative theories.

A taxonomy of potential innovation effects at the firm level would thus provide a significant contribution to the innovation management literature. Innovation is, however, a very broad area, and the development of a firm-level innovation effect theory for all types of innovation extends beyond the scope and capacity of a single research paper. Tidd (2001) has suggested three basic forms of innovation: 1) product innovation, 2) service innovation, and 3) process innovation. This paper focuses only on service innovation, in part due to its novelty and recently acknowledged importance (e.g. Page and Schirr, 2008). The approach and method applied here may later be extended to cover other innovation types.

2.2 Service innovation

The service sector has grown significantly throughout the industrial world since the 1950s (Miles, 2005). In 2003, services constituted more than 77% of the value added in the United States, and 73% of the value added in the United Kingdom (Grönroos, 2007). These statistics cover services provided only by firms in the “service sector”; today, however, most manufacturing firms also offer a number of services to their customers. Grönroos (2007) called these services “*hidden services*”, because “*in statistics they are registered as part of*

manufacturing's contribution to GNP" (p. 3). Gadrey et al. (1995) defined service as "to organise a solution to a problem (a treatment, an operation) which does not principally involve supplying a good. It is to place a bundle of capabilities and competences (human, technological, organisational) at the disposal of a client to organise a solution..." (p. 5). Other definitions are less complex, but one vital element is the delivery of something from one party to another without the transfer of a tangible product. Traditional definitions thus distinguish between intangible services and tangible goods. Vargo and Lusch (2004) have suggested an alternate view called the service-dominant logic, in which they have proposed that goods cannot be the primary unit of exchange. They have defined services "as the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity than the entity itself" (p. 2).

Due to the growing importance of services at the firm and societal levels, *service innovation* has increasingly become a topic of interest to researchers, policy makers and managers (Miles, 2005). Menor et al. (2002) characterized service innovation as "an offering not previously available to a firm's customers resulting from the addition of a service offering or changes in the service concept that allow for the service offering to be made available" (p. 138). Van der Aa and Elfring (2002) stated that that service innovation "is encompassing ideas, practices or objects which are new to the organisation and to the relevant environment, that is to say to the reference groups of that innovator" (p. 157). Den Hertog (2000) has defined four dimensions of service innovation that illustrate its complexity: 1) new service concept, 2) new client interface, 3) new service delivery system, and 4) new technological options. Innovation at the firm level is often divided into product and process innovation (Tidd, Bessant and Pavitt, 2001), but these traditional categories may be insufficient for innovation in services (e.g. Bitran and Pedrosa, 1998; de Jong et al., 2003). Service innovation may encompass both product and process innovation, or as stated by de Jong et al. (2003): "Because of the simultaneity of services, product- and process innovations usually coincide. New services often go together with new patterns of distribution, client interaction, quality control and assurance, etc." (p. 17).

The term "new service development" (NSD) is often used as a sub-category of "new product development" (NPD). NSD may thus seem more narrowly defined than service innovation. Johnes and Storey (1998) have stated that "NSD is the development of service products which are new to the supplier" (p. 185). However, when innovations discussed in the NSD literature

are further analyzed, our impression is that den Hertog's (2000) service innovation dimensions are applicable. In this paper we therefore consider the terms "NSD" and "service innovation" to be synonymous.

Little research has focused on the effects of service innovation. De Jong et al. (2003) found that "... *the amount of literature which focuses on the effects of innovation in service firms is surprisingly low ...*" (p. 51). Similarly, Nysveen and Pedersen (2007) found no focused descriptive research articles that aimed to identify or categorize the effects of service innovation. The lack of any overview, typology or taxonomy for the potential firm-level effects of innovation thus seems particularly applicable to the field of service innovation.

2.3 Research goals

A theory of firm-level service innovation effects is necessary, and may begin with an overview of the potential effects of service innovation, i.e. the service innovation opportunity set. Consequently, our principal goal in this paper is to identify the potential firm-level effects of service innovation. Our second goal is to suggest a categorization of this opportunity set into a taxonomic schema to more fully develop this theory.

3 Method

Potential effects of service innovation may be identified by conducting empirical studies with survey or case-study designs. An alternative approach is to use existing research as the empirical source of the study. Although service innovation has traditionally been given less attention than product innovation (de Jong et al., 2003), the number of research articles on this topic has increased considerably in recent years. Thus, we argue that an aggregated view of the service innovation opportunity set may be provided through a review of the service innovation research literature.

Articles for such a review may be selected in several ways. One approach uses "narrow" search terms such as "new service development effects", "service innovation outcomes" or "service innovation results". With this approach, most of the identified articles would focus on the topic relevant to this paper. Nysveen and Pedersen (2007), however, found very few research articles focusing solely on service innovation *effects* when using narrow search terms. The authors stated that "...*for articles discussing innovation outcomes, no articles were identified only discussing innovation outcomes in the form of innovation performance.*"

(p. 38). An alternative approach, employed in this study, uses wider search terms combined with a manual review of each article's content. The search terms "service innovation" and "new service development" were used to identify a large number of articles potentially covering service innovation effects. While this approach requires the extensive step of searching article content, it conveys the obvious advantage of allowing most articles with a discussion of service innovation effects to be included in the review. We thus argue that it is most appropriate for the purpose of this paper.

We searched articles in two EBSCO databases, Academic Source Premier and Business Source Complete. Academic Source Premier is a multi-disciplinary database including more than 4,500 journals, while Business Source Complete includes 1,200 journals relevant to business and management. A search for peer-reviewed articles including the terms "new service development" or "service innovation" in the abstract yielded 325 hits in these databases. From this sample, 183 were peer-reviewed research articles studying service innovation as defined in this paper. Of these, 73 directly or indirectly covered the effects of service innovation. Directly considered service innovation effects were measured or theoretically derived in the research reported in the articles, while indirectly considered effects were referenced and discussed more generally by authors other than those who conducted the primary research. The 73 articles covering service innovation effects are listed in appendix A.

Each article was coded according to seven predetermined classifier variables. The principles for selecting classifier variables were guided by those applied in the NPD-focused review of Montoya-Weiss and Calantone (1994), but were adapted to fit the purpose of this paper. The following variables were used: 1) year of publication, 2) type of study [empirical (qualitative or quantitative) or conceptual/theoretical], 3) aim of study (exploratory, descriptive, explanatory or normative), 4) scope of study (service innovation project or service innovation programme), 5) type of organization studied [industrial (B2B) or consumer (B2C)], 6) geographic region studied and 7) industry studied. Table 1 summarizes the classification of the identified articles with these variables.

Table 1: Study characteristics

Classifier Variable	Number of articles	%
Year of publication		
- 2000	13	17.8
2001-2003	14	19.2
2004-2006	31	42.5
2007-	16	21.9
Type of study		
Empirical	53	72.6
Qualitative	23	31.5
Quantitative	30	41.1
Theoretical	18	24.7
Aim of study		
Exploratory	9	12.3
Descriptive	10	13.7
Explanatory	31	42.5
Normative	14	19.2
Scope of study		
Service innovation project	14	19.2
Service innovation programme	57	78.1
Type of organization studied		
Industrial (business to business)	7	9.6
Consumer (business to consumer)	35	47.9
General	29	39.7
Geographic region studied		
United States	10	13.7
Europe	26	35.6
Asia	5	6.8
Other	5	6.8
General	25	34.2
Industry studied		
Telecom/mobile services	5	6.8
Airline and tourism services	4	5.5
Finance/banking	14	19.2
Other	19	26.0
General	29	39.7

As illustrated in Table 1, 53 articles could be classified as empirical studies that used a quantitative or qualitative method to investigate a specific research problem, while the remaining 18 articles were theoretical or conceptual. Discrimination between empirical and theoretical articles in the sample, however, was not straightforward. For example, several articles focusing on conceptual elements included a simple empirical case study to justify the conclusions. We have classified such articles as empirical for the purposes of this study. The aim of some studies was also difficult to determine. For example, an article primarily descriptive or explanatory in nature may also include some normative elements and implications. We have classified such articles based on our opinion of their primary focus.

We registered the following information about the content of each article: 1) the innovation studied, 2) the explanatory and explained variables (if relevant), 3) the service innovation effects measured (empirically) or derived (theoretically), and 4) the service innovation effects mentioned, discussed or suggested. The results of this categorization form the basis for the analysis presented in the next section.

4 The firm-level effects of service innovation

We identified 278 individual firm-level effects that were measured in empirical studies or derived in theoretical studies. A first step in identifying and organizing the service innovation opportunity set is to identify patterns in the reported effects. Our methodology was guided by Griffin and Page (1993), who focused the performance measurement categories of NPD and structured their findings by deploying two of the so-called Japanese "seven management tools" (King, 1989). According to Griffin and Page (1993), "*these techniques group similar attributes together and separate groups of different attributes using a bottom-up group consensus process*" (p. 293). Inspired by this method, we categorized all the potential effects and their corresponding explanatory variables applying the same principles.

We first categorized the 278 individual effects into groups of similar effects. This process resulted in the creation of 27 service innovation effect categories. The grouping procedure was then repeated with the 27 categories, placing them into higher-level categories. This resulted in a service innovation effect hierarchy with 3 levels, in which level 1 constituted the individual effects, level 2 constituted the sub-effect categories, and level 3 constituted the effect categories.

The grouping process resulted in the following five effect categories at level 3: 1) business process effects, 2) capability effects, 3) relationship effects, 4) financial performance effects, and 5) competitiveness effects. Each of these categories contained a number of sub-effect categories. Table 2 summarizes these findings.

Table 2: Effect categories and effects found in the literature

Effect category (level 3)	Number of articles*	%**	Sub-effect category (level 2)	Number of articles***	%**
A. Business process effects	24	32.9			
			A-1. Internal business process effects	2	2.7
			A-2. Service delivery capacity effects	4	5.5
			A-3. Internal cost effects	14	19.2
			A-4. Productivity effects	8	11.0
			A-5. Flexibility effects	2	2.7
			A-6. Risk reduction effects	1	1.4
B. Capability effects	15	20.5			
			B-1. Learning effects	9	12.3
			B-2. Culture effects	1	1.4
			B-3. Employee growth effects	3	4.1
			B-4. Employee satisfaction effects	3	4.1
C. Relationship effects	42	57.5			
			C-1. Effects on customer's value	20	27.4
			C-2. Customer satisfaction effects	20	27.4
			C-3. Customer loyalty effects	4	5.5
			C-4. Lock-in effects	3	4.1
			C-5. Image effects	8	11.0
			C-6. Business partner relationship effects	3	4.1
			C-7. Service quality effects	4	5.5
D. Financial performance effects	36	49.3			
			D-1. General financial performance effects	24	32.9
			D-2. Market share effects	10	13.7
			D-3. Sales (of new services) effects	13	17.8
			D-4. Sales (of existing goods/services) effects	13	17.8
			D-5. Effects on the market value of the firm	1	1.4
E. Competitiveness effects	25	34.2			
			E-1. Effects on the competitive position	16	21.9
			E-2. Effects on the ability to survive	2	2.7
			E-3. Creation of new markets effects	6	8.2
			E-4. Strategic performance effects	4	5.5

* This number refers to the number of reviewed articles that have theoretically derived, empirically measured or discussed the effect.

**The percentages designate how many of the 73 articles derive or measure an effect in the category.

***Note that one article may discuss more than one effect, meaning that the sum of the articles in the sub-effect categories does not equal the number of effect category articles.

In the following sections, we explain and discuss the effect- and sub-effect categories, guided by examples of individual effects from the reviewed literature.

4.1 Business process effects

The first of the five effect categories is termed “business process effects”. This is a broad effect category including several sub-categories. Rummler and Brache (1995) stated that “a

business process is a series of steps designed to produce a product or service” (p. 45). All effects in this category share the common element of embracing changes in the firm’s business processes. The category contains the following six sub-effect categories: 1) internal business process effects, 2) service delivery capacity effects, 3) internal cost effects, 4) productivity effects, 5) flexibility effects, and 6) risk reduction effects. In the following text, we briefly explain each sub-category.

Wong and He (2005) measured whether service innovation improves *the internal business process*. They found internal business process improvement to be an important objective for service innovation in knowledge-intensive business service firms in Singapore. Lievens and Moenaert (2000) studied the role of communication during the innovation process of new financial services, and its impact on success. Their measure of success included a dimension capturing “*increasing service delivery capacity*” with four items: “1) *the service innovation is a platform that will ease introduction of subsequent new products*, 2) *the development of the new financial service improved the new service development capacity of our organization*, 3) *the systems developed to launch the new service provided a basis for a better introduction of services in the future*, and 4) *the new service increased a general service delivery capacity of the organization*” (Lievens and Moenart, 2000, pp. 1107-1108).

Fifteen of the 73 articles suggested that service innovation may *reduce the internal cost* of the innovating firm (e.g. Lawler, 2005; Panesar and Markeset, 2008a; Panesar and Markeset, 2008b; Perks and Riihela, 2004; Richmond, 2008; Shimizu et al., 2004). A typical case study from the United Kingdom by Perks and Riihela (2004) found that the introduction of customer self-service reduced the internal cost of this firm. Similar results were found by Lawler (2005) for web-based banking services and by Richmond (2008) for transportation services in Singapore.

Some studies (e.g. Akamavi, 2005; Ciptono, 2006; Hipp, Tether and Miles, 2000; Schulz, 2005) suggested that service innovation may increase the service provider’s *productivity*, e.g. the value added per employee. For example, Hipp, Tether and Miles (2000) presented evidence from a large-scale survey of innovation in German commercial service firms. They found that the accomplishment of service innovation was positively related to increasing productivity. Two quantitative studies investigated whether service innovation improves service providers’ *flexibility* (Hipp, Tether and Miles, 2000; Wong and He, 2005). Wong and

He (2005) found the improvement of internal production flexibility to be an important service innovation objective in Singapore and Hipp, Tether and Miles (2000) found improved service provider flexibility to be an important innovation objective for German service providers. In a theoretical study, Cowell (1988) proposed that service innovation may also *reduce risk*: “*New services may be introduced to balance an existing sales portfolio where heavy dependence is placed on just a few services offered within a range*” (p. 297).

4.2 Capability effects

A number of the reviewed studies highlighted the role of service innovation in improving or strengthening the innovator’s internal *capabilities*. This effect category is broken down into the following sub-effect categories: 1) learning effects, 2) culture effects, 3) employee growth effects, and 4) employee satisfaction effects. These sub-effect categories are briefly described below.

In a case study, Stevens and Dimitriadisb (2004) identified *learning* at the organizational, group and individual levels as one result of a service innovation process. *Learning effects* of different forms (e.g. project learning, technological learning) have also been identified in several other studies (e.g. Blazevic and Lievens, 2004; Blazevic, Lievens and Klein, 2003; Lievens and Moenaert, 2000), and some studies found that service innovation activities create knowledge of new innovation opportunities (Lievens and Moenaert, 2000; Van Riel, Lemmink and Ouwersloot, 2004).

The “*Capstone model for service systems...*” (Kaner and Karni, 2007, p. 264) has suggested that service innovation may also have *culture effects*. Kaner and Karni (2007) have argued that one potential effect of a new service development process is that the *culture* of the innovative enterprise becomes more innovation-oriented. The marketing literature (e.g. Berthon, Hulbert and Pitt, 2004; Simpson, Siguaw and Enz, 2006) has contrasted innovation orientation with market orientation, and has suggested that likely outcomes of innovation orientation “*include more, faster, and higher quality innovations, along with employee-, customer- and competition-related advantages, and operational excellence*” (Simpson, Siguaw and Enz, 2006, p. 1140).

The reviewed literature has also indicated that service innovation may have *employee growth effects*. For example, Mansury and Love (2008) examined the impact of innovation on the

performance of business service firms in the United States, and found that service innovation positively affected the number of employees. This finding is also supported in the economic literature on innovation effects (e.g. Pianta, 2005).

The final sub-category of capability effects is *employee satisfaction effects*. This was measured by Van Riel, Lemmink and Ouwersloot (2004) in a quantitative study. Hipp, Tether and Miles (2000) found that service innovation motivated the service provider's employees. Wong and He (2005) found that service innovation improved the working conditions of employees, and Song, di Benedetto and Song (2000) found that pioneers in the service industry (i.e. innovative firms) had better access to superior labour resources.

4.3 Relationship effects

Relationship effects refer to the proposition that service innovation may have effects on the innovator's relationship with other stakeholders, primarily *customers*. In turn, such relationship effects may also have further effects on the innovator's financial performance or competitiveness. Based on our review, the category of relationship effects may be divided into the following sub-effects categories: 1) effects on customer's value, 2) customer satisfaction effects, 3) customer loyalty effects, 4) lock-in effects, 5) image effects, 6) business partner relationship effects, and 7) service quality effects. We briefly describe these sub-effect categories below.

A customer-oriented effect of service innovation frequently treated in the literature is the *effect on customer's value* (e.g. Sigala, 2006; van Riel and Lievens, 2004). This effect refers to the value a customer receives from provision of a new service. While this effect should also indirectly affect firm performance or its competitive position, the effect on customer value itself, and not on the value of the customer, is the focus here. This sub-category of effects may be further divided into three additional sub-groups: 1) effects on the customer's competitiveness, 2) effects on the customer's internal process, and 3) effects on the customer's perceived value. The first two effects are typically created by business services, whereas the third effect is mainly found in consumer services studies. In the following, we briefly describe each sub-group.

Möller, Rajala and Westerlund (2008) focused on value creation in client-provider relationships, suggesting that service innovation may make both the service provider and the

client more competitive. Other examples of service innovation increasing the customer's competitiveness are given by Lyons, Chatman and Joyce (2007), who found that service innovation has the potential to increase the clients' (i.e. the customers') strategic degrees of freedom, and by Shum and Watanabe (2007), who suggested that the introduction of smart services may off-load work from customers and enable them to focus on their core competencies.

Many of the reviewed articles (e.g. Bátiz-Lazo and Wood, 2002; de Jong and Vermeulen, 2003; Hipp, Tether and Miles, 2000; Panesar and Marqueset, 2008a) have emphasized that service innovation may also change the customer's internal process. For example, a large-scale quantitative study of German commercial service firms (Hipp, Tether and Miles, 2000) found that service innovation improved the service user's (i.e. the customer's) productivity. In a discussion of industrial service innovation management in the oil and gas industry, Panesar and Marqueset (2008a) identified a group of service innovation effects that changed the customer's internal process. They suggested that selling a new service to a customer may give the customer: 1) reduction in costs, 2) improved operation and maintenance process effectiveness, 3) improved maintenance quality, 4) improved safety, 5) reduction in execution time (e.g. reduced downtime), and 6) improved availability and quality of production output.

Other studies have found that new services may create perceived value for the customer (e.g. Royston et al., 2006; Sigala, 2006). The term perceived value encompasses a wide range of effects that are important for customers, but are somewhat difficult to define. For example, Sigala (2006) identified the types of customer value perceived by users of mobile phone services, such as social value, emotional value, conditional value, epistemic value, and freedom of choice value. Examining the introduction of a national 24-hour telephone helpline service, Royston et al. (2003) found that the patients (the customers in this case) became more reassured as a consequence of this service. Finally, Eriksson et al. (2008) studied the development of e-newspapers in the media industry and suggested that the introduction of this new service increased customer perceived value by giving the customers ubiquitous access to news. These examples illustrate that customer perceived value is more typically investigated for consumer services and has been given considerable attention in the marketing literature (e.g. Woodruff, 1997)

Numerous articles in the sample have suggested that service innovation may have *customer satisfaction effects* (e.g. Lyons, Chatman and Joyce, 2007; Matear, Gray and Garrett, 2004; Perks and Riihela, 2004; Rajatanavin, Ranchana and Speece, 2004; Richmond, 2008; Royston et al., 2003; Smith, Fischbacher and Wilson, 2007; Wong and He, 2005). For example, Royston et al. (2003) found that the introduction of a national 24-hour telephone helpline service in the United Kingdom resulted in increased patient satisfaction, and Perks and Riihela (2004) found that the introduction of a customer self-service termed “Secure Remote Access Service” improved customer satisfaction.

Several authors have also suggested that service innovation may have *customer loyalty effects* (e.g. Blazevic, Lievens and Klein, 2003; Ching-Chow, 2007; Van Riel, 2005; Van Riel, Lemmink and Ouwersloot, 2004). Van Riel, Lemmink and Ouwersloot (2004) quantitatively measured customer loyalty by the item “*the new service increased customer satisfaction and loyalty*” (p. 354), with which respondents agreed.

New services may have *lock-in effects*, meaning that existing customers are locked-in to the service provider (e.g. Berry et al., 2006; Blazevic, Lievens and Klein, 2003; Dolfisma, 2004; Xu, Sharma and Hackney, 2005). In this way, behavioural loyalty is increased. For example, Blazevic, Lievens and Klein (2003) suggested that the introduction of new services in the mobile phone industry may increase the customer’s switching costs, and this may increase behavioural loyalty. Berry et al. (2006) examined the loyalty card programmes of airlines, casinos and supermarket chains. These services are developed with the intention to lock-in customers to a relationship with the service provider. Papers that empirically measure this effect are not easily identified in the service innovation literature, but the online marketing literature provides several examples (e.g. Shankar, Smith and Rangaswamy, 2003).

The sub-effect category of *image effects*, documented in several quantitative studies (e.g. Avlonitis, Papastathopoulou and Gounaris, 2001; Blazevic and Lievens, 2004; de Brentani, 1991; Lievens and Moenaert, 2000; Matear, Gray and Garrett, 2004; Van Riel, Lemmink and Ouwersloot, 2004), refers to the idea that the introduction of new services may improve the image of the service provider. For example, Matear, Gray and Garrett (2004) studied 231 service organizations in New Zealand, and concluded that “*New service development... are found to contribute to the attainment of positional advantage*” (p. 284), where positional

advantage includes cost reduction, improvement of relationship with customers and improvement of the (brand) image of the firm.

Xu, Sharma and Hackney (2005) suggested that service innovation may also have *business partner relationship effects*. These authors developed a model to improve understanding of the adoption of web services innovations, and suggested a wide range of business benefits related to innovations in web-based services, including dynamic business partnership.

Another potential service innovation effect discussed by several authors (e.g. Alam, 2006; Hipp, Tether and Miles, 2000; Løvlie, Downs and Reason, 2008; Menor, Tatikonda and Sampson, 2002; Savory, 2006; Wong and He, 2005; Wyatt, 2000) is the *improvement of service quality*. Service quality is an inherent property of the service, usually evaluated by customers. Wong and He (2005) found improvement of service quality through the development of new services to be a very important service innovation objective. Hipp, Tether and Miles (2000) found that 75% of the innovating firms in their survey considered improved service quality to be an “important” or “very important” effect of service innovation.

4.4 Financial performance effects

Many of the reviewed articles emphasize that service innovation may result in increased financial performance for the innovating firm. This category of effects is divided into the following sub-categories: 1) general financial performance effects, 2) market share effects, 3) sales (of new services) effects, 4) sales (of existing goods or services) effects, and 5) effects on the market value of the firm. These sub-effect categories are briefly described below.

General financial performance effects were discussed in one theoretical article (de Jong and Vermeulen, 2003) and measured in several quantitative studies (e.g. Avlonitis, Papastathopoulou and Gounaris, 2001; Lievens and Moenaert, 2000; Matear, Gray and Garrett, 2004; van Riel, Lemmink and Ouwersloot, 2004). In all articles measuring financial performance, this measure is combined with non-financial measures. The reviewed articles measured financial effects by asking the respondents to what degree service innovation contributed to financial success. A variety of measurement items have been used. For example, Matear, Gray and Garrett (2004) stated that “*financial performance was assessed with three items that asked the respondents to evaluate their firm’s profitability, change in*

profitability over the last three years, and revenue compared to their nearest competitor” (p. 290), and Van Riel, Lemmink and Ouwersloot (2004) measured financial effects with three items: “1) *The new service adds substantial value to other products and services*, 2) *The new service was a good idea to invest in and* 3) *The new service contributed to financial success”* (p. 354). It is surprising, however, that none of the reviewed articles analyzed financial accounting data to investigate the relationship between service innovation and financial performance.

Market share effects following the development and introduction of a new service have been discussed and directly measured by several authors (e.g. Atuahene-Gima, 1996b; de Brentani, 1991; López and Roberts, 2002; Peffers and Dos Santos, 1996; Song, di Benedetto and Song, 2000). Peffers and Dos Santos (1996) investigated the effects of very early investments in automated teller machines (ATMs) by banks, and found a considerable effect on market share.

The sub-category *sales (of new services) effects* refers to the fact that introduction of a new service may lead to new revenue generation from this particular service (e.g. Avlonitis, Papastathopoulou and Gounaris, 2001; Atuahene-Gima, 1996a; Atuahene-Gima, 1996b; Cowell, 1988; de Brentani, 1991; de Jong and Vermeulen, 2003; Hipp, Tether and Miles, 2000; Kubeczko, Rametsteiner and Weiss, 2006; Lievens and Moenaert, 2000; Mansury and Love, 2008). In a large German survey, Hipp, Tether and Miles (2000) found that “*firms that had innovated were more likely to have increased their sales, and were more likely to expect to increase their sales in the future, than non-innovating firms*” (p. 447). We note, however, that all reviewed empirical articles discussing sales effects base their analyses on perceived sales effects captured through interviews or questionnaires, rather than on objective sales data, when they investigate the relationship between service innovation and sales effects. This may partly be due to the sampling procedures used to identify relevant articles in our review, given that authors such as Cainelli, Evangelista and Savona (2004) have investigated sales effects using objective sales data.

Service innovation may change the sales of the innovator’s existing products or services, which falls under the sub-category *sales (of existing goods or services) effects* (e.g. Ciptono, 2006; Cowell, 1988; Kubeczko, Rametsteiner and Weiss, 2006; Lu, Lin and Wu, 2005; Mansury and Love, 2008; Panesar and Markeset, 2008a). Some authors (e.g. Lu, Lin and Wu, 2005; Panesar and Markeset, 2008a) have argued that a new service may increase the sale of

the firm's existing goods, whereas others (e.g. Blazevic and Lievens, 2004; Cowell, 1988; Richmond, 2008; Victorino et al., 2005) have suggested that a new service may increase the sale of the firm's existing services. Cowell (1988) stated that "*new services may be introduced to use up spare capacity like vacant theatre seats...*" (p. 297) and "*Many service organisations (e.g. in tourism) may have seasonal patterns of demand. New services may be introduced to even out these fluctuations*" (p. 297).

One article in our sample (Chaney and Devinney, 1992) investigated *effects on the market value of the firm*. These authors provided evidence that innovative behaviour is positively related to firm market value. This study did not distinguish between service innovation (or NSD) and NPD, but there were no indications in the study that the conclusions for service innovation and NPD differed.

4.5 Competitiveness effects

Several articles have examined the ways in which service innovation may improve the innovator's competitiveness. Based on the reviewed literature, we suggest that this category may be divided into four sub-categories: 1) effects on the competitive position, 2) effects on the ability to survive, 3) creation of new markets effects, and 4) strategic performance effects. We explain each sub-category below.

Service innovation may have *effects on the competitive position* (e.g. Avlonitis, Papastathopoulou and Gounaris, 2001; Blazevic and Lievens, 2004; Van Riel, Lemmink and Ouwersloot, 2004). The term "competitive position" is used generally in these articles, without definition of specific measures. Findings are consistent with those in the economic innovation literature (e.g. Cantwell, 2005) and the strategic innovation literature (e.g. Schlegelmilch, Diamantopoulos and Kreuz, 2003), indicating that innovation may improve the competitive position of the innovating firm.

Some authors have more specifically noted that service innovation may have *effects on the ability to survive*. In a theoretical paper, Cowell (1988) suggested that "*service organisations cannot continue to rely on their existing range of services for their success. Sooner or later they become obsolete. They mature and then decline in their product life cycle. Change is a way of life for the innovative service organisation*" (p. 297). Wong and He (2005) similarly suggested that new services may replace those being phased out. Crosby, Johnson and

Winslow (2003) stated that “*one of the best ways for an organization to survive an economic downturn and stay at the forefront of its industry is to innovate*” (p. 10), an effect they argued to be equally important in the manufacturing and service industries.

In a conceptual article, Berry et al. (2006) suggested that service innovation may have *creation of new markets effects*. They provided several examples of such market-creating service innovations, such as the “Enterprise Rent-A-Car Company”. This firm observed that people often needed a rental car while their own car was serviced, and established a service that provided temporary replacement vehicles to local customers. This was a new service in the market, since other rental car companies aimed primarily at tourists and business travellers. Today, the “*Enterprise Rent-A-Car Company’s revenues exceed \$8 billion, and the company boasts the largest fleet size and the most rental locations in the United States*” (Berry et al., 2006, p. 56). Not all types of service innovation have the potential to create new, or reshape existing, markets. Berry et al. (2006) pointed out that incremental service innovation does not have this potential effect, and they proposed that: “*...most improvements to service activities are incremental. Stores stay open longer; product makers establish Web sites with e-commerce functions; airlines, casinos and supermarket chains enhance loyalty card programs. These improvements are useful and indeed necessary, but they are limited in the kind of returns they can produce. Only rarely does a company develop a service that creates an entirely new market or so reshapes a market that the company enjoys unforeseen profits for a considerable length of time...*” (p. 56). Nevertheless, creating new, or reshaping existing, markets may be an important part of the service innovation opportunity set. The relevance of this effect is also supported by several other authors (e.g. Atuahene-Gima, 1996a; Van Riel, Lemmink and Ouwersloot, 2004; Wong and He, 2005).

Some articles have considered that service innovation may have *strategic performance effects*. Kaner and Karni (2007) proposed that service innovation may be a tool to achieve both general and service-related strategic goals. De Jong and Vermeulen (2003) also emphasized this, suggesting that service innovation may contribute to strategic success. This potential effect is not specified or operationalized any further in these theoretical articles.

5 Discussion

5.1 Relationships among firm-level service innovation effects

In section 4 we organized the service innovation effects into a conceptual hierarchy. We now discuss potential causal relationships among the effects identified in the review (Figure 1). Some effects may be a direct consequence of the service innovation process, while others may be indirectly caused by one or more direct effects. A literature review of the kind presented here does not allow us to firmly establish causal relationships among the effects, but it provides a basis for *discussing* potential relationships among the effect categories and for *exploring* the development of a causal model of service innovation effects.

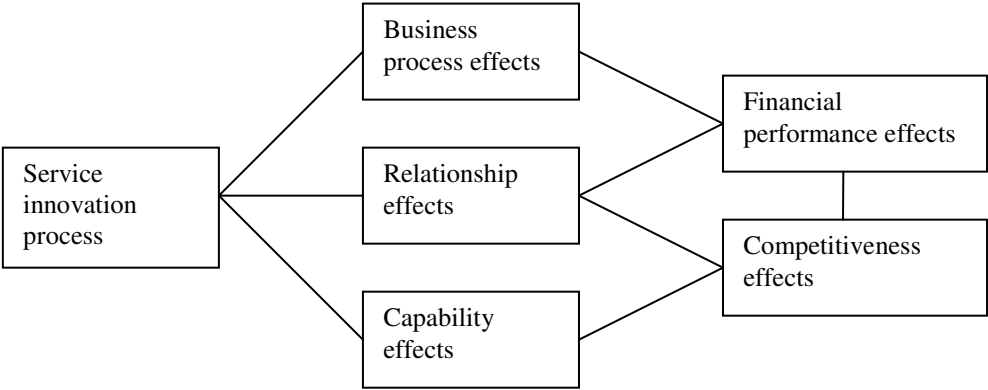


Figure 1: Suggested relationship between the service innovation effect categories

Based on our review, we suggest that business process effects, relationship effects, and capability effects may be direct results of service innovation activities. Since business process effects typically result in cost reduction or increased revenues from sales, we also argue that they may be related to financial performance effects. We further suggest that relationship effects may be related to both financial performance effects (explained through increasing sales revenues) and competitiveness effects. The proposed association of relationship effects and competitiveness effects is founded on the resource-based view of competitive advantage (e.g. Barney, 1991). This view argues that valuable and rare resources are sources of

competitive advantage¹⁰, and that several relationship effects (e.g. image effects, customer satisfaction effects, loyalty effects, and lock-in effects) may be considered as such resources.

Capability effects may also represent valuable and rare resources, and, according to the resource-based view, they may be potential sources of competitive advantage. While capability effects may not be directly related to financial performance, long-term competitive advantages may result in improved financial performance. Thus, we also propose a relationship between financial performance effects and competitiveness effects.

Our review does not consider moderating influences on the relationships suggested in Figure 1. However, previous research has identified a number of variables that moderate the effects of service innovation. De Brentani (1991) studied success factors that may moderate the effects of service innovation, such as: formality of new service development process, corporate synergy, market competitiveness, service innovativeness, service newness to the firm, effectiveness of new service development management, service complexity, quality of service experience, standardisation of service process, and market newness to the firm. Other potential moderating variables are firm size, sector membership (Hipp, Tether and Miles, 2000), cross-functional involvement (Avlonitis, Papastathopoulou and Gounaris, 2001), and market orientation (Matear, Gray and Garrett, 2004).

The identification of moderating variables and tests of causality among the effect categories of Figure 1 require empirical investigation beyond the scope of this article. The accumulation of more primary data and the application of further qualitative and quantitative analyses would contribute significantly to an improved understanding of the complexity of the causal chain linking service innovation activities to measurable financial results. These pursuits are given considerable attention in our further research.

5.2 Other effects of service innovation

Our review has revealed that service innovation may have effects on stakeholders other than the innovating firm. For example, the reviewed research suggested that service innovation may have environmental effects (Løvlie, Downs and Reason, 2008; Wong and He, 2005),

¹⁰ Barney (1991) also suggested that if resources were also non-substitutable and imperfectly imitable, they would have potential not only as sources of competitive advantage, but as sources of *sustained* competitive advantage. We do not, however, conduct a sustainability analysis in this paper.

effects on industry structure (Xu, Sharma and Hackney, 2005), and effects on political kudos (Savory, 2006).

External effects such as these may also be relevant for the innovating firm and may indirectly influence the innovator's financial performance or competitiveness. However, further research is needed to explain the relationship between external and firm-level effects of service innovation.

5.3 Journals

The 73 articles reviewed in this paper were published in 45 journals. Two articles were published in journals focusing on economics, one article was published in a sociology journal and the remaining 70 articles were published in management journals. Sixteen articles were published in journals focusing on service management, such as the *Service Industries Journal*, *International Journal of Service Industry Management* and *Managing Service Quality*. Thirteen articles were published in innovation management-oriented journals, such as the *Journal of Product Innovation Management*, *International Journal of Innovation Management* and *Innovation: Management, Policy & Practice*. Eight articles were published in marketing management journals such as the *European Journal of Marketing*. The remaining 33 articles were published in other types of management journals, including those with a general management focus, such as the *Journal of Business Research*, and those focusing on a specific management area, such as the *Journal of Quality in Maintenance Engineering* and the *Journal of Operations Management*.

Although our review has included a broad range of articles from a considerable number of journals, including many articles from service management journals, it is somewhat surprising that the review contains only one article from the *Journal of Service Research (JSR)* and none from the *Journal of Services Marketing (JSM)*. These are arguably among the most important journals specifically focusing on services. For this reason, we thoroughly reviewed the articles published in JSR and JSM after 2000. For this period we found 7 articles in JSR and 13 articles in JSM that explicitly discussed innovation, representing 2.7% and 3.2%, respectively, of the total number of articles published in each journal. Two articles in JSR and one article in JSM discussed service innovation effects, but did not identify any effects not already discussed in this paper. These data show that innovation has been given relatively little

attention in these two important journals, which may be in part due to relatively low production or quality of service innovation research.

6 Conclusions and implications

By conducting an extensive structured review of the service innovation research literature, this paper has identified five main categories of potential firm-level effects in service innovation. These are: 1) business process effects, 2) capability effects, 3) relationship effects, 4) financial performance effects and 5) competitiveness effects. Each category has been divided into sub-effect categories. In total, 27 sub-effect categories have been identified and explained. We have also proposed that the effect categories are causally related. We have suggested that business process effects, capability effects, relationship effects and external effects are potential direct effects of the service innovation process, while financial performance effects and competitiveness effects may be indirect service innovation effects caused by effects in other categories.

Our review did not provide us with enough data to establish a model of causal relationship among the effects. Thus, we emphasise that the model presented in Figure 1 is preliminary. Further empirical research is needed to explore and test causal relationships among the potential service innovation effects. The model, however, represents a theoretical basis for further exploration and empirical testing of such relationships. Our review further assists such efforts because effect categories may be operationalized using the suggested effect hierarchy derived from the literature review.

The proposed model in Figure 1 may be interpreted as an effect process model of service innovation that underlines the complexity and interrelatedness of its outcomes. Such a model may also be used as a basis for developing performance measurement systems for service innovation activities. As suggested in our model, all service innovation effects may be related to financial performance. It should thus be possible to design a performance measurement system that reflects the bottom-line impacts of service innovation, but simultaneously incorporates time lags and indirect effects between measurable effects of different categories. Such a design, however, requires further research on causality, as suggested above.

From a research perspective, our review provides an overview of the potential effects of service innovation – the opportunity set. This opportunity set may also be used as a starting

point for the measurement of success or failure of service innovation. Success measures used in much of the existing literature have not reflected all potential effects of service innovation, and the majority of authors have measured the success of service innovation using relatively simple instruments. This paper contributes to the improvement of service innovation success measures, and to the cumulative organization of the knowledge established by numerous previous studies on service innovation effects.

From a managerial perspective, the findings of this paper have several important implications. For managers struggling to manage and control their service innovation activities, it is of utmost importance to have thorough knowledge of the potential effects of service innovation – the opportunity set. To date, a description of the service innovation opportunity set has not been readily available in the literature; the current paper offers an extensive overview of this opportunity set. This may improve managers' ability to search for potential effects of service innovation project ideas, and suggests ways to measure these effects during and after the project period. In sum, our map of the service innovation opportunity set may be used as an enabler for better managing the service innovation function.

References

Adler, PS, WD McDonald and F MacDonald (1992). Strategic management of technical functions. *Sloan Management Review*, 33(2), 19-37.

Akamavi, RK (2005). Re-engineering service quality process mapping: e-banking process. *International Journal of Bank Marketing*, 23(1), 28-53.

Alam, I (2006). Service innovation strategy and process: a cross-national comparative analysis. *International Marketing Review*, 23(3), 234-254.

Armenakis, AA and AG Bedeian (1999). Organizational change: A review of theory and research in the 1990s. *Journal of Management*, 25(3), 293-315.

Atuahene-Gima, K (1996a). Market orientation and innovation. *Journal of Business Research*, 35(2), 93-103.

Atuahene-Gima, K (1996b). Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia. *Journal of Product Innovation Management*, 13(1), 35-52.

Avlonitis, GJ, PG Papastathopoulou and SP Gounaris (2001). An empirically-based typology of product innovativeness for new financial services: Success and failure scenarios. *Journal of Product Innovation Management*, 18(5), 324-342.

Barney, J (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

Bátiz-Lazo, B and D Wood (2002). An historical appraisal of information technology in commercial banking. *Electronic Markets*, 12(3), 192-205.

Becker, TE (1992). Foci and bases of commitment: Are they distinctions worth making? *Academy of Management Journal*, 35(1), 232-244.

Belliveau, P, A Griffin and S Somermeyer (2002). *The PDMA ToolBook 1 for New Product Development*. New York: John Wiley & Sons, 1-472.

Belliveau, P, A Griffin and S Somermeyer (2004). *The PDMA ToolBook 2 for New Product Development*. New Jersey: John Wiley & Sons, 1-547.

Berry, LL, V Shankar, J Turner Parish, S Cadwallader and T Dotzel (2006). Creating new markets through service innovation. *MIT Sloan Management Review*, 47(2), 56-63.

Berthon, P, JM Hulbert and L Pitt (2004). Innovation or customer orientation? an empirical investigation. *European Journal of Marketing*, 38(9/10), 1065-1090.

Bitran, G and L Pedrosa (1998). A structured product development perspective for service operations. *European Management Journal*, 16(2), 169-189.

Blazevic, V and A Lievens (2004). Learning during the new financial service innovation process: Antecedents and performance effects. *Journal of Business Research*, 57(4), 374-391.

Blazevic, V, A Lievens and E Klein (2003). Antecedents of project learning and time-to-market during new mobile service development. *International Journal of Service Industry Management*, 14(1), 120-147.

Booz, Allen and Hamilton (1982). *New Products Management for the 1980s*. New York, NY: Booz, Allen and Hamilton, 1-24.

Bryson, JR and CM Monnoyer (2004). Understanding the relationship between services and innovation: The RESER review of the European service literature on innovation, 2002. *The Service Industries Journal*, 24(1), 205-222.

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

Cantwell, J (2005). Innovation and competitiveness. In: *The Oxford Handbook of Innovation*. Jan Fagerberg, David C. Mowery, Richard R. Nelson, Oxford: Oxford University Press, 543-567.

Ciptono, WS (2006). A sequential model of innovation strategy - company non-financial performance links. *Gadjah Mada International Journal of Business*, 8(3), 137-178.

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

Chaney, PK and TM Devinney (1992). New product innovations and stock price performance. *Journal of Business Finance & Accounting*, 19(5), 677-695.

Ching-Chow, Y (2007). A systems approach to service development in a concurrent engineering environment. *Service Industries Journal*, 27(5), 635-652.

Clarke, JS, CD Ellett, JM Bateman and JK Rugutt (1996). *Faculty Receptivity/Resistance to Change, Personal and Organizational Efficacy, Decision Deprivation and Effectiveness in Research I Universities*. Paper presented at the 21st Annual Meeting of the Association for the Study of Higher Education, Memphis, TN, October 31st- November 3rd.

Cowell, DW (1988). New service development. *Journal of Marketing Management*, 3(3), 296-312.

Crosby, LA, SL Johnson and KD Winslow (2003). Innovation-not for the fainthearted. *Marketing Management*, 12(2), 10-11.

Dean Jr., JW, P Brandes and R Dharwadkar (1998). Organizational cynicism. *Academy of Management Review*, 23(2), 341-352 (April).

De Brentani, U (1991). Success factors in developing new business services. *European Journal of Marketing*, 25(2), 33-59.

De Brentani, U (2001). Innovative versus incremental new business services: different keys for achieving success. *Journal of Product Innovation Management*, 18(3), 169-187.

De Jong, JPJ, A Bruins, W Dolfsma and J Meijgaard (2003). Innovation in service firms explored: what, how and why? Strategic study B200205. *Zoetermeer, Holland: EIM Business & Policy Research*, 1-73.

De Jong, JPJ and PAM Vermeulen (2003). Organizing successful new service development - a literature review. *Management Decision*, 41(9), 844-858.

Den Hertog, P (2000). Knowledge-intensive business services as co-producers of innovation. *International Journal of Innovation Management*, 4(4), 491-528.

Dolfsma, W (2004). The process of new service development - issues of formalization and appropriability. *International Journal of Innovation Management*, 8(3), 319-337.

Englund, RL and RJ Graham (1999). From experience: linking projects to strategy. *Journal of Product Innovation Management*, 16(1), 52-64.

Eriksson, CI, T Kalling, M Åkesson and T Fredberg (2008). Business models for m-services: exploring the e-newspaper case from a consumer view. *Journal of Electronic Commerce in Organizations*, 6(2), 29-57.

Fagerberg, J (2005). Innovation: a guide to the literature. In: *The Oxford Handbook of Innovation*. Jan Fagerberg, David C. Mowery, Richard R. Nelson, Oxford: Oxford University Press, 1-26.

Gadrey, J, F Gallouj and O Weinstein (1995). New modes of innovation: how services benefit industry. *International Journal of Service Industry Management*, 6(3), 4-16.

Geroski, P (1998). Thinking creatively about your market: crisps, perfume and business strategy. *Business Strategy Review*, 9(2), 1-10.

Griffin, A and AL Page (1993). An interim report on measuring product development success and failure. *Journal of Product Innovation Management*, 10(4), 291-308.

Griffin, A and AL Page (1996). PDMA success measurement project: recommended measures for product development success and failure. *Journal of Product Innovation Management*, 13(6), 478-496.

Grönroos, C (2007). *Service Management and Marketing: Customer Management in Service Competition*. Chichester: John Wiley & Sons, 1-483.

Hipp, C, BS Tether and I Miles (2000). The incidence and effects of innovation in services: evidence from Germany. *International Journal of Innovation Management*, 4(4), 417-453 (December).

Johne, A and C Storey (1998). New service development: a review of the literature and annotated bibliography. *European Journal of Marketing*, 32(3/4), 184-251.

Kahn, KB (2005). *The PDMA Handbook of New Product Development*. New Jersey: John Wiley & Sons, 1-625.

Kaner, M and R Karni (2007). Design of service systems using a knowledge-based approach. *Knowledge & Process Management*, 14(4), 260-274.

King, B (1989). *Hoshin Planning: The Developmental Approach*. Methuen, MA: GOAL/QPC, 1-219.

Krinsky, RJ and AC Jenkins (1997). The uneasy fusion of strategy and innovation. *Strategy & Leadership*, 25(4), 36-41.

Kubeczko, K, E Rametsteiner and G Weiss (2006). The role of sectoral and regional innovation systems in supporting innovations in forestry. *Forest Policy & Economics*, 8(7), 704-715.

Lawler, JP (2005). Case study of customer relationship management (CRM) in the on-line affluent financial services market. *Journal of Internet Commerce*, 4(4), 153-164.

Lievens, A and RK Moenaert (2000). Communication flows during financial service innovation. *European Journal of Marketing*, 34(9/10), 1078-1110.

López, LE and EB Roberts (2002). First-mover advantages in regimes of weak appropriability: the case of financial services innovations. *Journal of Business Research*, 55(12), 997-1005.

Lovelock, CH (1984). Developing and implementing new services. In: *Developing New Services*. George, W. R. and Marshall, C. E., Chicago, IL: American Marketing Association, 44-64.

Lu, I-Y, L-H Lin and G-C Wu (2005). Applying options to evaluate service innovations in the automotive industry. *International Journal of Technology Management*, 32(3/4), 339-349.

Lyons, RK, JA Chatman and CK Joyce (2007). Innovation in services: corporate culture and investment banking. *California Management Review*, 50(1), 174-191.

Løvlie, L, C Downs and B Reason (2008). Bottom-line experiences: measuring the value of design in service. *Design Management Review*, 19(1), 73-79.

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

Martin Jr., CR and DA Horne (1995). Level of success inputs for service innovations in the same firm. *International Journal of Service Industry Management*, 6(4), 40-56.

Matear, S, BJ Gray and T Garrett (2004). Market orientation, brand investment, new service development, market position and performance for service organisations. *International Journal of Service Industry Management*, 15(3), 284-301.

Menor, LJ, MV Tatikonda and SE Sampson (2002). New service development: areas for exploitation and exploration. *Journal of Operations Management*, 20(2), 135-157 (April).

Miles, I (2005). Innovation in services. In: *The Oxford Handbook of Innovation*. Jan Fagerberg, David C. Mowery, Richard R. Nelson, Oxford: Oxford University Press, 433-458.

Montoya-Weiss, MM, and R Calantone (1994). Determinants of new product performance: a review and meta-analysis. *Journal of Product Innovation Management*, 11(5), 397-417.

Möller, K, R Rajala and M Westerlund (2008). Service innovation myopia? a new recipe for client-provider value creation. *California Management Review*, 50(3), 31-48.

Nysveen, H and PE Pedersen (2007). *Service innovation methodologies I. What can we learn from service innovation and new service development research?* Kristiansand, Norway: Agder University College (available at: http://idtjeneste.nb.no/URN:NBN:no-bibsys_brage_2238 (accessed 29 July 2008)), 1-135.

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

Panesar, SS and T Markeset (2008a). Industrial service innovation through improved contractual relationship: A case study in maintenance. *Journal of Quality in Maintenance Engineering*, 14(3), 290-305.

Panesar, SS and T Markeset (2008b). Development of a framework for industrial service innovation management and coordination. *Journal of Quality in Maintenance Engineering*, 14(2), 177-193.

Peppers, K and BL Dos Santos (1996). Performance effects of innovative IT applications over time. *IEEE Transactions on Engineering Management*, 43(4), 381-392.

Perks, H and N Riihela (2004). An exploration of inter-functional integration in the new service development process. *Service Industries Journal*, 24(6), 37-63.

Pianta, M (2005). Innovation and employment. In: *The Oxford Handbook of Innovation*. Jan Fagerberg, David C. Mowery, Richard R. Nelson, Oxford: Oxford University Press, 568-598.

Porter, ME (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press, 1-396.

Rajatanavin, R and M Speece (2004). The sales force as an information transfer mechanism for new service development in the Thai insurance industry. *Journal of Financial Services Marketing* 8(3), 244-258.

Richmond, JED (2008). Transporting Singapore - the air-conditioned nation. *Transport Reviews*, 28(3), 357-390 (May).

Royston, G, J Halsall, D Halsall and C Braithwaite (2003). Operational Research for informed innovation: NHS Direct as a case study in the design, implementation and evaluation of a new public service. *Journal of the Operational Research Society*, 54(10), 1022-1028.

Rummler, GA and AP Brache (1995). *Improving Performance: How to Manage the White Space on the Organizational Chart*. San Francisco: Jossey-Bass, 1-226.

Savory, C (2006). Does the Utto model of technology transfer fit public sector healthcare services? *International Journal of Innovation & Technology Management*, 3(2), 171-187.

Schabracq, MJ and CL Cooper (1998). Toward a phenomenological framework for the study of work and organizational stress. *Human Relations*, 51(5), 625-648 (May).

Schlegelmilch, BB, A Diamantopoulos and P Kreuz (2003). Strategic innovation: the construct, its drivers and its strategic outcomes. *Journal of Strategic Marketing*, 11(2), 117-132.

Schulz, M (2005). Guest editor's introduction: is Japan finally catching up on service innovation? *Japanese Economy*, 33(3), 3-9.

Shankar, V, AK Smith and A Rangaswamy (2003). Customer satisfaction and loyalty in online and offline environments. *International Journal of Research in Marketing*, 20(2), 153-175.

Shimizu, S, H Ishikawa, A Satoh and T Aihara (2004). On-demand design service innovations. *IBM Journal of Research & Development*, 48 (5/6), 751-764.

Shum, KL, and C Watanabe (2007). The effects of technological trajectory in product centric firms upon the transition to smart service provision - the case of smart solar photovoltaic (PV). *Journal of Services Research*, 7(2), 163-182.

Sigala, M (2006). Mass customisation implementation models and customer value in mobile phones services: Preliminary findings from Greece. *Managing Service Quality*, 16(4), 395-420.

Simpson, PM, JA Siguaw and CA Enz (2006). Innovation orientation outcomes: the good and the bad. *Journal of Business Research*, 59(10/11), 1133-1141 (October).

Smith, AM, M Fischbacher and FA Wilson (2007). New service development: from panoramas to precision. *European Management Journal*, 25(5), 370-383.

Song, XM, CA di Benedetto and LZ Song (2000). Pioneering advantage in new service development: a multi- country study of managerial perceptions. *Journal of Product Innovation Management*, 17(5), 378-392.

Song, XM and MM Montoya-Weiss (1998). Critical development activities for really new versus incremental products. *Journal of Product Innovation Management*, 15(2), 124-135.

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

Stevens, E and S Dimitriadis (2005). Managing the new service development process: towards a systemic model. *European Journal of Marketing*, 39(1/2), 175-198.

Teece, DJ, G Pisano and A Shuen (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Tidd, J (2001). Innovation management in context: environment, organization and performance. *International Journal of Management Reviews*, 3(3), 169-183 (September).

Tidd, J, J Bessant and K Pavitt (1997). *Managing Innovation - Integrating Technological, Market and Organizational Change*. Chichester: John Wiley & Sons, 1-377.

Tidd, J, J Bessant and K Pavitt (2001). *Managing Innovation - Integrating Technological, Market and Organizational Change (2nd edition)*. Chichester: John Wiley & Sons, 1-388.

Tidd, J and FM Hull (2003). *Service Innovation: Organizational Responses to Technological Opportunities & Market Imperatives*. London: Imperial College Press, 1-418.

Van der Aa, W and T Elfring (2002). Realizing innovation in services. *Scandinavian Journal of Management*, 18(2), 155-171.

Van der Panne, G, C van Beers and A Kleinknecht (2003). Success and failure of innovation: a literature review. *International Journal of Innovation Management*, 7(3), 309-338.

Van Klink, A and E-J Visser (2004). Innovation in Dutch horticulture: fresh ideas in fresh logistics. *Tijdschrift voor Economische en Sociale Geografie (Journal of Economic & Social Geography)*, 95(3), 340-346.

Van Riel, ACR (2005). Introduction to the special issue on service innovation management. *Managing Service Quality*, 15(6), 493-495.

Van Riel, ACR and A Lievens (2004). New service development in high tech sectors: a decision-making perspective. *International Journal of Service Industry Management*, 15(1), 72-101.

Van Riel, ACR, J Lemmink and H Ouwersloot (2004). High-technology service innovation success: a decision-making perspective. *Journal of Product Innovation Management*, 21(5), 348-359.

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

Veflen Olsen, N and J Sallis (2006). Market scanning for new service development. *European Journal of Marketing*, 40(5/6), 466-484.

Verspagen, B (2005). Innovation and economic growth. In: *The Oxford Handbook of Innovation*. Jan Fagerberg, David C. Mowery, Richard R. Nelson, Oxford: Oxford University Press, 487-513.

Victorino, L, R Verma, G Plaschka and C Dev (2005). Service innovation and customer choices in the hospitality industry. *Managing Service Quality* 15(6), 555-576.

Woodruff (1997). Customer value: the next source for competitive advantage. *Journal of the Academy of Marketing Science*, 25(2), 139-154.

Wong, PK and Z-L He (2005). A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms. *Service Industries Journal*, 25(1), 23-42.

Wyatt, S (2000). ICT innovation in central government: learning from the past. *International Journal of Innovation Management*, 4(4), 391-416 (December).

Xu, H, SK Sharma and R Hackney (2005). Web services innovation research: towards a dual-core model. *International Journal of Information Management*, 25(4), 321-334.

Appendix A: Reviewed articles measuring (empirically) or deriving (theoretically) effects of service innovation*

No	Reference
1	Panesar, SS and T Markeset (2008). Industrial service innovation through improved contractual relationship: A case study in maintenance. <i>Journal of Quality in Maintenance Engineering</i> , 14(3), 290-305.
2	Fulcher, J (2008). A whole new angle. <i>Manufacturing Business Technology</i> , 26(7), 20-22.
3	Panesar, SS and T Markeset (2008). Development of a framework for industrial service innovation management and coordination. <i>Journal of Quality in Maintenance Engineering</i> , 14(2), 177-193 (May).
4	Richmond, J (2008). Transporting Singapore - the air-conditioned nation. <i>Transport Reviews</i> , 28(3), 357-390 (May).
5	Möller, K, R Rajala and M Westerlund (2008). Service innovation myopia? A new recipe for client-provider value creation. <i>California Management Review</i> , 50(3), 31-48.
6	Eriksson, CI, T Kalling, M Åkesson and T Fredberg (2008). Business models for m-services: exploring the e-newspaper case from a consumer view. <i>Journal of Electronic Commerce in Organizations</i> , 6(2), 29-57.
7	Løvlie, L, C Downs and B Reason (2008). Bottom-line experiences: measuring the value of design in service. <i>Design Management Review</i> , 19(1), 73-79.
8	Mansury, MA and JH Love (2008). Innovation, productivity and growth in US business services: A firm-level analysis. <i>Technovation</i> , 28(1/2), 52-62.
9	Lyons, RK, JA Chatman and CK Joyce (2007). Innovation in services: corporate culture and investment banking. <i>California Management Review</i> , 50(1), 174-191.
10	Smith, AM, M Fischbacher and FA Wilson (2007). New service development: from panoramas to precision. <i>European Management Journal</i> , 25(5), 370-383.
11	Ozdemir, S, P Trott and A Hoecht (2007). New service development: insights from an explorative study into the Turkish retail banking sector. <i>Innovation: Management, Policy & Practice</i> , 9(3/4), 276-291.
12	Den Hertog, P and G de Jong (2007). Randstad's business model of innovation: results from an exploratory study in the temporary staffing industry. <i>Innovation: Management, Policy & Practice</i> , 9(3/4), 351-364.
13	Shum, KL and C Watanabe (2007). The effects of technological trajectory in product centric firms upon the transition to smart service provision – the case of smart solar photovoltaic (PV). <i>Journal of Services Research</i> , 7(2), 163-182.
14	Kaner, M and R Karni (2007). Design of service systems using a knowledge-based approach. <i>Knowledge & Process Management</i> , 14(4), 260-274.
15	Yang, C-C (2007). A systems approach to service development in a concurrent engineering environment. <i>Service Industries Journal</i> , 27(5), 635-652.
16	Oke, A (2007). Innovation types and innovation management practices in service companies. <i>International Journal of Operations & Production Management</i> , 27(6), 564-587.
17	Ciptono, WS (2006). A sequential model of innovation strategy – company non-financial performance links. <i>Gadjah Mada International Journal of Business</i> , 8(3), 137-178.

18	Veflen Olsen, N and Sallis, J (2006). Market scanning for new service development. <i>European Journal of Marketing</i> , 40(5/6), 466-484.
19	Sigala, M. (2006). Mass customisation implementation models and customer value in mobile phones services: preliminary findings from Greece. <i>Managing Service Quality</i> , 16(4), 395-420.
20	Savory, C (2006). Does the Utto model of technology transfer fit public sector healthcare services? <i>International Journal of Innovation & Technology Management</i> , 3(2), 171-187.
21	Berry, LL, V Shankar, JT Parish, S Cadwallader and T Dotzel (2006). Creating new markets through service innovation. <i>MIT Sloan Management Review</i> , 47(2), 56-63.
22	Lawler, JP (2005). Case study of customer relationship management (CRM) in the on-line affluent financial services market. <i>Journal of Internet Commerce</i> , 4(4), 153.
23	Van Riel, AC (2005). Introduction to the special issue on service innovation management. <i>Managing Service Quality</i> , 15(6), 493-495.
24	Van Birgelen, M, P Ghijsen and J Semeijn (2005). The added value of web innovation for customer satisfaction: experiences with a barbeque catering service. <i>Managing Service Quality</i> , 15(6), 539-554.
25	Victorino, L, R Verma, G Plaschka and C Dev (2005). Service innovation and customer choices in the hospitality industry. <i>Managing Service Quality</i> , 15(6), 555-576.
26	Schulz, M (2005). Guest editor's introduction: is Japan finally catching up on service innovation? <i>Japanese Economy</i> , 33(3), 3-9.
27	Coggburn, JD and A Vega (2005). Municipal service bundling: the case of San Antonio's neighbourhood sweep program. <i>International Journal of Organization Theory & Behavior (PrAcademics Press)</i> , 8(3), 343-370.
28	Lu, I-Y, L-H Lin and G-C Wu (2005). Applying options to evaluate service innovations in the automotive industry. <i>International Journal of Technology Management</i> , 32(3/4), 339-349.
29	Xu, H, SK Sharma and R Hackney (2005). Web services innovation research: towards a dual-core model. <i>International Journal of Information Management</i> , 25(4), 321-334.
30	Akamavi, RK (2005). Re-engineering service quality process mapping: e-banking process. <i>International Journal of Bank Marketing</i> , 23(1), 28-53.
31	Wong, PK and Z-L He (2005). A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms. <i>Service Industries Journal</i> , 25(1), 23-42.
32	Asthana, S and J Halliday (2004). What can rural agencies do to address the additional costs of rural services? A typology of rural service innovation. <i>Health & Social Care in the Community</i> , 12(6), 457-465.
33	Rennings, K, A Ziegler and T Zwick (2004). The effect of environmental innovations on employment changes: an econometric analysis. <i>Business Strategy & the Environment (John Wiley & Sons, Inc)</i> , 13(6), 374-387.
34	Matthing, J, B Sandén and B Edvardsson (2004). New service development learning from and with customers. <i>International Journal of Service Industry Management</i> , 15(5), 479-498.
35	Perks, H and N Riihela (2004). An exploration of inter-functional integration in the new service development process. <i>Service Industries Journal</i> , 24(6), 37-63.
36	Stevens, E and S Dimitriadisb (2004). New service development through the lens of organisational learning: evidence from longitudinal case studies. <i>Journal of Business Research</i> , 57(10), 1074-1084.

37	Shimizu, S, H Ishikawa, A Satoh and T Aihara (2004). On-demand design service innovations. <i>IBM Journal of Research & Development</i> , 48(5/6), 751-764.
38	Dolfsma, W (2004). The process of new service development – issues of formalization and appropriability. <i>International Journal of Innovation Management</i> , 8(3), 319-337.
39	Van Riel, ACR, J Lemmink and H Ouwersloot (2004). High-technology service innovation success: a decision-making perspective. <i>Journal of Product Innovation Management</i> , 21(5), 348-359.
40	Van Klink, A and E-J Visser (2004). Innovation in Dutch horticulture: fresh ideas in fresh logistics. <i>Tijdschrift voor Economische en Sociale Geografie (Journal of Economic & Social Geography)</i> , 95(3), 340-346.
41	Matear, S, BJ Gray and T Garrett (2004). Market orientation, brand investment, new service development, market position and performance for service organisations. <i>International Journal of Service Industry Management</i> , 15(3), 284-301.
42	Blazevic, V and A Lievens (2004). Learning during the new financial service innovation process: antecedents and performance effects. <i>Journal of Business Research</i> , 57(4), 374.
43	Rajatanavin, R and M Speece (2004). The sales force as an information transfer mechanism for new service development in the Thai insurance industry. <i>Journal of Financial Services Marketing</i> , 8(3), 244-258.
44	Van Riel, ACR and A Lievens (2004). New service development in high tech sectors: a decision-making perspective. <i>International Journal of Service Industry Management</i> , 15(1), 72-101.
45	Dougherty, D (2004). Organizing practices in services: capturing practice-based knowledge for innovation. <i>Strategic Organization</i> , 2(1), 35-64.
46	Abramovici, M and L Bancel-Charensol (2004). How to take customers into consideration in service innovation projects. <i>Service Industries Journal</i> , 24(1), 56-78.
47	De Jong, JPJ and PAM Vermeulen (2003). Organizing successful new service development a literature review. <i>Management Decision</i> , 41(9), 844-858.
48	Royston, G, J Halsall, D Halsall and C Braithwaite (2003). Operational Research for informed innovation: NHS Direct as a case study in the design, implementation and evaluation of a new public service. <i>Journal of the Operational Research Society</i> , 54(10), 1022-1028.
49	Korsching, PF, SG Sapp and S El-Ghamrini (2003). Rural telephone company adoption of service innovations: a community field theory approach. <i>Rural Sociology</i> , 68(3), 387.
50	Laws, E and N Scott (2003). Developing new tourism services: dinosaurs, a new drive tourism resource for remote regions? <i>Journal of Vacation Marketing</i> , 9(4), 368-380.
51	Crosby, LA, SL Johnson and KD Winslow (2003). Innovation-not for the fainthearted. <i>Marketing Management</i> , 12(2), 10-11.
52	Blazevic, Vera, Lievens, Annouk, and Klein, Evelien (2003). Antecedents of project learning and time-to-market during new mobile service development. <i>International Journal of Service Industry Management</i> 14(1), 120.
53	López, LE and EB Roberts (2002). First-mover advantages in regimes of weak appropriability: the case of financial services innovations. <i>Journal of Business Research</i> , 55(12), 997.
54	Bátiz-Lazo, B and D Wood (2002). An historical appraisal of information technology in commercial banking. <i>Electronic Markets</i> , 12(3), 192-205.

55	Rennings, K and T Zwick (2002). Employment impact of cleaner production on the firm level: empirical evidence from a survey in five European countries. <i>International Journal of Innovation Management</i> , 6(3), 319.
56	Goldstein, SM, R Johnston, J Duffy and J Rao (2002). The service concept: the missing link in service design research? <i>Journal of Operations Management</i> , 20(2), 121-134.
57	Menor, LJ, MV Tatikonda and SE Sampson (2002). New service development: areas for exploitation and exploration. <i>Journal of Operations Management</i> , 20(2), 135-157.
58	Avlonitis, GJ, PG Papastathopoulou and SP Gounaris (2001). An empirically-based typology of product innovativeness for new financial services: success and failure scenarios. <i>Journal of Product Innovation Management</i> , 18(5), 324-342.
59	De Brentani, U (2001). Innovative versus incremental new business services: different keys for achieving success. <i>Journal of Product Innovation Management</i> , 18(3), 169-187.
60	Storey, C and D Kelley (2001). Measuring the performance of new service development activities. <i>Service Industries Journal</i> , 21(2), 71-90.
61	Wyatt, S (2000). ICT innovation in central government: learning from the past. <i>International Journal of Innovation Management</i> , 4(4), 391.
62	Hipp, C, BS Tether and I Miles (2000). The incidence and effects of innovation in services: evidence from Germany. <i>International Journal of Innovation Management</i> , 4(4), 417.
63	Lievens, A and RK Moenaert (2000). Communication flows during financial service innovation. <i>European Journal of Marketing</i> , 34(9/10), 1078.
64	Song, XM, CA di Benedetto and LZ Song (2000). Pioneering advantage in new service development: a multi- country study of managerial perceptions. <i>Journal of Product Innovation Management</i> , 17(5), 378-392.
65	Lievens, A and RK Moenaert (2000). New service teams as information-processing systems: reducing innovative uncertainty. <i>Journal of Service Research</i> , 3(1), 46.
66	Johne, A and C Storey (1998). New service development: a review of the literature and annotated bibliography. <i>European Journal of Marketing</i> , 32(3/4), 184.
67	Peffers, K and BL dos Santos (1996). Performance effects of innovative IT applications over time. <i>IEEE Transactions on Engineering Management</i> , 43(4), 381.
68	Atuahene-Gima, K (1996). Market orientation and innovation. <i>Journal of Business Research</i> , 35(2), 93-103.
69	Atuahene-Gima, K (1996). Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia. <i>Journal of Product Innovation Management</i> , 13(1), 35-52.
70	Martin Jr, CR and DA Horne (1995). Level of success inputs for service innovations in the same firm. <i>International Journal of Service Industry Management</i> , 6(4), 40.
71	Chaney, PK and TM Devinney (1992). New product innovations and stock price performance. <i>Journal of Business Finance & Accounting</i> , 19(5), 677-695.
72	De Brentani, U (1991). Success factors in developing new business services. <i>European Journal of Marketing</i> , 25(2), 33-59.
73	Cowell, DW (1988). New service development. <i>Journal of Marketing Management</i> , 3(3), 296-312.

* The articles are sorted by publication date (descending)

Paper III¹¹

¹¹ Aas, T.H. and Pedersen P.E. (2010). “The Impact of Service Innovation on Firm Level Financial Performance”, Accepted for publication in *Service Industries Journal*.

The Impact of Service Innovation on Firm Level Financial Performance

Tor Helge Aas
University of Agder

Per Egil Pedersen
Norwegian School of Economics and Business Administration

Abstract

This article empirically investigates if firms focusing service innovation perform better financially than firms not focusing service innovation. Analysis of the financial performance of 3575 Norwegian firms in the manufacturing industries supports the proposition that firms focusing service innovation have significantly higher operating results growth than firms not focusing service innovation. However, this proposition is not supported in a corresponding analysis of 1132 Norwegian firms in the service industries. We elaborate on these results by investigating a variety of performance measures and by comparing the effects of service innovation between manufacturing and service industries. The article contributes to the service innovation measurement literature, and to a better general understanding of the determinants of service innovation performance effects.

Keywords: Service innovation; firm performance; financial performance; community innovation survey

1 Introduction

Numerous studies have been reported on the relationship between innovation and firm performance, and today, most innovation scholars seem to agree that “*innovation is a powerful explanatory factor behind differences in performance between firms*” (Fagerberg, 2005, p. 20). Nevertheless, research on the relationship between innovation and firms’ financial performance has traditionally focused primarily on innovations related to the development, production and marketing of goods, while the effects of innovations related to services have been given less attention (e.g. de Jong, Bruins, Dolfsma & Meijgaard, 2003; Cainelli, Evangelista & Savona, 2004).

The research literature argues that the firm-level effects of service innovation are different from those of other types of innovation. Tether (2003), for example, argues that service innovation effects have a more qualitative nature, and for this reason, are less tangible than the effects of other innovation efforts. For example, it is suggested (e.g. de Jong et al., 2003; Tether & Metcalfe, 2001; Narver & Slater, 1990) that service innovation typically transforms the state of the customers and results in customer satisfaction and loyalty, rather than short term financial performance. It has also been argued that “*due to the nature of services (intangibility, heterogeneity), the impact of service innovations is harder to trace than in manufacturing*” (de Jong et al., 2003, p. 61).

Nevertheless, the literature also argues that it is likely that the intangible effects of service innovation will have an impact also on the financial results of the innovating firm in a more long-term perspective. For example, it is argued that increased customer loyalty most likely will result in repeat purchases by the customer, and in recommendations to other potential customers. This will increase sales and consequently, improve the financial results of the firm (Narver & Slater, 1990).

However, there are very few studies providing empirical evidence supporting this relationship by explicitly measuring the effects of service innovation efforts on financial performance. Thus, we argue that relatively little is known about the economic impact of service innovation, particularly at the firm level. In fact Cainelli et al. (2004) stated that “*the*

literature in this field is largely descriptive and dominated by a series of impressionistic views not supported by robust evidence” (p. 118).

Today, services contribute to more than 70% of the value added in most developed countries (e.g. Grönroos, 2007), and a large share of innovative efforts in both the service industries (e.g. Berry, Shankar, Turner Parish, Cadwallader & Dotzel, 2006; de Jong et al., 2003; Matear, Gray & Garrett, 2004; Miles, 2005; Tidd & Hull, 2003), and the manufacturing industries (e.g. Bryson & Monnoyer, 2004; Howells, 2001; Lu, Lin & Wu, 2005) is related to service innovation. Obviously, managers that consider alternative uses of their financial and managerial resources need to know the financial effects of using their resources on service innovation. Thus, from a managerial point of view, the lack of empirical studies on the relationship between service innovation and financial performance is worrying.

Among the few studies investigating this relationship, Cainelli et al. (2004) provided a major contribution to the understanding of the impact of innovation on financial performance in services when they matched CIS-2 data from Italy with a set of economic indicators provided by the Italian System of Enterprise Account. The data is analysed at the firm level showing that innovating firms out-perform non-innovating firms in terms of productivity levels and economic growth. Despite this honourable effort, more research on the topic is required. For example, Cainelli et al. (2004) focused on service innovations in the service industries exclusively. However, several authors have recently argued that manufacturing firms should include service offerings to improve their performance (e.g. Fang, Palmatier & Steenkamp, 2008; Sawhney, Balasubramanian & Krishnan, 2004; Vargo & Lusch, 2004), and in practice many leading manufacturing firms have added services to their existing product offerings (see e.g. Bryson & Monnoyer, 2004; Howells, 2001; Lu, Lin & Wu, 2005; Lusch, Vargo & O'Brien, 2007; Sawhney, 2006). Thus, service innovation is equally relevant to the manufacturing industries, and the financial impact of service innovation in these industries also requires attention. Another limitation is related to the fact that Cainelli et al.'s (2004) analysis is based on innovation data from 1993-1995 and accounting data from 1996-1998. These data are old, and may not reflect the present status. Furthermore, Cainelli et al.'s (2004) analysis is based on an Italian data set, and it may not reflect the status in other countries.

In addition, some of Cainelli et al. (2004)'s methodological choices may be questioned, justifying the need for more research. For example, Cainelli et al. (2004) do not test whether

the observed differences between the innovators and non-innovators are statistically significant, their financial performance indicators do not include cost dimensions, and their sample show a systematic bias towards innovative firms.

Viewed in the light of this background, and viewed in the light of the fact that other efforts (e.g. Mansury & Love, 2008) to identify the impact of service innovation on financial performance generally also have had limitations similar to Cainelli et al.'s (2004), we aim to explore the relationship between service innovation and financial performance in both service and manufacturing firms by using recent Community Innovation Survey data (CIS2006) from Norway matched with a set of economic accounting data from The Norwegian Register of Company Accounts. The Norwegian CIS2006 data report the innovation activities in Norwegian firms in the manufacturing and service industries during the period 2004-2006. Using these data, we will analyze the impact of service innovation activities in this period on the financial performance in the following year, i.e. 2007. Thus, the aim of the paper is to answer the following research question: *Do firms in 1) the service industries and 2) the manufacturing industries focusing service innovation activities in the period 2004-2006 perform better financially in the following year (2007) than firms not focusing such activities?*

The paper is organised as follows: Section 2 reviews the literature on service innovation effects and presents our hypotheses on the differences in financial performance between firms focusing service innovation activities and those not focusing such activities. Section 3 presents the methodology chosen to test these hypotheses. In section 4, we present the empirical analyses applied to test the hypotheses and their corresponding results. In section 5, we discuss the results and compare them with the findings of other studies. Finally, in section 6, we conclude.

2 Theoretical background and hypotheses

Firm level innovations are often categorized as product or process innovations (e.g. Tidd, Bessant & Pavitt, 2001), but for service related innovations these traditional categories may be insufficient (e.g. de Jong et al., 2003; Bitran & Pedrosa, 1998). Service innovation may include both product and process innovation, or as stated by de Jong et al. (2003); "*Because of the simultaneity of services, product- and process innovations usually coincide. New services often go together with new patterns of distribution, client interaction, quality control and assurance, etc.*" (p. 17).

This complexity of service innovation is illustrated well in den Hertog's (2000) service innovation framework. Den Hertog (2000) suggests that service innovations include 4 dimensions; 1) new service concept, 2) new client interface, 3) new service delivery system, and 4) new technological options. Typically, a service innovation involves more than one of these dimensions. An historical example is the introduction of automated teller machines (ATM). This service innovation involved both a new IT system (new technology) and a new client interface. Consequently, service innovation is a complex concept that covers more than what may be observed through the presence of a new service. Instead, one needs to include a number of activities that may affect any of the service innovation dimensions, e.g changes in the client interface or service delivery system, as well.

Based on den Hertog's (2000) service innovation framework, van Ark, Broersma and den Hertog (2003) suggest a broad definition of service innovation that will be deployed throughout this paper. They suggest that service innovation may be defined "*as a new or considerably changed service concept, client interaction channel, service delivery system or technological concept that individually, but most likely in combination, leads to one or more (re)new(ed) service functions that are new to the firm and do change the service/good offered on the market and do require structurally new technological, human or organisational capabilities of the service organisation*" (p. 16).

Another issue contributing to the complexity of service innovation is that service innovation activities are found in both service and manufacturing firms (e.g. Bryson & Monnoyer, 2004; Howells, 2004; Lu, Lin & Wu, 2005). To increase the value of their products and attract customers, most manufacturing firms today offer a number of services in addition to their physical products. These firms primarily use services to encapsulate their goods (Howells, 2004) and primarily do not sell services as their main output. An example of this phenomenon is provided by Lu, Lin and Wu (2005). They state that "*In the automotive industry, nearly all motor companies sell new cars with financial, marketing, maintenance, repairing, warranty and repossession services.*" (p.340). Thus, an investigation of the effects of service innovation should include the effects of service innovation activities in manufacturing firms as well as in service firms. Due to differences in the conceptualization of service innovation in these two sectors, however, the measurement of relevant service innovation activities will have to be adapted to each sector.

2.1 Financial effects of service innovation

When reviewing the service innovation literature, several direct effects of service innovation at the firm level have been identified. First, service innovation may change the internal business process of the innovator for example by increasing the service delivery capacity (Lievens & Moenaert, 2000). Second, it may change the innovating firm's internal capability, for example as a result of learning effects (e.g. Stevens & Dimitriadisb, 2004; Blazevic & Lievens, 2004; Blazevic, Lievens & Klein, 2003). Third, it may change the relationship with other stakeholders, or have effects on customer value (e.g. van Riel & Lievens, 2004; Sigala, 2006) or customer satisfaction (e.g. Lyons, Chatman & Joyce, 2007; Matear et al., 2004; Wong & He, 2005; Royston, Halsall, Halsall & Braithwaite, 2003). Fourth, service innovation may have external effects like for example environmental effects (e.g. Wong & He, 2005; Løvlie, Downs & Reason, 2008). Finally, service innovation may influence the innovating firm's competitiveness (e.g. Van Riel, Lemmink & Ouwersloot, 2004; Blazevic & Lievens, 2004; Avlonitis, Papastathopoulou & Gounaris, 2001).

It is furthermore suggested that all these potential direct effects of service innovation are causally related to the financial performance of the firm (e.g. Van Riel et al., 2004; Matear et al., 2004; Avlonitis et al., 2001; Lievens & Moenaert, 2000). Thus, financial performance effects may be considered indirect or mediated by these direct effects. It is likely to be a time lag between the direct effects and the observed financial effects, and this time lag may vary considerable for different service innovation effects. If the direct effect is a change of internal business processes, this may result in cost reductions, and thus, financial performance effects may be observed rather immediately. If, however, the direct service innovation effect is a learning or customer satisfaction effect, it may take considerably longer time before any financial effects are observed. A second consequence of this time lag is that financial effects may be studied using both the financial performance indicators from a specific year as well as indicators measuring the change in financial performance over a period of two or more years.

In the service innovation literature, three categories of financial performance effects are typically discussed. In the first category, service innovations are proposed to increase the operating result of a firm by either reducing operational costs (e.g. Panesar & Markeset, 2008a; Panesar & Markeset, 2008b; Richmond, 2008; Lawler, 2005; Shimizu, Ishikawa, Satoh & Aihare, 2004; Perks & Riihela, 2004) or by increasing sales revenues (e.g. Mansury & Love, 2008; Kubeczko, Rametsteiner & Weiss, 2006; de Jong & Vermeulen, 2003;

Avlonitis et al., 2001; Hipp, Tether & Miles, 2000; Lievens & Moenaert, 2000; Atuahene-Gima, 1996a; Atuahene-Gima, 1996b; De Brentani, 1991; Cowell, 1988). Focusing operating results effects as the first potential financial performance effects of service innovations, we suggest the following hypotheses.

Hypothesis 1a: Manufacturing and service firms focusing service innovation activities have significantly higher operating results than firms not focusing service innovation.

Hypothesis 1b: Manufacturing and service firms focusing service innovation activities have significantly higher operating results growth than firms not focusing service innovation.

In the second category of performance effects found in the service innovation literature, service innovations are proposed to increase the profitability of the firm (e.g. Van Riel et al., 2004; Matear et al., 2004; Avlonitis et al., 2001; Lievens & Moenaert, 2000). This suggests the following hypotheses.

Hypothesis 2a: Manufacturing and service firms focusing service innovation activities have significantly higher profitability than firms not focusing service innovation.

Hypothesis 2b: Manufacturing and service firms focusing service innovation activities have significantly higher profitability growth than firms not focusing service innovation.

Finally, in the third category of effects, it is proposed that service innovations increase the productivity, e.g. the value added per employee, of the firm (e.g. Ciptono, 2006; Schulz, 2005; Akamavi, 2005; Hipp et al., 2000). Consequently, we suggest the following hypotheses.

Hypothesis 3a: Manufacturing and service firms focusing service innovation activities have significantly higher productivity than firms not focusing service innovation.

Hypothesis 3b: Manufacturing and service firms focusing service innovation activities have significantly higher productivity growth than firms not focusing service innovation.

To summarize, the financial performance effects of service innovations are proposed to be indirect or mediated effects that are reflected in increased operating results, profitability or productivity, and these effects may be observed either through the financial performance indicators at a specific point in time after the service innovation activities have been initiated, or through measures capturing the change in financial performance over a period of time.

3 Method

To test our hypotheses, a data set was designed by matching the Norwegian CIS2006 data and economic accounting data from The Norwegian Register of Company Accounts. The Norwegian CIS2006 data include a wide range of measures of innovation activities for the period 2004-2006, and the accounting data include a wide range of accounting variables (e.g. sales revenues, operating costs, operating results, assets and equity) for the years 2006 and 2007.

3.1 Sample

The sample of the Norwegian CIS2006 study includes 6443 firms from a number of service and manufacturing industries. All Norwegian firms with more than 50 employees in these selected industries are included in the sampling frame. In addition, 35% of the Norwegian firms having between 5 and 49 employees are randomly selected and included in the sampling frame. The sampling frame is designed to represent the population of all Norwegian firms with more than 5 employees. For more information on the sampling procedure, we refer to Statistics Norway (2007).

Despite obligations to reply, some firms have, unfortunately, not fully completed the questionnaire used in the CIS2006 survey. In principle, accounting data should have been reported by all the 6443 firms of the CIS2006 sample to The Norwegian Register of Company Accounts. Unfortunately, some accounting data are incomplete, leading to “missing data” for some firms in the CIS2006 sample. Thus, our final analysis is based on a sample of 4707 firms for which we have obtained valid innovation and accounting data. The distribution of the service and manufacturing firms is shown in Table 1.

Table 1: The sample Industry

Industry	No. Firms in Norwegian CIS2006	No. valid observations (both innovation data and accounting data)	% with focus on service innovation
<i>The service industry</i>	2750	1132	52.0%
<i>The manufacturing industry*</i>	3693	3575	13.6%
Total	6443	4707	22.8%

3.2 Measures

3.2.1 Service innovation focus

Firms' focus on service innovation activities was measured by designing two dichotomous variables. The first variable indicated focus on service innovation activities of firms in the service industry, whereas the second was designed to reflect a similar focus in manufacturing industry firms. In the CIS2006 data set, these variables were not readily available, and had to be designed somewhat differently for the two industry categories.

By deploying den Hertog's (2000) service innovation framework and van Ark et al.'s (2003) definition of service innovation we argue that for firms in the *service industry*, all innovation types reported in CIS, i.e. product innovation, process innovation, organisational innovation and marketing innovation, may be regarded as service innovations. Nearly all innovation activities in service firms are service innovations in the broad sense. For example, product innovation in these industries may be changes in the service concept, process and organisational innovation may be changes in the service delivery systems, and marketing innovation may be changes in the client interface, and all of them may change the service offered on the market and may require structurally new technological, human or organisational capabilities of the service organisation. Thus, according to den Hertog (2000) and van Ark et al. (2003), these innovation types should all be regarded as service innovations.

For firms in the *manufacturing industry* the focus on service innovation should be captured in a somewhat different way. These firms primarily use services to encapsulate their goods (Howells, 2004) and do not sell services as their main output. Nevertheless, introduction of new services in manufacturing firms may change the service or good offered on the market and may require structurally new technological, human or organisational capabilities of the organisation. Thus, product innovation, in form of introduction of new services, falls within van Ark et al.'s (2003) definition of service innovation. However, the introduction of new

processes, organisational changes or new marketing methods in manufacturing firms will more seldom fall within van Ark et al.'s (2003) definition. For example, process innovations, in form of introduction of new methods of producing goods, organisational innovation, in form of introduction of new business practices for organising work, or marketing innovations, in form of changes to product design of goods, will neither change the service concept, client interaction channel, service delivery system nor the technological concept. Thus, they do not fall within van Ark et al.'s (2003) definition of service innovation.

There are a few situations, however, when marketing innovations and process innovations in manufacturing firms could be regarded as service innovations according to van Ark et al.'s (2003) definition. Examples are: 1) The introduction of new delivery or distribution methods (a subcategory of process innovation) may be perceived as service innovation since delivery and distribution may be perceived as services encapsulating the goods, and changes in these services could therefore be regarded as service innovations. 2) The introduction of new methods for product placement or sales channels may also be perceived as services encapsulating the goods, and changes could be regarded as service innovations. One example may illustrate this: If a manufacturer that has normally offered its products in stores starts to offer the products online, the customers will perceive this as a new service encapsulating the good, and thus, this innovation should be regarded as a service innovation.

Extending this line of reasoning to all innovation indicators of the CIS2006, it was possible to design a variable that reflected the focus on service innovation in manufacturing firms. In Table 2 we show how the variables reflecting firms' focus on service innovation were designed for both service and manufacturing firms.

**Table 2: Service innovation in the Norwegian CIS2006
CIS2006 innovation type**

		Considered as <i>service innovation</i> for firms in the service industry?	Considered as <i>service innovation</i> for firms in the manufacturing industry?	Service innovation type (den Hertog, 2000)
Product innovation	Introduction of new goods	No	No	
	Introduction of new services	Yes	Yes	New service concept
Process innovation	Introduction of new methods of manufacturing or producing goods or services	Yes	No	New service delivery system
	Introduction of new logistics, delivery or distribution methods	Yes	Yes	New service delivery system
	Introduction of new supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing	Yes	No	New service delivery system
Organisational innovation	Introduction of new business practices for organising work or procedures	Yes	No	New service delivery system
	Introduction of new knowledge management systems	Yes	No	New service delivery system
	Introduction of new methods of workplace organisation for distributing responsibilities and decision making	Yes	No	New service delivery system
	Introduction of new methods of organising external relations with other firms or public institutions	Yes	No	New service delivery system
Marketing innovation	Changes to product design of goods or services	Yes	No	New client interface
	Changes to the packaging of goods	No	No	
	New media or techniques for product promotion	Yes	No	New client interface
	New marketing strategy	No	No	
	New methods for product placement or sales channels	Yes	Yes	New client interface
	New methods of pricing goods or services	No	No	

Using the categorization scheme shown in Table 2, a final dichotomous variable reflecting each firm's focus on service innovation was designed. This variable was applied as the main independent variable in all further analyses of both service and manufacturing firms.

3.2.2 Financial performance variables

Several financial indicators may be relevant when measuring the financial impact of innovation. Löf, Heshmati, Asplund & Nåås (2001) use variations in the sales per employee

as an indicator of financial performance. This measure is obtained by multiplying the proportion of sales of innovative products by total sales and then dividing the sum by the number of employees. Kemp, Folkeringa, de Jong & Wubben (2003) use the following financial performance indicators; 1) total number of employees and the development of this figure over time, 2) turnover and its development, 3) export share in total turnover and its development, and 4) net profits/losses and its development. Klomp & van Leeuwen (2001) use total sales growth and employment growth as indicators of financial performance. As mentioned above, Cainelli et al. (2004) measured the financial performance of firms by three indicators; the annual average growth rate of sales and of employees, and the annual level of labour productivity - calculated in terms of sales per employee.

We observe that the measures include both measures of performance growth and measures of average performance levels, and both relative (e.g. scaled by the number of employees and growth in percentages) and absolute measures. Based on a review of the indicators used in innovation effects studies, it is not possible, or at least not straight forward, to conclude on a set of “best practice” financial performance indicators to apply. Instead, we suggest that a service innovation effect study, like ours, should include a rather extensive set of potential financial performance indicators, and that this set should reflect the diversity of financial performance indicators used in previous studies. In the literature review reported above, we identified three categories of financial performance effects of service innovation; 1) effects on operational results and operational results growth, 2) effects on profitability level and growth, and 3) effects on productivity level and growth. These categories of financial effects were also reflected in our hypothesis and we therefore suggest that the effect indicators should include measures capturing all these categories.

To measure the effects on operational results and operational results growth, both absolute and relative measures are relevant. To compare the operational results and the operational results growth of different firms we chose to scale the operational results and the operational results growth by the number of employees.

For the effects on profitability, several possible indicators may be found in both the innovation effects and the financial performance literature. Examples include return on assets, return on equity, return on capital, return on sales and basic earning power ratios. Common to all these measures are that they are relative. In this paper, we chose a basic earning power

ratio (BEP ratio) defined as the operating result divided by total assets, since this measure is not influenced by equity level, tax level or other factors believed to be irrelevant to the effects of innovation. For this profitability measure, both a level and a growth indicator were applied in our analyses.

The effects on productivity may be measured by dividing sales revenue by the number of employees, like for example Cainelli et al. (2004) did, and this measure was applied here as well. In addition, both the level of this relative measure and the growth of the measure were used in our further analyses.

To measure the financial performance of innovative activities it is also necessary to decide *when* to measure. As discussed in our theory section there may be a considerable time lag before the direct effects of service innovation may be observed in financial performance indicators. Thus, we may not capture the financial effects of a specific service innovation activity by measuring the financial performance immediately after the completion of the service innovation. In fact, the innovation activities are reported by the firms in the CIS2006 data as ongoing activities during the two-year period prior to the year when the CIS2006 data is collected. Thus, these activities may still be ongoing innovation activities in the reporting firms. Cainelli et al. (2004) solved this problem by measuring the financial performance in a three year period after the innovative activities. We argue, however, that Cainelli et al. (2004)'s time lag may be too long, and may be a source of error in their analyses. For example, the reporting firms may have started and finalized new innovative activities that may have influenced the effect measures when the time lag used is as long as three years. Therefore, we argue that it may be more appropriate to investigate the resulting financial performance in the first year following the period of the reported innovation activities. This means that since CIS2006 is covering innovation in the period 2004-2006, we suggest measuring the financial performance effects by using indicators from the period 2006-2007.

Table 3 summarizes the indicators chosen to measure financial performance in this paper.

Table 3: Selected indicators of financial performance

Hypothesis	Performance indicators (PI)
1a	PI_1: Level of operating result per employee in 2007 (Operating result 2007/Number of employees)
1b	PI_2: Operating result growth from 2006 to 2007 per employee ((Operating result 2007 – Operating result 2006)/Number of employees)
2a	PI_3: Level of Basic Earning Power ratio (BEP ratio) in 2007 (Operating result 2007/Total assets)
2b	PI_4: Growth of BEP ratio from 2006 to 2007 (BEP ratio 2007 – BEP ratio 2006)
3a	PI_5: Level of productivity in 2007 (Sales revenues 2007/Number of employees)
3b	PI_6: Productivity growth from 2006 to 2007 (Productivity in 2007 – Productivity in 2006)

4 Analysis and results

Table 4 presents descriptive statistics for the performance indicators. As seen from these statistics, the financial performance measures were not normally distributed. This implies that the extreme values of outliers heavily affected mean values. Therefore, traditional analysis of variance (F-tests) could not be applied to test our hypothesis. Consequently, we deployed the non-parametric Mann-Whitney-Wilcoxon test (Z-tests) to decide whether, and in what way, the financial performance of firms focusing service innovation and the firms not focusing service innovation activities differed.

Table 4: Financial performance indicators: Descriptive statistics

Performance indicator (PI)*	No. of valid obs.	Mean	Median	Std. dev	Min	Max	Skewness	Kurtosis
PI_1 (mill. NOK***)	5649	0.34	0.104	3.76	-138.3	155.5	10.5	1009.0
PI_2 (mill. NOK)	5649	0.16	0.022	14.1	-134.5	1044.6	72.17	5368.95
PI_3	4912**	0.121	0.118	0.365	-9.035	16.228	12.579	870.439
PI_4	4912**	0.007	0.008	0.409	-14.9	15.7	-0.664	853.231
PI_5 (mill. NOK)	5649	3.10	1.55	10.6	-0.79	429.6	22.17	686.39
PI_6 (mill. NOK)	5694	0.30	0.15	4.98	-241.9	147.1	-14.4	1179.3

*See Table 3 for an explanation

**Firms with “Total asset=0” in 2007/2006 are perceived as “missing” observations

***NOK – Norwegian Kroner – The Norwegian currency

Hypothesis 1a suggested that firms focusing service innovation in the manufacturing and service industries have significantly higher operating results than firms not focusing service innovation. As Table 5 and 6 shows, the results of the Mann-Whitney-Wilcoxon tests did not support this hypothesis. We found that both manufacturing and service firms focusing service

innovation had the same operating result (scaled by the number of employees) as firms without this focus.

Hypothesis 1b suggested that firms focusing service innovation in the manufacturing and service industries have significantly higher *operating results* growth than firms not focusing service innovation. Table 6 shows that the Mann-Whitney-Wilcoxon test supported this hypothesis for firms in the manufacturing industry. That is, firms in the manufacturing industry focusing service innovation activities did have significantly higher operating results growth than firms without a service innovation focus. However, Table 5 also shows that the Mann-Whitney-Wilcoxon test did not support this hypothesis for firms in the service industry. This means that firms in the service industry focusing service innovation did not have significantly higher operating results growth than firms without this focus.

Table 5: Differences in financial performance for firms in the *service industry*: firms with vs. firms without service related innovation activities.

Performance indicator (PI)	<i>Firms with service innovation^a</i>	<i>Firms without service innovation^a</i>	<i>Median difference</i>	<i>Z-value (Mann-Whitney-Wilcoxon test)</i>
PI_1 (op. result per emp. in mill NOK)	0.14	0.096	0.044	Z=-1.3
PI_2 (op. result growth per emp. in mill NOK)	0.027	0.016	0.011	Z=-0.6
PI_3 (BEP ratio in 2007)	0.078	0.087	-0.009	Z=-0.36
PI_4 (BEP ratio growth)	0.0015	0.0004	0.0011	Z=-0.11
PI_5 (productivity in mill NOK)	1.76	1.60	0.16	Z= -0.79
PI_6 (productivity growth in mill NOK)	0.22	0.14	0.08	Z=-2.2*

^aMedian values

** P < 0.01

* P < 0.05

Table 6: Differences in financial performance for firms in the *manufacturing industry*: firms with vs. firms without service related innovation activities.

Performance indicator (PI)	<i>Firms with service innovation^a</i>	<i>Firms without service innovation^a</i>	<i>Median difference</i>	<i>Z-value (Mann-Whitney-Wilcoxon test)</i>
PI_1 (op. result per emp. in mill NOK)	0.12	0.097	0.023	Z=-1.4
PI_2 (op. result growth per emp. in mill NOK)	0.028	0.020	0.008	Z=-2.2*
PI_3 (BEP ratio in 2007)	0.13	0.12	0.01	Z=-0.75
PI_4 (BEP ratio growth)	0.0159	0.0134	0.0025	Z=-0.42
PI_5 (productivity in mill NOK)	1.79	1.57	0.22	Z= -3.88**
PI_6 (productivity growth in mill NOK)	0.19	0.15	0.04	Z=-2.4*

^aMedian values

** P < 0.01

* P < 0.05

Furthermore, in hypothesis 2a, manufacturing and service firms focusing service innovation activities were expected to have significantly higher *profitability* than firms not focusing

service innovation. As shown in Table 5 and 6 the Mann-Whitney-Wilcoxon tests did not support this hypothesis. Also, hypothesis 2b was not supported by our results. Thus, firms in both the manufacturing and the service industry focusing service innovation activities were not found to have a higher profitability growth than the firms not focusing service innovation.

Hypothesis 3a suggested that manufacturing and service firms focusing service innovation activities have significantly higher *productivity* than firms not focusing service innovation activities. Table 5 shows that the Mann-Whitney-Wilcoxon test did not support this hypothesis for firms in the service industry. However, as shown in Table 6, the Mann-Whitney-Wilcoxon test did support the hypothesis for firms in the manufacturing service. Thus, our findings suggested that firms in the manufacturing industry focusing service innovation activities did have a higher productivity than firms in the manufacturing industry without this focus.

Finally, hypothesis 3b suggested that manufacturing and service firms focusing service innovation activities have significantly higher productivity growth than firms not focusing service innovation activities. As shown in Table 5 and 6, the Mann-Whitney-Wilcoxon tests supported this hypothesis for both manufacturing and service firms.

To summarize, three financial performance indicators reflecting the level of a firm's financial performance and three indicators reflecting the growth of a firm's financial performance were used to test hypotheses that firms focusing service innovation activities outperform firms not focusing service innovation. Both manufacturing and service industry firms were investigated. For the manufacturing firms, three of the 6 indicators showed significant effects, whereas for service firms, only one of the 6 indicators indicated significant effects. Two conclusions may be drawn from these observations. First, the financial performance effects of service innovation activities are not obvious, but depend on the indicators used to capture these effects. Further investigation into this issue is required before it can be inconclusively generalized that service innovation activities positively affects financial performance. Second, manufacturing firms seem to better transform service innovation activities into observable financial performance effects. The causes of this difference in the ability to turn service innovation activities into performance effects also require further investigation.

5 Discussion

The impact of service innovation on firm level financial performance has received a somewhat limited attention in the research literature. This study has sought to contribute to filling this gap in the research literature on service innovation effects by empirically investigating the differences in financial performance between firms focusing service innovation activities and firms not focusing such activities. Due to the mixed results of our empirical analysis, further discussion is required. In this section we first discuss the interpretation and implications of our findings. Next, we, discuss what happens with the results if we apply independent variables based on alternative definition of service innovation focus. Thereafter, we compare our findings with the findings of some corresponding empirical studies (e.g. Cainelli et al., 2004). Finally, we discuss the limitations of our research.

5.1 Interpretation and implications of our results

5.1.1 Operating results

When we analysed operating result growth we did not find any differences between firms focusing and firms not focusing service innovation in the service industries. For firms in the manufacturing industries, however, we found a significant difference. Firms focusing service innovation in the manufacturing industry were found to have a higher operating result growth than firms without this focus.

By looking closer into these findings we find that the higher operating result growth for manufacturing firms focusing service innovation was caused by a higher growth in sales revenues than the growth in operational costs. On the other hand, firms in the service industry focusing service innovation were also found to have a higher sales revenue growth than service firms not focusing service innovation, but for these firms the growth in operational costs was correspondingly high. In other words; for firms in the service industries focusing service innovation, the effects on financial performance caused by increased sales revenues were neutralized by increased costs.

5.1.2 Profitability

Our results from Hypothesis 2 show that the profitability and profitability growth of firms focusing service innovation activities did not differ from those not focusing such activities. This result was valid both for firms in the service industry and for firms in the manufacturing

industry. Thus, we may conclude that service innovation does not seem to have an impact on the profitability (BEP ratio) of the firms in our sample.

However, the reason why service innovation does not have an impact on the BEP ratio (defined as the operating result divided by total assets), differ considerably for firms in the service and the manufacturing industries. For firms in the manufacturing industries we found that firms focusing service innovation had a higher growth (statistically significant) *both* in terms of operating results and in terms of assets, whereas for firms in the service industry we found that firms focusing service innovation did not have a higher growth neither in terms of operating results, nor in terms of assets. Even if the consequence of these findings was that service innovation did not have an impact on the BEP ratio for any firm, the result is more worrying for firms in the service industries than for firms in the manufacturing industries.

5.1.3 Productivity

Results from Hypothesis 3b showed that all firms, i.e. both firms in the manufacturing and service industries, focusing service innovation activities had significantly higher productivity growth than firms without the presence of service innovation activities. This was as expected. However, our findings from Hypothesis 1 showing that the increased productivity was neutralized by increased operational costs for firms in the service industry, modify the positive impression. The results from Hypothesis 3a further modifies the positive impression since firms in the service industries focusing service innovation activities are not found to have a higher level of productivity than the firms not focusing service innovation.

5.1.4 Possible explanations

For firms in the manufacturing industries, most results were as expected, and in accordance with our hypotheses. An important question remains, however; why are several of our expectations not met by the service firms? Given the nature of our data, we can only speculate on what the answers to this question might be. One possible explanation may be that service innovation simply has a higher financial potential for firms in the manufacturing industry when compared to firms in the service industry. However, since the literature has revealed several case studies reporting very positive financial innovation results from firms in the service industry (e.g. Akamavi, 2005; Matear et al. 2004), we doubt that this explanation is generally valid.

Another possible explanation may be that the manufacturing firms on average are more capable of managing innovation projects when compared to firms in the service industries. This suggestion is supported to a certain extent by prior research. For example, Storey and Kelly's (2001) findings indicated that the innovation management practices in service firms seemed to be less developed than the innovation management practices found in studies of manufacturing firms (e.g. Barczak, Griffin and Kahn, 2009). Oke (2007) also found that service firms lacked formal practices for incremental service innovation implementation. Furthermore, de Brentani (2001) found less developed innovation management practices and lacking formal evaluation and design procedures to be a problem in less well performing service firms. She, thus, suggested "*a well-planned NSD process can provide important benefits, particularly when developing incremental new service offerings*" (p. 182).

Yet another possible explanation is related to the nature of the CIS2006 survey. Radical and incremental innovations count the same in this survey. Prior research has found that radical innovation on average has a stronger effect on financial performance than incremental innovation (Chaney, Devinney & Winer, 1991; Kleinschmidt & Cooper, 1991). We checked if manufacturing firms focusing service innovation also to a greater extent focused "new to the market" innovations, and found this to be the case ($\chi^2=5.46$, d.f.=1, $p<0.05$). This shows that manufacturing firms focusing service innovation also focus more radical innovations. Thus, service innovation focus in manufacturing firms may be considered an indicator of innovativeness that contributes more generally to financial performance. We, consequently, scrutinized our findings applying alternative definitions of "service innovation focus".

5.2 Alternative definitions of "service innovation focus"

As discussed, "service innovation focus" is not a readily available variable in CIS2006. Thus, to find the impact of service innovation we designed a variable that reflected this focus, and due to the differences between the service and manufacturing industries, "service innovation focus" was captured in a somewhat different way in these industries. Based on van Ark et al.'s (2003) broad service innovation definition, eleven CIS2006 innovation types could be perceived as service innovation for firms in the service industries, whereas three CIS2006 innovation types could be perceived as service innovation for firms in the manufacturing industries (see Table 2). A relevant question is; what happens to the results if a more narrow definition of service innovation is deployed and only the CIS2006 innovation type termed "introduction of new services" is regarded as service innovation?

Using this definition, we found no differences in financial performance between firms introducing and firms not introducing new services that were statistically significant at the 5% level. At the 10% level however, some performance differences were found both for firms in the manufacturing industries and for firms in the service industries. For firms in the manufacturing industries, the operating result growth was higher ($Z=-1.67$) for firms introducing new services than for firms not introducing new services. For firms in the service industries, the BEP ratio was lower ($Z=-1.86$) for firms introducing new services than for firms without this innovation type, whereas the productivity growth was higher ($Z=-1.84$) for firms introducing new services than for firms without this innovation type.

Thus, when the analysis is based on a more narrow definition of service innovation, the differences between firms focusing service innovation and firms not focusing service innovation, are more indistinct, but still present. Furthermore, our finding that the effects on financial performance caused by increased sales revenues are neutralized by increased costs for firms in the service industries, but not for firms in the manufacturing industries, is still valid when the more narrow definition of "service innovation focus" is applied.

Another relevant question is; what happens to the results if we deploy a more extensive definition reflecting firms' general innovation orientation, rather than their specific service innovation focus? Including indicators of product, process, marketing and organisational innovation in a general innovation orientation measure, we found significant effects on the levels of operating results and profitability ($Z=-4.8^{**}$ for PI_1 and $Z=-9.0^{**}$ for PI_5), but not on operating results growth ($Z=-1.2$ for PI_2). Thus, a specific service innovation focus is required for operating results growth. This suggests that service innovation focus indicates a particular innovativeness of some manufacturing firms. For the productivity indicators, the results were similar for both independent measures of innovation. For service firms, the same pattern of findings was revealed for general innovation orientation as for specific service innovation focus for operating result and productivity growth. We did, however, find that a general innovation orientation in these firms had a negative effect on profitability ($Z=-4.3^{**}$ for PI_7). Thus, it seems that an unfocused innovation orientation among service firms may lead to negative effects on profitability and that these negative effects may be avoided by focusing more specifically on service innovations.

5.3 Comparing our results with the results of other studies

Other studies (e.g. Cainelli et al., 2004; Mansury & Love, 2008) studying the impact of service innovation on financial performance, have covered service innovation in the service industries (Cainelli et al., 2004), or in a selection of specific sub-sectors, for example business services (Mansury & Love, 2008), only. Thus, our results on the service industries are comparable with Cainelli et al. (2004) and Mansury & Love (2008), whereas our results on the manufacturing industries may be compared with the results of some recent studies on the impact of innovation on the financial performance of manufacturing SMEs (e.g. Lin & Chen, 2007; Oke, Burke & Myers, 2007). Although these studies are not focusing on service innovation per se, service innovation is investigated as one type of innovation in these studies.

Cainelli et al. (2004) and Mansury and Love (2008) did not use exactly the same financial performance indicators as we did. Thus, to test whether we were able to replicate their findings, we investigated our dataset by also applying their indicators. Cainelli et al. (2004) and Mansury and Love (2008) used three performance measures; 1) sales growth (in percentages), 2) productivity (defined as sales revenue per employee), and 3) employment growth, and Cainelli et al. (2004) found that “...*the comparison of the economic performances of innovating and non-innovating firms across industry does confirm that innovation plays a positive effect on productivity and economic growth...*” (p. 123), whereas Mansury and Love (2008) found that “...*the presence of service innovation and its extent has a consistently positive effect on growth, but no effect on productivity*” (p. 52).

The results when we applied these indicators on our data set showed that our results only partly resemble those of Cainelli et al. (2004) and Mansury and Love (2008). We may draw the same conclusion as Cainelli et al. (2004) and Mansury and Love (2008) for the sales growth indicator. Our results indicated that the sales growth in percentage (as measured by Cainelli et al. (2004) and Mansury and Love (2008)) was higher ($Z=-3.5^{**}$) for firms in the service industry focusing service innovation activities, than for firms in the service industries not focusing service innovation activities. We also found the same as Mansury and Love (2008) for productivity. As reported earlier (Hypothesis 3) our results did not indicate that productivity was higher for firms focusing service innovation than for those not focusing service innovation ($Z=-0.79$). Neither did we find any significant differences for firms focusing service innovation and for firms not focusing service innovation in terms of

employment growth ($Z=-1.3$). Thus, we are not able to fully replicate the findings of Cainelli et al. (2004) and Mansury and Love (2008).

Lin and Chen (2007) and Oke et al. (2007) study the impact of innovation on manufacturing SMEs performance. In Lin and Chen (2007) service innovation is treated as a subcategory of technological innovations, and in Oke et al. (2007) service innovation is treated as a separate innovation category. Both studies used sales growth as a performance measure. In addition Oke et al. (2007) used the measure “net profit before tax growth” that is approximately the same as our operating result growth measure. Lin and Chen (2007) found that technological innovations, including service innovations, could not explain sales growth. Oke et al. (2007) did not report their results for service innovation explicitly, but found that a focus on innovation was significantly related to sales growth, but not to net profit growth. Thus, the findings of Lin and Chen (2007) and Oke et al. (2007) were not fully replicated in our study.

However, the four studies discussed did have some limitations, that may explain why our findings differ from the findings of these studies, for example: 1) Cainelli et al. (2004)’s conclusions were based solely on a comparison of median values, and the median differences were not tested for statistical significance. Thus, sufficient statistical evidence to draw their conclusions was not reported. 2) We consider the financial performance measures used by Cainelli et al. (2004), Mansury and Love (2008) and Lin and Chen (2007) to be relevant, but a problem is that their measures did not provide a sufficiently broad picture of the overall financial performance of the firm. Especially, we consider it to be serious that all their indicators lack a cost dimension. As for Cainelli et al. (2004) and Mansury and Love (2008), our results indicated that service firms focusing service innovation did have higher sales revenues growth than those not focusing it, but our finding was that this growth was neutralized by a corresponding growth in costs. As costs were not studied by Cainelli et al. (2004) and Mansury and Love (2008), they were unable to capture the broader picture of the financial performance effects of innovation for the firms in their study. 3) Mansury and Love (2008), Lin and Chen (2007) and Oke et al. (2007) only study a few sectors and deploy relatively small samples that may not be representative for the majority of firms. Thus, their conclusions may not be valid for service innovation in general.

5.4 Limitations

A major threat to the internal validity of our study is that observed differences in the financial performance may be caused by other factors than differences in service innovation focus. Due to this threat we investigated whether differences in the firms' size or differences in the sub-sector membership could explain the differences in financial performance. On the whole, we found that small and large firms focusing service innovation, both in the service industries and in the manufacturing industries, had the same financial performance effects. We were also unable to find any systematic financial performance effect differences between the firms of different sub-sectors. Thus, differences in firm size and sub-sector membership could not explain the differences in financial performance effects. Despite these findings, further research may reveal if and how moderating variables like service innovation expenses, type of service innovation, market orientation, firm level human capital etc. may affect the relationship between service innovation activities and financial performance.

Another concern related to the internal validity is that the non-parametric tests used to test for statistical significance in our analysis may not fully utilize the information included in the variance of the original variables. This may have made us unable to reject the null hypothesis of equal financial performance when, in fact, such a difference may be observed by comparing means or medians. The reason for choosing non-parametric testing was that the financial performance indicators were not normally distributed. An alternative to non-parametric testing would be to log-transform the performance measures and apply traditional parametric analysis of variance (F-tests). As an additional exercise we did this, and on the whole we found the same results as when the non-parametric tests were applied. Thus, we argue that the validity of our conclusions is not threatened by the use of the non-parametric tests.

The dichotomous independent variable used in our study, namely the operationalization of firms' focus on service innovation activities, is rather broad. Further analysis is recommended to investigate if alternative operationalizations of the focus on or presence of service innovation activities may lead to different results than those reported here.

Hall and Soskice (2001) draw a distinction between two types of political economies, Liberal Market Economies (LMEs) and Coordinated Market Economies (CMEs), and suggest that the *“institutional frameworks of LMEs provide companies with better capacities for radical*

innovation, while those of CMEs provide superior capacities for incremental innovation.” (p. 41). Norway is a typical example of a CME. Thus, the service innovation activities identified in our study may have a more incremental nature than the service innovation activities in LMEs. This may have threatened the external validity of our conclusions. Further research into this issue may be conducted by comparing data of the kind used in this study across countries. We do believe, however, that our findings are generalizable to CMEs.

6 Concluding remarks

Our findings indicate that service innovation affects firms’ financial performance. Both in the service industry and in the manufacturing industry we found evidence supporting the proposition that firms focusing service innovation have significantly higher productivity (sales revenue per employee) growth than firms not focusing service innovation.

However, our results also show that the financial effects of service innovation are not universal across all financial performance indicators and across all industries. The increased sales revenues resulting from service innovation in service firms seem to be neutralized by increased costs, meaning that these firms are unable to benefit financially, in terms of operating result growth, from their innovation activities. This is, however, not the case for firms in the manufacturing industry. Our results show that firms focusing service innovation activities in the manufacturing industry outperform firms not focusing service innovation activities, both in terms of operating result growth and productivity.

In addition, our findings also indicate that profitability, defined as operating result divided by asset, is not influenced by firms’ focus on service innovation activities. This is true for firms in both the service and manufacturing industries.

To conclude, our findings did not support the clear and unambiguous conclusions drawn in the comparable study of Cainelli et al. (2004). They concluded that *“the results presented have shown that innovating firms out-perform non-innovating firms in terms of both productivity levels and economic growth”* (p. 116). On the other hand, our findings show that the financial performance effects of service innovation activities is far more nuanced. Our findings suggest that more research is required on how the relationship between service innovation activities and financial performance is moderated. Furthermore, the findings

suggest that firms aiming to benefit financially from service innovation activities have to manage this process carefully.

7 References

Akamavi, R.K. (2005). Re-engineering service quality process mapping: e-banking process. *International Journal of Bank Marketing*, 23(1), 28-53.

Atuahene-Gima, K. (1996a). Market Orientation and Innovation. *Journal of Business Research*, 35(2), 93-103.

Atuahene-Gima, K. (1996b). Differential Potency of Factors Affecting Innovation Performance in Manufacturing and Services Firms in Australia. *Journal of Product Innovation Management*, 13(1), 35-52.

Avlonitis, G.J., Papastathopoulou, P.G., & Gounaris, S.P. (2001). An empirically-based typology of product innovativeness for new financial services: Success and failure scenarios. *Journal of Product Innovation Management*, 18(5), 324-342.

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

Berry, L.L., Shankar, V., Turner Parish, J., Cadwallader, S., & Dotzel, T. (2006). Creating New Markets Through Service Innovation. *MIT Sloan Management Review*, 47(2), 56-63.

Bitran, G., & Pedrosa, L. (1998). A structured product development perspective for service operations. *European Management Journal*, 16(2), 169-189.

Blazevic, V., & Lievens, A. (2004). Learning during the new financial service innovation process: Antecedents and performance effects. *Journal of Business Research*, 57(4), 374-391.

Blazevic, V., Lievens, A., & Klein, E. (2003). Antecedents of project learning and time-to-market during new mobile service development. *International Journal of Service Industry Management*, 14(1), 120-147.

- Bryson, J.R., & Monnoyer, C.M. (2004). Understanding the relationship between services and innovation: The RESER review of the European service literature on innovation, 2002. *The Service Industries Journal*, 24(1), 205-222.
- Cainelli, G., Evangelista, R., & Savona, M. (2004). The Impact of Innovation on Economic Performance in Services. *The Service Industries Journal*, 24(1), 116-130.
- Cainelli, G., Evangelista, R., & Savona, M. (2006). Innovation and economic performance in services: a firm level analysis. *Cambridge Journal of Economics*, 30, 435-458.
- Chaney P.K., Devinney, T.M., & Winer, R.S. (1991). The Impact of New Product Introductions on the Market Value of Firms. *The Journal of Business*, 64(4), 573-610.
- Ciptono, W.S. (2006). A sequential model of innovation strategy - company non-financial performance links. *Gadjah Mada International Journal of Business*, 8(3), 137-178.
- Cowell, D.W. (1988). New Service Development. *Journal of Marketing Management*, 3(3), 296-312.
- De Brentani, U. (1991). Success Factors in Developing New Business Services. *European Journal of Marketing*, 25(2), 33-59.
- De Brentani, U. (2001). Innovative versus incremental new business services: different keys for achieving success. *Journal of Product Innovation Management*, 18(3), 169-187.
- De Jong, J.P.J., Bruins, A., Dolfsma, W., & Meijgaard, J. (2003). *Innovation in service firms explored: what, how and why? Strategic study B200205*. Zoetermeer, Holland: EIM Business & Policy Research.
- De Jong, J.P.J., & Vermeulen P.A.M. (2003). Organizing successful new service development - A literature review. *Management Decision*, 41(9), 844-858.
- Den Hertog, P. (2000). Knowledge-intensive business services as co-producers of innovation. *International Journal of Innovation Management*, 4(4), 491-528.

Fagerberg, J. (2005). Innovation: A Guide to the Literature. In: J. Fagerberg, D.C. Mowery, & R.R. Nelson (Eds.), *The Oxford Handbook of Innovation* 1-26. Oxford: Oxford University Press.

Fang, E., Palmatier, R.W., & Steenkamp, J.E.M. (2008). Effect of Service Transition Strategies on Firm Value. *Journal of Marketing*, 72, 1-14.

Grönroos, C. (2007). Service management and marketing: Customer management in service competition. *Chichester: John Wiley & Sons*.

Hall, P. A. & Soskice, D. (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. New York: Oxford University Press.

Hipp, C., Tether, B.S., & Miles, I. (2000). The Incidence and Effects of Innovation in Services: Evidence from Germany. *International Journal of Innovation Management*, 4(4), 417-453.

Howells, J. (2001). The nature of innovation in services. In *Innovation and Productivity in Services: Proceedings of a Workshop Held in Sydney, Australia, October 31 - November 3, 2000* (pp. 57-79). Paris: Organisation for Economic Co-operation and Development (OECD) Publishing.

Howells, J. (2004). Innovation, consumption and services: Encapsulation and the combinatorial role of services. *The Service Industries Journal*, 24(1), 19-36.

Kemp, R.G.M., Folkeringa, M., de Jong J.P.J., & Wubben, E.F.M. (2003). *Innovation and firm performance*. Zoetermeer, Holland: EIM Business & Policy Research.

Kleinschmidt, E.J., & Cooper, R.J. (1991). The Impact of Product Innovativeness on Performance. *Journal of Product Innovation Management*, 8(4), 240-252.

Klomp, L., & van Leeuwen, G. (2001). Linking innovation and firm performance: A new Approach. *International Journal of the Economics of Business*, 8(3), 343-364.

- Kubeczko, K., Rametsteiner, E., & Weiss, G. (2006). The role of sectoral and regional innovation systems in supporting innovations in forestry. *Forest Policy & Economics*, 8(7), 704-715.
- Lawler, J.P. (2005). Case Study of Customer Relationship Management (CRM) in the On-Line Affluent Financial Services Market. *Journal of Internet Commerce*, 4(4), 153-164.
- Lievens, A., & Moenaert, R.K. (2000). Communication flows during financial service innovation. *European Journal of Marketing*, 34(9/10), 1078-1110.
- Lin, C.Y., & Chen, M.Y. (2007). Does innovation lead to performance? An empirical study of SMEs in Taiwan. *Management Research News*, 30(2), 115-132.
- Lu, I.-Y., Lin, L.-H., & Wu, G.-C. (2005). Applying options to evaluate service innovations in the automotive industry. *International Journal of Technology Management*, 32(3/4), 339-349.
- Lusch, R.F., Vargo, S.L., & O'Brien M. (2007). Competing Through Service: Insights from Service-Dominant Logic. *Journal of Retailing*, 83(5), 5-18.
- Lyons, R.K., Chatman, J.A., & Joyce, C.K. (2007). Innovation in Services: Corporate Culture and Investment Banking. *California Management Review*, 50(1), 174-191.
- Lööf, H., Heshmati A., Asplund R., & Nåås S.O. (2001). *Innovation and performance in manufacturing industries: a comparison of the Nordic countries* (SSE/EFI working paper series in economics and finance, no. 457). Stockholm: Stockholm School of Economics.
- Lööf, H., & Heshmati, A. (2002). Knowledge capital and performance heterogeneity: A Firm Level Innovation Study. *International Journal of Production Economics*, 76(1), 61-85.
- Løvlie, L., Downs, C., & Reason, B. (2008). Bottom-line Experiences: Measuring the Value of Design in Service. *Design Management Review*, 19(1), 73-79.
- Mansury, M.A., & Love, J.H. (2008). Innovation, productivity and growth in US business services: A firm-level analysis. *Technovation*, 28(1/2), 52-62.

Matear, S., Gray, B.J., & Garrett, T. (2004). Market orientation, brand investment, new service development, market position and performance for service organisations. *International Journal of Service Industry Management*, 15(3), 284-301.

Miles, I. (2005). Innovation in services. In: J. Fagerberg, D.C. Mowery, & R.R. Nelson (Eds.), *The Oxford Handbook of Innovation* 433-458. Oxford: Oxford University Press.

Oke, A. (2007). Innovation types and innovation management practices in service companies. *International Journal of Operations & Production Management*, 27(6), 564-587

Oke, A., Burke, G., & Myers, A. (2007). Innovation types and performance in growing UK SMEs. *International Journal of Operations & Production Management*, 27(7), 735-753.

Panesar, S.S., & Markeset, T. (2008a). Industrial service innovation through improved contractual relationship: A case study in maintenance. *Journal of Quality in Maintenance Engineering*, 14(3), 290-305.

Panesar, S.S., & Markeset, T. (2008b). Development of a framework for industrial service innovation management and coordination. *Journal of Quality in Maintenance Engineering*, 14(2), 177-193.

Perks, H. and Riihela, N. (2004). An exploration of inter-functional integration in the new service development process. *Service Industries Journal*, 24(6), 37-63.

Richmond, J.E.D. (2008). Transporting Singapore - The Air-Conditioned Nation. *Transport Reviews*, 28(3), 357-390.

Royston, G., Halsall, J., Halsall, D., & Braithwaite, C. (2003). Operational Research for informed innovation: NHS Direct as a case study in the design, implementation and evaluation of a new public service. *Journal of the Operational Research Society*, 54(10), 1022-1028.

Sawhney, M. (2006). Going Beyond the Product: Defining, Designing, and Delivering Customer Solutions. In: R.F. Lusch, & S.L. Vargo (Eds), *The Service-Dominant Logic of Marketing: Dialog, Debate, and Directions* 365-380. Armonk, NY: M.E. Sharpe.

Sawhney, M., Balasubramanian, S. & Krishnan V.V. (2004). Creating Growth with Services. *Sloan Management Review*, 45, 34–43.

Shimizu, S., Ishikawa, H., Satoh, A., & Aihara, T. (2004). On-demand design service innovations. *IBM Journal of Research & Development*, 48(5/6), 751-764.

Schulz, M. (2005). Guest Editor's Introduction: Is Japan Finally Catching Up on Service Innovation? *Japanese Economy*, 33(3), 3-9.

Sigala, M. (2006). Mass customisation implementation models and customer value in mobile phones services: Preliminary findings from Greece. *Managing Service Quality*, 16(4), 395-420.

Statistics Norway (2007). *Om statistikken*. Retrieved from <http://www.ssb.no/vis/emner/10/03/innov/om.html>.

Stevens, E., & Dimitriadis, S. (2005). Managing the new service development process: towards a systemic model. *European Journal of Marketing*, 39(1/2), 175-198.

Storey, C., & Kelly, D. (2001). Measuring the Performance of New Service Development Activities. *The Service Industries Journal*, 21(2), 71-90.

Tether, B. (2002). Who Cooperates for Innovation and Why: An Empirical Analysis. *Research Policy*, 31(6), 947-967.

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

Tidd, J., Bessant, J., & Pavitt, K. (2001). *Managing Innovation - Integrating Technological, Market and Organizational Change (2nd edition)*. Chichester: John Wiley & Sons.

Vargo, S.L., & Lusch, R.F. (2004), Evolving to a New Dominant Logic for Marketing. *Journal of Marketing*, 68(January), 1–17.

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

Van Riel, A.C.R., Lemmink, J., & Ouwersloot, H. (2004). High-Technology Service Innovation Success: A Decision-Making Perspective. *Journal of Product Innovation Management*, 21(5), 348-359.

Van Riel, A.C.R., & Lievens, A. (2004). New service development in high tech sectors: A decision-making perspective. *International Journal of Service Industry Management*, 15(1), 72-101.

Wong, P.K., & He, Z.-L. (2005). A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms. *Service Industries Journal*, 25(1), 23-42.

Paper IV¹²

¹² Aas, T.H. (2008), “Service Innovation and Sustained Competitive Advantage: A Resource-based Analysis”, in Timmermans, H.J.P (Ed.), *Proceedings of the 15th Recent Advances in Retailing and Services Science Conference*, ISBN: 978-90-6814-172-6, Zagreb, Kroatia, July 14-17, (the paper won “Highly Commended Paper Award”).

Service Innovation and Sustained Competitive Advantage: A Resource-based Analysis

Tor Helge Aas
University of Agder

Abstract

The answer to the fundamental question if the competitive advantage resulting from service innovation has a sustainable character is not readily available in the research literature. This paper is drawing on the theoretical insights from the resource based view and analyses if the resources resulting from service innovation, or the resources necessary to conduct service innovation, have the potential of being sources of sustained competitive advantage. It is found that the unique image and knowledge that may result from service innovation have the potential to improve a firm's ability to conduct new service innovations, and continuously stay ahead of competitors.

Key words

“service innovation”, “sustained competitive advantage”, “resource based view”

1 Introduction

In most economies services constitute a great amount of the total economy, and in many countries it is accounting for more than 70 % of the Gross National Product (OECD, 2001). At the same time it is clear that a large part of innovative efforts in firms are related to service innovation (e.g. DeJong et al., 2003). Several studies (e.g. Cooper and Edgett, 1996 and Kelly and Storey, 2000) suggest that service innovation, or new service development, is critical for competitive advantage, and Perks and Riihela (2004) state that the importance of service innovation to firm-level success is increasingly recognised.

Thus, the existence of a relationship between service innovation and competitive advantage on the firm-level seems to be indisputable. However, a fundamental subsequent question is if the competitive advantage resulting from service innovation is only of limited duration for the firm. For example; does the advantage resulting from service innovation cease to exist as soon as another firm is in the position to offer the same service? Or does the advantage have a more sustainable character?

In the innovation and strategy literature there are found some attempts to find the relationship between *product* innovation and sustained competitive advantage. One example is Roberts (1999) who suggests that innovative propensity influences the extent to which abnormal profit outcomes persist over time. At the same time several studies stress that service innovation and product innovation is different, due to the fact that services have some distinguishing characteristics like for example intangibility, simultaneity, heterogeneity and perishability (e.g. Vermeulen, 2001 and Zeithaml, Parasuraman and Berry, 1985). Based on this I argue that the relationship between service innovation and competitive advantage may differ from the relationship between product innovation and competitive advantage. Given that this starting point is correct, I argue that the relationship between service innovation and sustained competitive advantage is not readily available in the research literature. This paper therefore addresses this gap in the literature by aiming on answering the research question: Does service innovation lead to sustained competitive advantage, and if so; why and how?

To find the answer on this research question, the paper is drawing on the insights from the strategic management literature, especially the resource based view, and on the insights from the service innovation literature. In the first section I will review the relevant strategic management literature, concerned with the sustainability of competitive advantage. Then, in

the section thereafter I will develop a specific analysis framework. Afterwards, I will follow the path developed in the analysis framework. The starting point is to identify potential service innovation results and service innovation antecedents, found in the service innovation literature. Thereafter I will evaluate whether some of the identified results or antecedents are resources, and I will discuss whether some of these resources may be the source of sustained competitive advantage.

When this resource based analysis is accomplished I will discuss the validity of the results. A central question in this discussion will be whether the use of another theory base would have given another analysis result. After this discussion I will deduce the theoretical implications and conclusions. I can already reveal that among other things I suggest that the unique service innovation knowledge, the unique knowledge of new service innovation opportunities and the unique image resulting from service innovation may have the potential to improve a firm's ability to continuously conduct new service innovations, and stay ahead of competitors. In the end of the paper I will derive some implications for practitioners in the service industry, and I will indicate some possible directions for further research.

2 Choice of theoretical framework

Teece, Pisano, and Shuen (1997) state that how firms achieve and sustain competitive advantage, is the fundamental question in the field of strategic management. Therefore, in order to position myself to answer the research question, I begin by briefly reviewing the accepted frameworks for strategic management. According to a literature review by Hoskisson, Hitt, Wan and Yiu (1999) there are three theoretical traditions within the field of strategic management. These are 1) the industrial organization economics tradition, 2) the organizational economics tradition, and 3) the resource based view.

The competitive forces model developed by Porter (1980) is an example of a theory rooted in the industrial organization economics tradition, and during the 1980s this model became the dominant view in strategic management (Hoskisson, Hitt, Wan and Yiu, 1999). The competitive forces model says that five industry level forces affect a firm's competitive position. These forces are threats of new entrants, threats of substitute products, bargaining power of customers, bargaining powers of suppliers and rivalry among industry incumbents. Porter (1980) suggests that a firm can create a defensible position against these competitive forces by implementing a cost leadership strategy, differentiation strategy or a segmentation,

or focus, strategy, and then be able to obtain above-normal performance and sustained competitive advantage. In other words; the firm's performance, according to the industrial organization tradition, is primarily a function of the industry environment in which it competes (Hoskisson, Hitt, Wan and Yiu, 1999). A problem, however, is that the industrial organization tradition fails to explain why firms within one industry, that are faced with the identical conditions of supply and demand, and operated under the same market structure, perform different, and according to Hawawini, Subramanian and Verdin (2003) this shortcoming is the main reason for the shift away from the industrial organization economics tradition towards other theoretical platforms.

The two main theory platforms that grew up after the industrial organization economics era, i.e. the organizational economics approach and the resource based view, therefore had the firm itself, instead of the industry and the market, as the main unit of analysis (Hawawini, Subramanian and Verdin, 2003). The sustainability issue is given most thought in the resource based view. This view suggests that firm specific resources have the potential to be sources of sustained competitive advantage. For the advantage to be sustainable the resources have to be valuable, rare, imperfectly imitable and non-substitutable (Barney, 1991). Later, the resource based view has been developed further. For example; the concept of dynamic capability (Teece, Pisano and Shuen, 1997) is one extension of the resource based view. In short Teece, Pisano and Shuen (1997) argue that having access to strategic resources alone is not sufficient to gain sustained competitive advantage. How these resources are used is also essential.

Another, somewhat alternative view, but also relevant for the research question in this paper, I argue, is the "first mover advantage concept" suggested by Lieberman and Montgomery (1988, 1998). Their concept suggests in what cases first movers may enjoy advantages. In addition they point out some factors that may give first movers disadvantages. Since a service innovator in most cases also will be a first mover, it is possible to use the "first mover advantage concept" as a theoretical basis to analyse if, and in what cases, service innovators will be able to enjoy first-mover advantages. However, Lieberman and Montgomery (1988, 1998) say little about sustainability. In fact they (Lieberman and Montgomery, 1998) turn to the resource based view when sustainability of the first mover advantage is in question, and state that "the sustainability of a first-mover advantage depends upon (...) the resources (...) captured by the pioneer".

Thus, it is clear that the first mover advantage concept is not a sufficient analysis framework for the research question in this paper. It is also clear that the different approaches rooted in the industrial organization economics tradition, like for example Porter (1980), focus too strongly on the external environment, and therefore these approaches will not be sufficient in this paper. The remaining theory framework is the resource based view. In this view the firm is the unit of analysis, and the sustainability question is given a thorough, and central, treatment, and therefore I argue that the resource based view may be a sufficient theory basis for this paper.

3 Development of a resource based analysis framework

Some early studies concerned with firm heterogeneity and imperfect competition (Chamberlin, 1933; Robinson, 1933) lay the foundation for the resource based view in the literature. These early studies suggest that firm heterogeneity is a key factor that contributes to creating above normal performance. Penrose (1959) develops these early ideas by describing the firm as a bundle of resources. Later, Wernerfelt (1984) gives an important contribution to the resource based view field. He looks at firms in terms of resources rather than in terms of products, and suggests that resource position barriers can be linked to profitability.

By developing and presenting a framework describing how firms, through their internal resources, can achieve sustained competitive advantage Barney (1991) contributes significantly to the resource based view research field. Barney (1991)'s resource based framework is presented in the figure below.

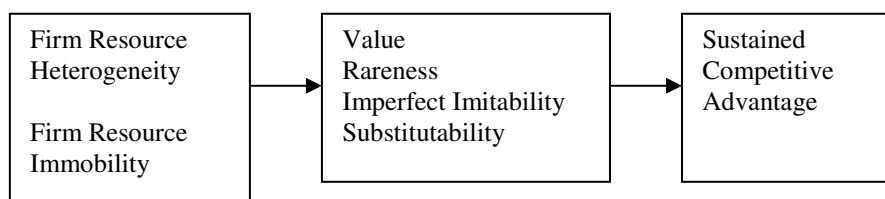


Figure 1: The relationship between resource heterogeneity, immobility, value, rareness, imperfect imitability, substitutability and sustained competitive advantage (Barney, 1991)

Barney (1991) adopts Daft (1983)'s definition of a firm resource saying that "a firm resource include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enables the firm to conceive of and implement strategies that improve its efficiency and effectiveness". Barney (1991) also utilizes a precise

definition of the key term *sustained competitive advantage*; “A firm is said to have a sustained competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of the strategy.”

Barney (1991)’s model builds on the assumption that firm resources may be heterogeneous and immobile, and that such resources are the source of sustained competitive advantage. Barney (1991) suggests that to have the potential of sustained competitive advantage a resource must satisfy four attributes: 1) The resource must be valuable, and resources are only valuable when they exploit opportunities and/or neutralizes threats in the firm’s environment. 2) The resource must be rare. A resource possessed by a large number of competing firms can not be the source of sustained competitive advantage. 3) The resource must be imperfectly imitable. Valuable and rare organizational resources can only be the source of sustained competitive advantage if firms that do not possess these can not obtain them, and 4) The resource must be impossible to substitute. There can not be equivalent substitutes for the resource. For simplicity I will call the resources that according to Barney (1991) have the potential to be sources of sustained competitive advantage for “strategic resources” throughout this paper.

According to Barney (1991)’s and Daft (1984)’s definition of a resource, ‘service innovation’, i.e. the development of new services, can not be considered a resource itself. Since the resource based view say that resources are the only possible source of sustained competitive advantage, I therefore argue that, according to the resource based view there is no direct relationship between service innovation and sustained competitive advantage. So, if the logic of the resource based view is to be used to analyse whether service innovation can result in a sustained competitive advantage, I have to go via resources. In fact I argue that there are two different resource based gateways to analyse the research question in this paper; 1) The first possibility is to analyse whether the resources a firm need to carry out, i.e. the resource antecedents, the service innovation have the potential to be source of competitive advantage. 2) The second possibility is to analyse whether the new resources resulting, i.e. the resource outcomes, from service innovation have the potential to be source of sustained competitive advantage.

Thus, to analyse if there is a relationship between service innovation and sustainable competitive advantage, a possible path is to evaluate 1) if some of the outcomes of service innovation are a resource for the innovating firm, 2) if some of the antecedents for service innovation are a resource for the firm, and 3) if some of these resources have the potential of being a strategic resource for the firm. If strategic resources are found among the service innovation outcomes, or the service innovation antecedents, I argue that there indeed also is a relationship between service innovation and sustained competitive advantage. From this brief discussion the analysis framework in figure 2 can be derived.

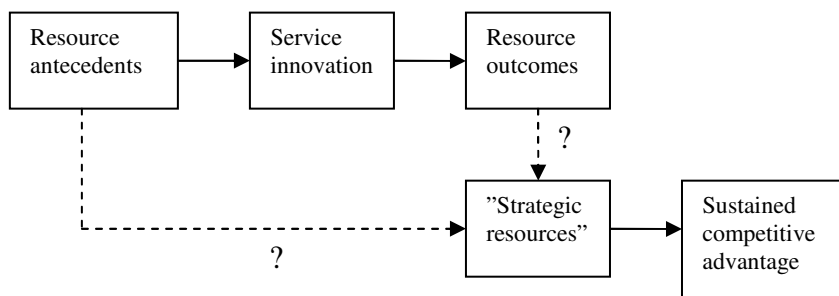


Figure 2: Analysis framework

The next sections of this paper will be organized around this analysis framework. The starting point is to identify what is service innovation and what are the possible resources resulting from service innovation, i.e. the resource outcomes. Then I will identify the possible resource antecedents. Afterwards I will evaluate all these resources separately against Barney (1991)'s resource criteria, aiming on discovering if some of the resources are strategic and have the potential to be the source of sustained competitive advantage.

4 Service innovation resource outcomes

De Jong et al. (2003) state that "like innovation in manufacturing, innovation in services is essentially about change and renewal". However, the literature reveals several more detailed definitions of the term service innovation. Johnes and Storey (1998) suggest that service innovation is the development of service products which are new to the supplier, while Menor et al. (2002) propose that service innovation is an offering not previously available to a firm's customers resulting from additions to or changes in the service concept. Van der Aa and Elfring (2002) broadens the term even more suggesting that service innovation is encompassing ideas, practices or objects which are new to the organisation and to the relevant environment. Summing up, and balancing these definitions, I suggest that service innovation

is the development of services that are new to the organisation and to the relevant environment.

Thus, it seems clear that an outcome of a service innovation process is a new service product. Den Hertog (2000) suggests that the new services consist of 4 different types or categories. These are 1) the new service concept, 2) the new client interface, 3) the new service delivery system, and 4) technological options. The question now is if these new services can be considered as new resources for the innovative firm. According to Barney (1991)'s definition firm resources include all assets, capabilities etc. controlled by a firm that improve its efficiency and effectiveness. I argue that if this definition is to be followed in a strict manner, the new services can not be considered resources for the firm. The new services must, according to the resource based view, be considered as a result of the innovating firm's resources, and not resources themselves. This conclusion is also in accordance with Wernerfeldt (1984)'s article. He saw the firm in terms of resources rather than in terms of products, and suggested that it was the resources, not the products, that were linked to long term profitability.

It is clear that although the new services are the most direct and tangible result of service innovation, the reason why firms invest in service innovation is most likely not the new service products themselves. In most cases there probably exists a more profound cause, and therefore some subsequent results have to exist. Since there is a possibility that some of these results can be considered as resources for the firm, the next step is to identify them. To identify these subsequent effects, my starting point is a literature review by Nysveen and Pedersen (2007). They have identified several articles describing service innovation results, and in the following I will refer the most important findings briefly.

De Jong et al. (2003) suggest that service innovation outcomes can be divided into financial outcomes and non-financial outcomes. Different financial outcomes suggested in the literature are several. For example some studies (e.g. Vermeulen et al., 2005 and Cainelly, Evangelista and Savona, 2004) suggest that service innovation outcomes are sales growth and employment growth. Other studies (e.g. Menor, Tatikonda and Sampson, 2002; Avlonitis, Papasthophilou and Gounaris, 2003 and de Brentani, 1991) suggests company profitability, company costs, sale and market share as possible outcomes. Lievens and Moenaert (2000) suggest achieved commercial objectives and de Brentani (2001) suggests increased revenue.

The relevant question, according to the analysis framework in this paper, is if these financial outcomes can be considered as resources for the firm. Deploying Barney (1991)'s and Daft (1983)'s definition of firm resource, saying among other things that a firm resource include everything that is controlled by a firm that *enables* the firm to conceive of and implement strategies, I will argue that a great part of the financial outcomes of service innovation are not resources. For example I argue that sales growth and company cost fall into this category. I would say that these outcomes are results from resources and not resources themselves. The same yield for company profitability and achieved commercial objectives. However, there are two of the identified financial outcomes I would argue we can put into the resource category, although they are in the border area, and these are increased market share and increased revenue. Strictly speaking both a firm's market share and a firm's revenue are probably also a result of other firm resources, but since there is a possibility that both can enable the implementation of a given strategy, I will (doubtfully) include them as service innovation resource outcomes.

Non-financial outcomes are also mentioned by several studies. Some studies mention strategically outcomes such as improved competitive position or expansion into new markets (e.g. Van Riel, Lemmink and Ouwerslot, 2004). De Jong et al. (2003) claim that service innovation typically results in increased customer satisfaction and loyalty, and they call this relationship enhancement. Also other studies (e.g. Matear, Gray and Garret, 2004) mention increased customer value as a dimension. In addition Lievens and Moenaert (2000) mention corporate reputation and increased service delivery reputation, and Avalonitis, Papasthophilou and Gounaris (2003) suggest that perceived image is a service innovation outcome. I will claim that all these identified non-financial outcomes are in fact also firm resources. For example it seems clear that customer loyalty is a capability a firm controls that enables the firm to conceive of and implement strategies that can improve its efficiency and effectiveness, and thus it is a firm resource.

The status now is that I have identified the direct service innovation outcomes, i.e. the actual new services, and their subsequent effects. However, the literature reveals also other, often very intangible, outcomes, or side effects, of service innovation, and these are also necessary to identify because some of these outcomes may have the potential of being resources for a firm. One such side effect, suggested as a service innovation outcome in several studies, is service innovation learning. For example Lievens and Moenhart (2000) suggest that learning

effects among the project participants is a service innovation outcome. Also Tether (2003) mentions this outcome dimension, suggesting that increased knowledge is a possible outcome of service innovation. The knowledge dimension is also considered by Van Riel, Lemmink and Ouwerslot (2004) who suggest that technology knowledge is an outcome. Van Riel, Lemmink and Ouwerslot (2004) also suggest that employee satisfaction and innovation opportunities are possible service innovation outcomes. There is no doubt that knowledge is a firm resource, and has to be evaluated further in this paper. Also the additional suggestions, employee satisfaction and innovation opportunities, given by Van Riel, Lemmink and Ouwerslot (2004) are for sure resources.

Table 1 below is summing up which of the service innovation outcomes found in the literature that can be considered as resources for a firm.

Table 1: Service innovation resource outcomes found in the literature

Service innovation outcomes	Reference	Is the outcome a resource?
<i>New service products</i>	Den Hertog (2000)	No
<i>Sales growth/Increased sale</i>	e.g. Vermeulen et al. (2005), Cainelly, Evangelista and Savona (2004), Menor, Tatikonda and Sampson (2002), Avlonitis, Papaststhoulou and Gounaris, (2003) and De Brentani (1991)	No
<i>Employment growth</i>	e.g. Vermeulen et al. (2005) and Cainelly, Evangelista and Savona (2004)	No
<i>Increased company profitability</i>	e.g. Menor, Tatikonda and Sampson (2002), Avlonitis, Papaststhoulou and Gounaris (2003) and De Brentani (1991)	No
<i>Reduced company costs</i>	e.g. Menor, Tatikonda and Sampson (2002), Avlonitis, Papaststhoulou and Gounaris (2003) and De Brentani (1991)	No
<i>Increased market share</i>	e.g. Menor, Tatikonda and Sampson, (2002), Avlonitis, Papaststhoulou and Gounaris (2003) and De Brentani (1991)	Yes
<i>Increased revenue</i>	De Brentani (2001)	Yes
<i>Improved competitive position</i>	e.g. Van Riel, Lemmink and Ouwerslot (2004)	Yes
<i>Expansion into new markets</i>	e.g. Van Riel, Lemmink and Ouwerslot (2004)	Yes
<i>Achieved commercial objectives</i>	Lievens and Moenaert (2000)	Yes
<i>Improved corporate reputation</i>	Lievens and Moenaert (2000)	Yes
<i>Increased service delivery reputation</i>	Lievens and Moenaert (2000)	Yes
<i>Perceived image</i>	Avalonitis, Papaststhoulou and Gounaris (2003)	Yes
<i>Improved customer satisfaction</i>	De Jong et. Al (2003) and Matear, Gray and Garret (2004)	Yes
<i>Improved customer loyalty</i>	De Jong et. Al (2003) and Matear, Gray and Garret (2004)	Yes
<i>Improved service innovation knowledge</i>	Lievens and Moenart (2000) and Tether (2003)	Yes
<i>Improved technology knowledge</i>	Van Riel, Lemmink and Ouwerslot (2004)	Yes
<i>Improved employee satisfaction</i>	Van Riel, Lemmink and Ouwerslot (2004)	Yes
<i>New innovation opportunities</i>	Van Riel, Lemmink and Ouwerslot (2004)	Yes

5 Service innovation resource antecedents

Until now I have focused on the new resources resulting from service innovation, only. However, when I developed my analysis framework I argued that it is necessary also to evaluate the resources needed to carry out service innovation, i.e. what I called the 'antecedent resources'. The rationale behind this was that if some of the resources that are necessary to carry out a successful service innovation, are found to be strategic resources, then I would have to conclude that there is a relationship between service innovation and sustained competitive advantage.

To develop something that is new to the organisation and to the market clearly is a demanding task that requires that the innovator is equipped with some resources. A literature review by de Jong et al. (2003) suggests that there are two different types of service innovation antecedents; 1) factors that are manageable by the firms, i.e. success factors, and 2) factors that are unmanageable by the innovating firms, i.e. external factors. However, from a resource point of view, and according to Barney (1991)'s resource criteria, the external factors can not be considered resources, since they are not controlled by the innovating firms. I will therefore focus on the success factors only, and evaluate if any of these may be defined as resources for the firms.

De Jong et al. (2003) divide the success factors into two categories; 1) factors related to the service innovation process, and 2) factors that tend to create an internal firm climate that is supportive to innovation. I argue that both categories may include resources, and I will therefore look closer to both.

De Jong et al. (2003) state that the literature reveals 17 success factors connected with the service innovation process. The first group of success factors is related to the employees in the innovating firm. Here de Jong et al. (2003) refer to several studies (e.g. Shane, 1994; De Brentani, 2001; Atuahene-Gima, 1996; Johne and Storey, 1998; De Jong and Kerste, 2002; Drew, 1995; Johne and Harborne, 1985) and emphasize 1) the importance of involving the so-called front line employees, i.e. employees that have the direct relationship with the customer, 2) the importance of some key roles in the firm, like product champions, decision makers and project managers, and 3) the importance of a highly qualified and experienced development staff. I argue that both a highly qualified and experienced development staff and the existence of the key roles indeed are capabilities controlled by the firm, and therefore also are resources

according to Barney (1991)'s definition. I am more doubtful if the involvement of the front line employees can be considered as a resource for the firm. I would say that such involvement is probably is an internal action that is resulting from the fact that a firm has an experienced development staff, and therefore this involvement is not a resource itself.

The next group of success factors mentioned by De Jong et al. (2003) is related to the structure of the innovating firm. Four factors are mentioned in this group; 1) rules and procedures, 2) task descriptions and rotation, 3) multifunctional teams, 4) internal cooperation and 5) reward systems. The effects of the first factor, rules and procedures, are, according to De Jong et al. (2003), twofold. The application of rules and procedures during the innovation process contributes directly to the execution speed (Fröhle et al., 2000). On the other hand, too much formalization is devastating for creativity (e.g. Bodewes, 2000). This implies, I argue, that the innovating firms need to formalize their rules and procedures, and even more important, they need to formalize when to make use of them. The second factor, task descriptions and rotation, is connected with the first one. Amabile (1998) points out that good task assignment to employees improve innovation success, and De Jong and Kemp (2001) and Atuahene-Gima (1995) point to the fact that task rotation may support the innovation success in service companies. The third factor, multifunctional teams, refers to the importance of collaboration in teams composed of people with different backgrounds. This dimension is stressed by several authors (e.g. Fröhle et al., 2000; Ancona and Caldwell, 1992; Gallouj and Weinstein, 1997). The fourth factor, internal cooperation, is based on a study conducted by Vermeulen (2001) who concludes that “functionally departmentalized structures can impede positive results of service innovation”. The last factor within this group is the reward system. De Jong et al. (2003) refers to the literature (e.g. Johnes and Storey, 1998 and Scheuing and Johnson, 1989), and state that the reward systems should be adjusted to stimulate service innovation activities. I argue that most of the factors related to the structure of the innovating firm are indeed resources according to Barney (1991)'s definition. My only doubt is concerning the reward system. The implementation of such a system is probably a result of other resources and not a resource itself.

The next group of service innovation antecedents mentioned by de Jong et al. (2003) is actually called ‘resources’¹³, and refers to the following factors: 1) Financial resources, 2)

¹³ De Jong et al. (2003) defines the term “resource” more narrowly than what is usual in the strategic management literature (e.g. Barney, 1991)

Information technology, and 3) Assignment of co-workers. I consider the first two factors as self-explanatory. The latter one, however, may need a short explanation. This factor refers to assigning co-workers to development projects, and allowing that to be their primary task. The importance of this is stressed by de Jong et al. (2003). All the factors in this group are resources also according to Barney (1991)'s definition.

The last group of antecedents mentioned by De Jong et al. (2003) is called networking. De Jong et al. (2003) mention 6 success factors in this group; 1) Interaction with clients, 2) External focus, 3) Co-operation with other parties, 4) Pre-launch testing, 5) Market launch, and 6) Reputation (role of peers and experts). Interactions with clients refer to the importance of involving the customers in the new service development. This is mentioned as a success factor in several studies (e.g. Kline and Rosenberg, 1986). External focus refers to the importance of having frequent and intensive contact with the whole environment of the company, and several studies suggest that in the service sector competitors are an important source of ideas for innovations (e.g. Kline and Rosenberg, 1986). The next factor, co-operation with other parties is related with the external focus, and de Jong et al. (2003) state that co-operation with other parties is important, especially for small service firms, to acquire the necessary knowledge and skills, and reduce the risk of failure. Pre-launch testing and market launch are also mentioned by de Jong et al. (2003). They stress the importance of testing, although this may be difficult for example due to the absence of a physical prototype and the difficulty of reproducing market conditions. De Jong et al. (2003) also stress the importance of a careful market launch. The last success factor mentioned by de Jong et al. (2003) is the reputation. Several studies claim that due to the characteristics of services, a service firm's reputation is important for successful service innovation (e.g. Terrill, 1992; Ford and Bowen, 2002; Reicheld and Sasser, 1990). The question if these network related antecedents are resources, according to Barney (1991)'s definition, is in my opinion somewhat tricky. For sure reputation is a resource. This is a capability controlled by the firm. I argue that the same could be said about the factor 'co-operation with other parties'. This is also a capability. The other factors mentioned in this category I would call firm actions rather than firm resources. Thus, I will not include them in the list of resources.

In addition to the factors directly influencing on the service innovation process, De Jong et al. (2003) mention in total 10 factors that tend to create an internal climate supportive to innovation. These are 1) management support, 2) open culture, 3) internal communication, 4)

autonomy of co-workers, 5) business vision, 6) innovation objectives, 7) fit with overall strategy, 8) technological synergy, 9) firm size, and 10) complexity of service design. Most of these factors are self-explanatory and therefore I do not need to explain them further. However, the question if these climate antecedents are actually resources, is also in this case somewhat difficult to decide. In short Barney (1991)'s definition says that a resource is a capability or asset, etc., controlled by a firm that enables the firm to implement a specific strategy. Based on this I will argue that the only resource in this group of antecedents is 'open culture'. The other antecedents in this group are, in my opinion, results of resources, and therefore not resources themselves.

Table 2 below is summing up which of the service innovation antecedent found in the literature that can be considered as resources for a firm.

Table 2: Service innovation resource antecedents found in the literature

Service innovation antecedent	Reference	Is the antecedent a resource?
<i>Involvement of front line employees</i>	e.g. De Jong et al. (2003), de Brentani (2001)	No
<i>The existence of key roles in the firm</i>	e.g. De Jong et al. (2003), Shane (1994)	Yes
<i>A highly qualified and experienced development staff</i>	e.g. De Jong et al. (2003), Drew (1995), Johnne and Harborne (1985)	Yes
<i>Rules and procedures</i>	e.g. De Jong et al. (2003), Fröhle et al. (2000), Bodewes (2000)	Yes
<i>Task descriptions and rotation</i>	e.g. De Jong et al. (2003), Amabile (1998), De Jong and Kemp (2001) and Atuahene-Gima (1995)	Yes
<i>Multifunctional teams</i>	e.g. De Jong et al. (2003), Fröhle et al. (2000), Ancona and Caldwell (1992), Gallouj and Weinstein (1997)	Yes
<i>Internal co-operation</i>	e.g. De Jong et al. (2003), Vermeulen (2001)	Yes
<i>Reward system</i>	e.g. De Jong et al. (2003), Johnne and Storey (1998) and Scheuing and Johnson (1989)	No
<i>Financial resources</i>	De Jong et al. (2003)	Yes
<i>Information technology</i>	De Jong et al. (2003)	Yes
<i>Assignment of co-workers</i>	De Jong et al. (2003)	Yes
<i>Interaction with clients</i>	De Jong et al. (2003) and Kline and Rosenberg (1986)	No
<i>External focus</i>	De Jong et al. (2003)	No
<i>Co-operation with other parties</i>	De Jong et al. (2003)	Yes
<i>Pre-launch testing</i>	De Jong et al. (2003)	No
<i>Market launch</i>	De Jong et al. (2003)	No
<i>Reputation</i>	e.g. De Jong et al. (2003), Terrill (1992), Ford and Bowen (2002), Reicheld and Sasser (1990)	Yes
<i>Management support</i>	e.g. De Jong et al. (2003)	No
<i>Open culture</i>	e.g. De Jong et al. (2003)	Yes
<i>Internal communication</i>	e.g. De Jong et al. (2003)	No
<i>Autonomy of co-workers</i>	e.g. De Jong et al. (2003)	No
<i>Business vision</i>	e.g. De Jong et al. (2003)	No
<i>Innovation objectives</i>	e.g. De Jong et al. (2003)	No
<i>Fit with overall strategy</i>	e.g. De Jong et al. (2003)	No
<i>Technological synergy</i>	e.g. De Jong et al. (2003)	No
<i>Firm size</i>	e.g. De Jong et al. (2003)	No
<i>Complexity of service design</i>	e.g. De Jong et al. (2003)	No

6 Resources related to service innovation – summing up

The status now is that I have identified several resources that in some way are related with service innovation. Some are new resources resulting from service innovation, i.e. resource outcomes, and some are resources needed to carry out service innovation, i.e. resource antecedents. An important observation is that some resources are both resource outcomes and resource antecedents. Therefore I argue that a wise next step is to group the resources in reasonable categories. This will ease the following sustainability analysis. Based on this I suggest the resource groups showed in the table below. These resource groups will be the point of departure for the analysis in the next section where the goal is to reveal if some resources can be the sources of sustained competitive advantage.

Table 3: Resources related to service innovation

Resource group	Resources
Market share	<ul style="list-style-type: none"> - <i>Increased market share</i> - <i>Improved competitive position</i> - <i>Expansion into new markets</i>
Reputation and image	<ul style="list-style-type: none"> - <i>Improved corporate reputation</i> - <i>Increased service delivery reputation</i> - <i>Perceived image</i> - <i>Reputation</i>
Liquidity	<ul style="list-style-type: none"> - <i>Financial resources</i> - <i>Increased revenue</i>
Customer relationship	<ul style="list-style-type: none"> - <i>Improved customer satisfaction</i> - <i>Improved customer loyalty</i>
Service innovation knowledge	<ul style="list-style-type: none"> - <i>A highly qualified and experienced development staff</i> - <i>Improved service innovation knowledge</i> - <i>Improved technology knowledge</i>
Knowledge of new innovation opportunities	<ul style="list-style-type: none"> - <i>New innovation opportunities</i>
Employee relationship	<ul style="list-style-type: none"> - <i>Improved employee satisfaction</i>
Innovation culture	<ul style="list-style-type: none"> - <i>Open culture</i>
Internal innovation procedures and arrangements	<ul style="list-style-type: none"> - <i>Rules and procedures</i> - <i>The existence of key roles in the firm</i> - <i>Task descriptions and rotation</i> - <i>Multifunctional teams</i> - <i>Internal co-operation</i> - <i>Assignment of co-workers</i> - <i>Co-operation with other parties</i> - <i>Information technology</i>

7 Resource based sustainability analysis

Following the path in my analysis framework the next step now is to evaluate if the identified resources are strategic resources, i.e. satisfy Barney (1991)'s criteria (rare, valuable, imperfectly imitable and impossible to substitute), and have the potential to be the sources of sustained competitive advantage. I will do this with basis in the resource groups identified, and by evaluating every resource group separately.

Market share – Improved competitive position, expansion into new markets and increased market share are all resources potentially resulting from service innovation. However, if these resources are resulting from the development and sale of new service products it is clear that other firms, by imitating or substituting the new service product, most probably will be able to imitate both the competitive position and expansion into new markets, and thus, these resources will not be the source of sustained competitive advantage. There could of course be situations where the customers would prefer to stick with the first mover, i.e. the innovative firm, and not the imitating firm, but I would argue that in this case the innovative firm would have to be in position of something more than just a new service product and an increased

market share. One example of this ‘something else’ could be the next resource group I am going to discuss, reputation and image.

Reputation and image – I identified reputation and image both as new resources resulting from service innovation, and as resources needed to carry out successful service innovations. That an improved reputation and image, or a new reputation and image, is a service innovation result may be easy to understand. That this resource also is necessary to carry out successful service innovations may be more difficult to understand. Nevertheless, as mentioned, several studies (e.g. Terrill, 1992; Ford and Bowen, 2002; Reicheld and Sasser, 1990) emphasize this relationship, and De Jong et al. (2003) argue that due to simultaneity, intangibility and heterogeneity service characteristics customers are not able to deduce the quality of the service products before purchasing. Therefore customers tend to ask peers (e.g. friends or colleagues) or experts for advice, and since the service firm’s reputation (or image) partly determines the judgement of peers and experts, the reputation (or image) plays a crucial role. Based on this I argue that reputation and image indeed have the potential to be valuable resources for a service firm.

It is clear that these resources also have the potential to be rare. For example if the image or reputation are resulting from the firm’s innovative activities, this would mean that a competitor only copying the new service products and offering them to the market will not obtain this innovative reputation or image. Thus, I will argue that imitating the image of an innovative firm would be impossible if you are not innovative yourselves. The same argument holds for the substitute criteria. It is difficult to imagine that it is possible to substitute a reputation or image. That said, I would have to add that I believe that earning an innovative reputation or image in the market that really matters is hard. Most probably a firm has to prove its innovative ability for a long period. The development of one new service product is most probably not enough. However, even if it is difficult to obtain this resource, we can not intercept its existence, and therefore we must conclude that reputation and image have the potential to be the source of sustained competitive advantage.

Liquidity – The resource group I called ‘liquidity’ was identified both as result from service innovation and as an antecedent for service innovation. It is obvious that liquidity is a valuable resource for a firm. However, this resource is not rare, and therefore I can, without

further discussion, conclude that increased liquidity can not be the source of sustained competitive advantage.

Customer relationship – The resource group I named ‘customer relationship’ included the resources ‘improved customer satisfaction’ and ‘improved customer loyalty’, and both are resources that are resulting from service innovation. There is no doubt that customer satisfaction and customer loyalty have the potential to be both valuable and rare for a firm. An assumption of most loyalty models, for example the service quality model by Storbacka, Strandvik and Gronroos (1994), is that keeping existing customers is less expensive than acquiring new ones. However, also according to Storbacka, Strandvik and Gronroos (1994) the source of customer satisfaction and loyalty is service quality. If so, it is clear that if a competitor imitate the new service products and deliver them with the same quality as the innovative firm, then also the competitor will be able to gain customer satisfaction and customer loyalty. Thus, I argue that customer satisfaction and loyalty do not have the potential to be source of sustained competitive advantage.

Service innovation knowledge – The resource group I named ‘service innovation knowledge’ consisted of resources necessary to carry out service innovation, and resources resulting from service innovation. The resource ‘a highly qualified and experienced development staff’ belongs in the first category, and the resources ‘improved service innovation knowledge’ and ‘improved technology knowledge’ belong in the second category. As mentioned earlier, knowledge is considered as a very valuable resource, and in fact, the resource based view has been extended with a research sub-field, called the knowledge-based view, concentrating on this resource only. In fact, several studies suggest that knowledge is the most important source of competitive advantage (e.g. Drucker, 1995 and Spender and Grant, 1996). Thus, in general it is clear that knowledge is valuable, and in the case when the knowledge is connected to a firm’s specific innovation experience, this knowledge is also most likely rare.

To evaluate whether the knowledge is imperfectly imitable I choose to evaluate the knowledge resulting from service innovation and the knowledge existing in the firm before the execution of a service innovation project separately. I start with the knowledge resulting from service innovation, and will start by dwelling upon the question if this knowledge is imperfectly imitable a little further. Reed and DeFillippi (1990) argue that causal ambiguity is an important barrier to imitation, and they suggest that causal ambiguity can be caused by

knowledge with a high degree of tacitness, complexity and specificity. Reed and DeFillippi (1990) suggest that competencies that are based on learning by doing have a high degree of tacitness, and crucial to the value of tacitness is the inability of even a skilled performer to codify the decision rules in a process. Based on this I will argue that the knowledge resulting from a firm's service innovation experiences most often have a high degree of tacitness. Although it is clear that the new service product resulting from the innovation process is easy to capture by a competitor, it is clear that the innovation process leading to this new service is not that easy to capture. The fact that the service innovation process is often an ad-hoc process (e.g. Gallouj and Weinstein, 1997, Kelly and Storey, 2000, Martin and Horne, 1993 and Sundbo, 1997) substantiate this even further. It is clear that an ad-hoc process is not easy for a competitor to understand and codify.

Reed and DeFillippi (1990) suggest that competencies that are based on large number of technologies, organization routines and individual- or team based experience have a high degree of complexity. It seems clear that at least the development of a new technological service solution has these characteristics, but also the other types of new service, i.e. the development of a new service concept, a new service delivery system or a new client interface could have such characteristics, and thus I argue that in some cases service innovation could result in knowledge with a high degree of complexity.

I will also argue that the knowledge resulting from service innovation has the potential to have a high degree of specificity. Reed and DeFillippi (1990) mention a special customer relationship as an example of a transaction that can be the source of the development of knowledge with a high degree of specificity. Several studies suggest that customer involvement is a very important success factor for service innovation (e.g. Martin and Horne, 1995 and Kline and Rosenberg, 1986). Thus, if the innovating firm involves their customers when they develop the new service product, it is likely that the knowledge resulting from the innovation process will have a high degree of specificity.

Based on this brief discussion, it seems clear that service innovation has the potential to result in knowledge that has a high degree of tacitness, complexity and specificity. Thus, according to Reed and DeFillippi (1990), this knowledge will have the potential to have a high degree of causal ambiguity. According to Reed and DeFillippi (1990) this causal ambiguity is an important barrier to imitation, and thus I argue that the knowledge resulting from service

innovation has the potential to be imperfectly imitable. Since the knowledge resulting from service innovation is unique for every service innovation, I will also argue that it will be impossible to substitute the knowledge. Thus, in my opinion there is no doubt that the service innovation knowledge resulting from the execution of a service innovation project has the potential to be a strategic resource for the innovative firm, and therefore also has the potential to be the source of sustained competitive advantage.

This said, I will stress that the degree of learning may vary between different service innovation processes in different firms. This can for example be illustrated with the perspective proposed by Cohen and Levinthal (1990). They introduce the term ‘absorptive capacity’ to describe a firm’s ability to learn, and state that a firm’s absorptive capacity is dependent on a firm’s level of prior related knowledge. This means that how much a firm is able to learn from a given service innovation process is dependent on the firm’s knowledge before the service innovation. This implies that a firm conducting service innovations frequently will be able to learn more from the innovation process than a firm that seldom conducts such innovations. This view is even stronger argued by Lei, Hitt and Bettis (1996) who suggest that knowledge only maintain value thorough continuous development.

Until now I have not discussed whether the knowledge existing in the firm before the execution of a service innovation project is a potential source of sustained competitive advantage. However, I find the evaluation of this knowledge difficult. The reason is that the nature of this knowledge, most probably, varies much between the firms, and is highly dependent on the experience of the employees. Nevertheless, I find it hard to believe that the firm has to be in possession of a valuable, rare, imperfectly imitable and non-substitutable knowledge to start an innovation project, but for sure it would help.

Knowledge of new innovation opportunities – I also identified a somewhat different knowledge dimension resulting from service innovation, called ‘knowledge of new innovation opportunities’. Undoubtedly the knowledge of new innovation opportunities resulting from service innovation has the potential to be valuable to a firm. I will also argue that these opportunities could be rare. The number of service innovation possibilities is infinite, and so are the new innovation opportunities. It is also clear that even if the new service product could be possible to imitate, the new innovation opportunities would be much more difficult to imitate. Some of the new opportunities will most likely appear for the innovator only.

Evidently the innovator has a much more thorough insight into the new service development process, and new and alternative ideas and solutions resulting from this process will therefore only appear for the innovator. Since an imitator has no insight into the internal development process, I will argue that some of these opportunities will remain hidden for this imitator. I argue that the same yield for substitutability. It is not possible to substitute an opportunity that is hidden for you. Thus, in my opinion, the knowledge of the new innovation opportunities resulting from service innovation has the potential to be a strategic resource for the innovator, and the source of sustained competitive advantage.

Employee relationship – A firm’s relationship with its employees, and employee satisfaction, are indeed valuable resources for a firm. Satisfied employees will undoubtedly be more efficient and produce more than employees that are not satisfied. It is also less likely that satisfied employees quit their job, and therefore firms with satisfied employees will have less turn over costs than firms with low employee satisfaction. However, when we ask if this employee satisfaction is rare, my opinion is that I will have to answer no. It is clear that several companies can be characterized by high employee satisfaction. Even if the source of employee satisfaction is service innovation, we have to realize that several companies are innovative, and thus creating this kind of ‘innovation employee satisfaction’. I therefore argue that an employee searching for satisfaction through being a member of an innovative environment would most probably find the source of satisfaction in most innovative firms. Thus, I conclude that employee satisfaction is not a strategic resource and does not have the potential to be a source of sustained competitive advantage.

Innovation culture – An open culture was identified as an antecedent resource for service innovation. De Jong, et al. (2003) refer to de Brentani (2001) and state that “developing innovative services that involve new service concepts, delivery systems, client interfaces and/or technological options, requires a corporate environment that encourages and supports openness, creativeness and ‘stepping out’ beyond the norm.” Thus, an open culture is indeed valuable for a firm. I argue that this resource may also be rare. The imitability question, however, is more difficult. For sure a firm culture in general may be difficult to imitate. On the other hand, the culture needed to carry out service innovation is described in a fairly detailed manner in the literature, and thus, it is most probably possible for most firms to establish the culture needed. Therefore, I will argue that the innovation culture needed to carry out service innovation successfully clearly is a valuable resource for the innovator, but

this resource does not need to be a strategic resource if the aim is to carry out service innovation successfully.

Internal innovation procedures and arrangements – Several internal firm procedures necessary to carry out service innovation were identified in the service innovation literature. In short I can mention the importance of having internal rules and procedures in the innovating firm, the importance of having relevant task descriptions, the importance of having internal multifunctional teams, the importance of both internal and external co-operation and the importance of having suitable information systems. For sure such internal procedures and arrangements are very valuable for the firm, and they may also be rare. I will also argue that these internal arrangements may very well be imperfectly imitable and non-substitutable. For example a firm may be in possession of a unique and patented information system that other firms are not able to imitate or substitute. However, the question for me is if such imperfectly imitable and non-substitutable resources are needed to carry out service innovation in a successful manner, and the answer to this question, I argue, would have to be no. I would argue, like I did for the ‘innovation culture’ resource, that since the internal procedures and arrangements needed to carry out service innovation is well known in the literature all firms have the possibility to establish sufficient procedures and arrangements. Thus, I conclude that internal procedures and arrangements do not need to be strategic resources to carry out service innovation in a successful manner.

Summing up, I can say that the findings imply that an innovating firm does not need to be in possession of any strategic resources to be able to carry out service innovation successfully. However, some strategic resources may result from the service innovation process. Thus, I argue that a relationship between service innovation and sustained competitive advantage does exist. In short, the results of this analysis are summed up in the table below.

Table 4: Service innovation resource outcomes that have the potential of being the source of sustained competitive advantage

Service innovation resource (outcome or antecedent)	Valuable	Rare	Imperfectly Imitable	Impossible to Substitute	Strategic resource
Market share	Yes	no	No	no	no
Reputation and image	Yes	yes	Yes	yes	yes
Liquidity	Yes	no	No	no	no
Customer relationship	Yes	yes	No	no	no
Service innovation knowledge	Yes	yes	Yes	yes	yes
Knowledge of new innovation opportunities	Yes	yes	Yes	yes	yes
Employee relationship	Yes	no	No	no	no
Innovation culture	Yes	yes	No	no	no
Internal innovation procedures and arrangements	Yes	yes	No	no	no

8 Discussion

In the beginning of this paper I briefly reviewed some accepted theoretical traditions within the field of strategic management, and argued that it would be most suitable to use the resource based view as a basis to answer the research question in this paper. I still agree in this judgment. However, I cannot refuse that there is a possibility that also this theoretical framework could have some limitations. Therefore, in this section I intend to discuss in what way the use of another theoretical platform might have given other results. Thereafter I will adjust my theoretical implications and conclusions in accordance with the results of this discussion.

Industrial organization economics

In the introductory part of the paper I argued that the industrial organization economics tradition would not be a sufficient theory base to answer the research question in this paper since the focus in this tradition is on the external environment and not on the individual and separated firm. Although this is correct, it is also clear that it would actually be possible to ask in what way service innovation could play a role for the innovating firm's relationship with the external environment. I could for example use Porter (1980)'s competitive forces model as the starting point. As mentioned earlier Porter (1980) says that five forces at the industry level affect a firm's competitive position. These forces are threats of new entrants, threats of substitute products, bargaining power of customers, bargaining powers of suppliers and rivalry among industry incumbents. To answer the research question in this paper a possible path would therefore be to ask whether the development of new service products would have the potential to defend a firm from Porter (1980)'s five forces. Porter (1980) say that one way of defending the firm against these forces is by implementing a differentiation strategy.

Differentiation involves developing a product that the customers perceive as unique, and it is clear that for a firm in the service industry the implementation of a differentiation strategy would have to involve the development of a new service product, i.e. service innovation. Thus, it is clear that, according to Porter (1980), the development of new service products is one possible solution for a firm that is aiming on creating a competitive forces defence, and through this create a competitive advantage.

The resource based view does not draw attention to the importance of a firm's service products. As demonstrated in the resource based analysis in this paper, the underlying logic of the resource based view is that the development of a new service product is only a result of a firm's resources, and therefore the service product can not be the source of a competitive advantage. The real source is always a resource, according to the resource based view. In my view one interesting theoretical dilemma arises from this apparent divergence between Porter (1980) and the resource based view: Can a unique service product be the source of sustained competitive advantage even if a firm does not control resources that are rare, valuable, imperfectly imitable and non-substitutable? According to the resource based logic, the answer to this would have to be no. The firm would have to control some rare, valuable, imperfectly imitable and non-substitutable resources either already before the development of the new service product or as a result of the development of the new service product. Given that this resource based logic is correct, I am in any case left with the fact that these rare, valuable, imperfectly imitable and non-substitutable resources in most cases are highly intangible, and thus difficult to measure. So, to cope with this measurement problem, and by balancing Porter (1980) and the resource based view, I therefore suggest that the service products a firm develops could be perceived as resources, and evaluated in the same manner as other resources.

If I use this somewhat modified resource based logic on service innovation, however, the findings from my resource based analysis would not change. If the new service products resulting from service innovation should have the potential to be a source of sustained competitive advantage they would have to be rare, valuable, imperfectly imitable and non-substitutable. It is no doubt that being in the possession of a new service product, i.e. a new service concept, a new client interface, a new service delivery system or a new technological option, is indeed valuable for a firm. There is also no doubt that if these are new service products, they will be rare. However, I am more in doubt whether the last two resource

criteria, imperfectly imitable and non-substitutable, are fulfilled. It is clear that when a firm provides a new service product this will most likely be visible for all the competitors, and in fact I see no reason why they should not be able to copy these new service products and offer them to the market. Perhaps, if the new service product was a new technological solution, this imitation would be difficult, or even impossible, if the innovating firm had protected the new product with patents or intellectual property rights. However, in this case I would argue that competing firms most probably would be able to substitute the new technological solution with a similar one. Thus, the new service product, perceived as a resource, would not be a source of sustained competitive advantage.

First-mover (dis)advantages

In the beginning of this paper I also introduced the possibility to use the concept of first-mover advantages and disadvantages (Lieberman and Montgomery, 1988, 1998) as a theoretical starting point. However, the reason for not choosing this as a theoretical base was the sustainability question. Nevertheless, it is clear that the use of this theoretical platform would have the potential to give some additional insight to the questions why or why not, and in what cases, an innovation could be an advantage for a firm.

Lieberman and Montgomery (1988) suggest that first mover advantages arise from three main sources; 1) technological leadership, 2) pre-emption of assets and 3) buyer switching costs. I would argue that service innovation at least could fall into two of these categories, and thus be the source of a first mover advantage. First, the development of new technological options could give the service innovator a technological leadership position, and second, the development of new services could increase the customer's switching costs, meaning that later entrants must invest extra resources to attract customers away from the service innovator. The latter source, buyer switching cost, is in accordance with the resource 'customer loyalty' that was discovered in the resource based analysis. The first source, technological leadership, is not in accordance with any resource discovered. The reason is probably that a technological leadership presupposes that the firm has some unique technological products, and as I have discussed earlier in this paper, products are not resources. And, as I discussed earlier in this section, even if we perceived products as resources, this would not influence on the findings of the resource based analysis in this paper.

Lieberman and Montgomery (1988) also call attention to several first mover disadvantages, and mention the following: 1) free-rider effects, 2) resolution of technological or market uncertainty, 3) shifts in technology or customer needs and 4) incumbent inertia. A question relevant to this paper is if some of these first mover disadvantages could possibly neutralize or eliminate the importance of the strategic resources related to service innovation. I will discuss each first mover disadvantage separately to evaluate this.

The free rider effects refer to the fact that late movers may be able to free-ride on the first mover's investments. Lieberman and Montgomery (1988) state that: "Late movers may be able to free-ride on a pioneering firm's investments in a number of areas including R&D, buyer education and infrastructure development", and that: "Imitation costs are lower than innovation costs in most industries." This sounds reasonable, and is probably relevant also for service innovation. However, when the sustainability of competitive advantage resulting from service innovation is in question, I argued, based on the resource based logic, that service innovation will only lead to sustained competitive advantage if some new valuable, rare, imperfectly imitable and non-substitutable resources result from the service innovation process, or alternatively, are needed to carry out the service innovation. Thus, the resources I have argued that can be the source of sustained competitive advantage are not possible to imitate, and therefore a later mover will not be able to imitate the service innovator's strategic resources, and free ride on the service innovator's investments. Therefore, free-riding is not a disadvantage that has the power to eliminate the importance of the strategic resources and eliminate the potential sustained competitive advantage.

The second first mover disadvantage mentioned by Lieberman and Montgomery (1988) is the resolution of technological or market uncertainty. Lieberman and Montgomery (1988) say that late movers can gain an edge through resolution of market or technological uncertainty and they may also be able to take advantage of the first mover's mistakes. For sure these are relevant disadvantages also for many service innovators. For example if a service innovator invests in the development of a new service product, and that product fails to succeed, the innovator might lose a lot of money, and even risk to go into bankruptcy, and at the same time the competitors will be able to learn from the innovator's mistakes, and derive advantage from the innovator's failure. On the other hand, it is of course also possible that the service innovator may learn more from its mistakes than the competitors, and in fact the innovator may therefore gain some strategic resources, but for sure these resources are of no use if the

firm goes into bankruptcy. Thus, the first mover disadvantage named ‘resolution of technological or market uncertainty’ may eliminate the importance of the strategic resources resulting from service innovation.

The next first mover disadvantage Lieberman and Montgomery (1988) mention is the potential shifts in technology or customer needs. Lieberman and Montgomery refer to Shumpeter (1961) and state that “technological progress is a process of ‘creative destruction’ in which existing products are superseded by innovations of new firms”, and they state that “since the replacement of technology often appears while the old technology is still growing it may be difficult for an incumbent to perceive the treat and take adequate preventative steps”. Lieberman and Montgomery (1988) also refer to Cooper and Schendel (1976) and mention the failure of steam locomotive manufacturers to respond to the invention of diesel as an example of this phenomenon. I argue that this is also a relevant problem for service innovating firms, and especially for those developing new service products with a high degree of technology dependency. It is clear that such firms may have invested a lot in building knowledge about a particular technology, and if suddenly a completely new and different technology is invented by a new firm, the original innovator may have problems. The original inventor may not have any knowledge about the new technology, and it may even be difficult to imitate this knowledge. Thus, potential shifts in technology or customer needs may eliminate the importance of the strategic resources resulting from service innovation.

The last first mover disadvantage mentioned by Lieberman and Montgomery (1988) is called ‘incumbent inertia’. Lieberman and Montgomery state that the sources of such inertia could be that the first mover is locked to a set of assets, that the firm becomes reluctant to cannibalize existing product lines or that the firm becomes organizational inflexible. These factors will reduce the firm’s ability to react to changes in the environment. Thus, in my view this factor is strongly connected to the factor called ‘shifts in technology or customer needs’, and will have the potential to enhance this disadvantage. I therefore argue that this factor is relevant for service innovators, and that it may reduce the value of the innovator’s resources.

The concept of dynamic capability

As a final aspect of this discussion I would like to draw attention to an extension of the resource based view - the concept of dynamic capability. This concept was introduced by Teece, Pisano and Shuen (1997), and they claim that resource-based strategy is not enough to

support a significant competitive strategy; timely responsiveness, as well as rapid and flexible innovation, is also needed to gain a sustained competitive advantage. Based on this I argue that the concept of dynamic capability is not opposed to the findings in my resource based analysis. In fact, the concept of dynamic capability actually supports, and enhances, the findings to some degree. Somewhat simplified, my findings from the resource based view say that when a firm carries out service innovation there is a possibility that this firm will acquire a unique and imperfectly imitable knowledge about service innovation and new innovation opportunities. An implicit consequence of this, also supported and enhanced by the concept of dynamic capability, is that the firm has to carry out new service innovations to utilize this unique knowledge resource, and achieve sustained competitive advantage. It is clear that this fact will have to influence the theoretical implications.

Summing up the discussion

Summing up the discussion of the validity of the chosen analysis framework I state that the use of another theoretical platform would not have given any different and conflicting answers to the research question. However, some first mover disadvantages, proposed by Lieberman and Montgomery (1988), have the potential to eliminate the importance of the strategic resources resulting from service innovation, and this fact has to be considered when theoretical implications are made.

9 Conclusions and theoretical implications

I have found that there is a relationship between service innovation and sustained competitive advantage, caused by the fact that service innovation may result in some strategic firm resources that are valuable, rare, imperfectly imitable and impossible to substitute. The strategic resources identified are the unique innovative image and reputation, the unique knowledge of new service innovation opportunities and the unique new knowledge of service innovation in general. I have also argued that to exploit these strategic resources, and gain sustained competitive advantage, the firm has to conduct new service innovations. Thus, the accomplishment of one successful service innovation does not have the potential to result in a sustained competitive advantage alone. I therefore suggest that it is the continuous use of the strategic resources to conduct new service innovations, that will give the innovator an opportunity to stay ahead of competitors at all times, and enjoy sustained competitive advantage. This view is supported by the fact that all the strategic resources found are both

described as results and antecedents of service innovation in the service innovation literature. And, as mentioned earlier, this view is also supported by the concept of dynamic capability.

I have argued that there, unfortunately for the innovator, in addition are some potential disadvantages resulting from the development of new services. These disadvantages may indeed change the value of the innovator’s strategic resources, and may eliminate the sustainability of the innovator’s advantage. These factors, that may be perceived as threats for the sustainability of the innovator’s advantages, are; 1) Resolution of technological or market uncertainty. The innovator will be exposed for a high risk, and may fail to succeed, and as a consequence risk to go into bankruptcy, 2) Shifts in technology or customer needs. Shifts in technology or customer needs may also be difficult for an innovator to respond to, and 3) Incumbent inertia. The phenomena ‘incumbent inertia’ may also lead to unfortunate consequences for the innovator.

Based on these findings I propose the theoretical model in the figure below to describe the relationship between service innovation and sustained competitive advantage.

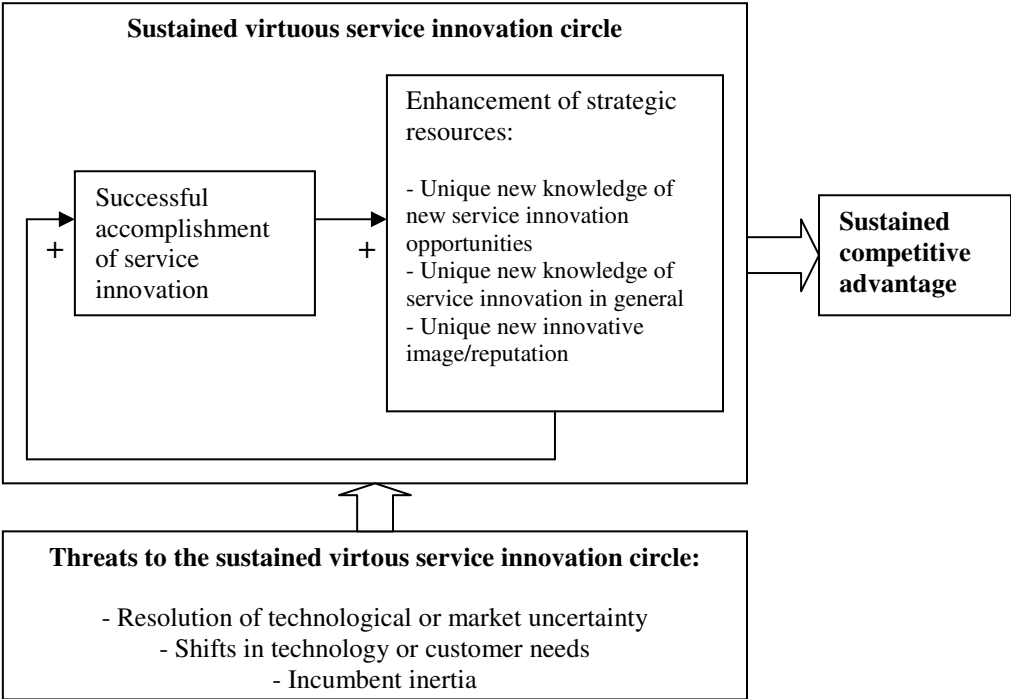


Figure 3: Suggested relationship between service innovation and sustained competitive advantage

10 Industry implications

The focus in this paper has mainly been theoretical, and therefore are also the implications mainly theoretical. Nevertheless, it is clear that the findings also have some implications for practitioners in the service industry, and in the following I will mention three important factors.

First, since it is clear that a relationship between service innovation and sustained competitive advantage does exist, a possible path for service firms seeking sustained competitive advantage is to carry out service innovations.

Second, the findings imply that if a firm is aiming on obtaining sustained competitive advantage through service innovation, it should focus primarily on achieving the strategic resources found in this paper. This implies that the service firms should realize that the new service products resulting from service innovation are actually not strategic resources, and are therefore most probably not the source of sustained competitive advantage. Therefore, the firm should have a broader perspective to service innovation than just developing new products. As mentioned, the main focus should be on achieving and exploiting the strategic resources, i.e. the unique innovative reputation and image, the unique service innovation knowledge and the unique new service innovation opportunities.

For example this means that the unique innovative image and reputation resulting from service innovation should be used heavily in the firm's marketing activities. The firm should also see to that all the potential learning effects of the innovation is realized, and if necessary combine the innovation activities with learning activities to make sure this happens. The new knowledge resulting from these activities should be used actively to carry out new service innovations. In the same manner the firm should strive to identify the new opportunities that arise as a consequence of service innovation, and take maximum advantage of these, by carrying out new innovations. In this way the innovating firm has the possibility to continuously stay ahead of competitors that are imitating the new service products, and thus achieve a sustained competitive advantage.

Third, the innovating firm should be aware of the possible disadvantages of being a first mover, and implement strategies to meet these threats and reduce the damage these disadvantages may cause. For example the innovating firm should implement methodologies

for risk control to reduce the possibility of failure, and the innovator should always be aware of trends in the market and technology trends to reduce the risk concerned with shifts in the market or technology.

11 Further research

This paper explores the relationship between service innovation and sustained competitive advantage in a theoretical manner only. It draws on the insights from both the literature in the field of strategic management and in the field of service innovation. However, the concepts and relationships derived from this theoretical exercise have not been empirically tested in this paper. This implies that further research should focus on conducting empirical studies to support (or not support) the theory suggested.

References

Atuahene-Gima, K., 1995. Developing and marketing successful product and service innovations: the role of human resource strategy. Proceedings of European Marketing Academy Conference, Paris, pp. 49-66.

Atuahene-Gima, K., 1996. Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia. *Journal of Product Innovation Management* Vol. 13, 35-52.

Amabile, T.M., 1998. How to kill creativity. *Harvard Business Review*, Sept/Oct, 77-87.

Ancona, D.G., Caldwell, D.F., 1992. Demography and Design: Predictors of New Product Team Performance. *Organization Science*, 3, pp. 321-341.

Avlonitis, George J., Papastathopoulou, Paulina G., Gounaris, Spiros P., 2001. An empirically-based typology of product innovativeness for new financial services: Success and failure scenarios. *Journal of Product Innovation Management* 18(5), 324-342.

Barney, J. B., 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management* 17, 99-120.

Bodewes, W. E. J., 2000. *Neither Chaos Nor Rigidity: An empirical study on the effect partial formalization on organizational innovativeness*. Tilburg, Dutch University Press.

Bruins, A., de Jong, J. P. J., 2000. *Wat betekent ICT voor vernieuwingen in het MKB?*, EIM: Zoetermeer.

Cainelli, G., Evangelista, R., Savona, M., 2004. *The Impact of Innovation on Economic Performance in Services*. *Service Industries Journal* 24(1), 116-130.

Chamberlin, E., 1933. *The theory of monopolistic competition*. Harvard University Press, Cambridge, MA.

Cohen, W. M., Levinthal, D. A., 1990. *Absorptive capacity: A new perspective on learning and innovation*. *Administrative Science Quarterly* 35, 128-152.

Cooper, A.C., Schendel, D., 1976. *Strategic responses to technological threats*. *Business Horizons*, 19 (February), 61-69.

Cooper, R.G., Kleinschmidt, E.J., 1996. *An Investigation into the New Product Process: Steps, Deficiencies and Impact*. *Journal of Product Innovation Management*, Vol.3, 71–85.

Daft, R., 1983. *Organization theory and design*. New York: West.

De Brentani, U., 1991. *Success factors in developing new business services*. *European Journal of Marketing* 25, 33-59.

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

De Carolis, D. M., Deeds, D. L., 1999. *The impact of stocks and flows of organizational knowledge on new product development*. *Strategic Management Journal* 20, 953-968.

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

De Jong, J. P. J., Kemp, R., 2001. Innovatief gedrag van medewerkers in dienstverlenende bedrijven. *M&O: tijdschrift voor management & organisatie*, 55 (5), sept/okt, pp. 5-20.

De Jong, J. P. J., Kerste, R. A. J., 2002. De kracht van het idee: betere resultaten door innovatief gedrag van medewerkers, Academic Service: Schoonhoven.

Den Hertog, P., 2000. Knowledge-intensive business services as co-producers of innovation. *International Journal of Innovation Management* 4(4), 491-528.

Drew, S., 1995. Strategic benchmarking: innovation practices in financial institutions. *International Journal of Bank Marketing* Vol. 13, No. 1, 4-16.

Drucker, P., 1995. *Managing in a Time of Change*. Truman Talley: New York.

Edgett, S., 1996. The New Product Development Process for Commercial Financial Services. *Industrial Marketing Management* Vol.25, 507-515.

Fitzsimmons, J. A., Fitzsimmons, J. A., 2000. *New Service Development: Creating Memorable Experiences*, Thousand Oaks, CA: Sage

Ford, R. C., Bowen, J., 2002. Managing service organizations: does having a 'thing' make a difference? *Journal of Management* 28(3), 447-469.

Fröhle, C.M., Roth, A.V., Chase, R.B., Voss, C.A., 2000. Antecedents of new service development effectiveness: An exploratory examination of strategic operations choices. *Journal of Service Research* Vol. 3, Iss. 1, 3-17.

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

Hoskinsson, R.E., Hitt, M.A., Wan, W.P., Yiu, D., 1999. Theory and research in strategic management; Swings of a pendulum. *Journal of Management* 25, 417-456.

Johne, A., Harborne, P., 1985. How large commercial banks manage product innovation. *International Journal of Bank Marketing* Vol. 3, No. 1, 54-70.

- Johne, A., Storey, C., 1998. New service development: a review of the literature and annotated bibliography. *European Journal of Marketing* 32, 184-251
- Kelly, D., Storey, C., 2000. New Service Development: Initiation Strategies. *Library Consortium Management: An International Journal* Vol.2, No5/6, 10-22.
- Kline, S. J., Rosenberg, N., 1986. An overview of innovation. In: R. Landau and N. Rosenberg, *The Positive sum strategy: harnessing technology for economic growth*, Washington D.C.: National Academy Press.
- Lei, D., Hitt, M. A., Bettis, R. A., 1996. Dynamic core competencies through meta-learning and strategic context. *Journal of Management* 22, 549-569.
- Lieberman, M. B., Montgomery, D. B., 1988. First mover advantages. *Strategic Management Journal* 9, 44-58.
- Lieberman, M. B., Montgomery, D. B., 1998. First mover (dis)advantages. *Strategic Management Journal* 19, 1111-1125.
- Lievens, A., Moenaert, R. K., 2000. New Service Teams as Information-Processing Systems. Reducing Innovative Uncertainty. *Journal of Service Research* vol. 3, no. 1, 46-65.
- Martin, C. R., Horne, D. A., 1993. Services innovation: successful versus unsuccessful firms. *International Journal of Service Industry Management* Vol. 4, 48-64.
- Martin, C. R., Horne, D. A., 1995. Level of success inputs for service innovations in the same firm. *International Journal of Service Industry Management* Vol. 6, No. 4, 40-56.
- Matear, S., Gray, B. J., Garrett, T., 2004. Market orientation, brand investment, new service development, market position and performance for service organisations. *International Journal of Service Industry Management* 15(3), 284-301.
- McEvily, S. K., Chakrevarthy, B., 2002. The persistence of knowledge-based advantage. *Strategic Management Journal* 23, 285-305.

Melville, N., Kraemer, K. L., Gurbaxani, V., 2004. Information Technology and Organizational Performance: An Integrative Model of IT Business Value. *MIS Quarterly* Vol. 28, No. 2.

Menor, L. J., Tatikonda, M. V., Sampson, S. E., 2002. New service development: areas for exploitation and exploration. *Journal of Operations Management* 20, 135-157.

Nysveen, H., Pedersen P. E., 2007. Service innovation methodologies I. What can we learn from service innovation and new service development research? Skriftserien nr 134, Høgskolen i Agder, 2007.

OECD, 2001. Innovation and Productivity in Services. OECD Publishing. (ISBN: 9789264186095).

Penrose, E., 1959. *The Theory of the Growth of the firm*. Basil Blackwell, London, 1959.

Perks, H., Riihela, N., 2004. An exploration of inter-functional integration in the new service development process. *Service Industries Journal* 24(6), 37-63.

Peteraf, M. A., 1993. The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal* 14, 179-192.

Reed, R., DeFillippi, R. J., 1990. Causal ambiguity, barriers to imitation and sustainable competitive advantage, *Academy of Management Review* 15, 88-102.

Reicheld, F. F., Sasser, W. E., 1990. Zero defects: quality comes to services. *Harvard Business Review*, September-October, 105-113.

Polanyi, M., 1966. *The tacit dimension*. New York: Anchor Day.

Porter, M. E., 1980. *Competitive Strategy*. Free Press, New York.

Roberts, P. W., 1999. Product innovation, product-market competition and persistent profitability in the U.S. pharmaceutical industry. *Strategic Management Journal* 20, 655–670.

Robinson, J., 1933. *The Economics of Imperfect Competition*. MacMillan Press, London.

Scheuing, E. E., Johnson, E. M., 1989. New product development and management in financial institutions. *International Journal of Bank Marketing* Vol. 7, No. 2, 17-21.

Shane, S.A., 1994. Are champions different from non-champions? *Journal of Business Venturing* vol. 9, no. 5.

Shapiro, C., 1989. The theory of business strategy. *RAND Journal of Economics* 20(1), 125-137.

Shumpeter, J. A., 1961. *The theory of Economic Development*. Oxford University Press, New York, 1961.

Spender, J. C., Grant, R., 1996. Knowledge and the firm: overview. *Strategic Management Journal*, Winter Special Issue, 17, 5-9.

Storbacka, K. Strandvik, T., Gronroos, C., 1994. Managing customer relationships for profit. *International Journal of Service Industry Management*, vol 5, no 5, 1994, 21-28.

Sundbo, J., 1997. Management of Innovation in Services. *The Service Industries Journal* 17(3), 432-455.

Teece, D. J., Pisano, G., Shuen, A., 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* 18, 509-533.

Terrill, C. A., 1992. The ten commandments of new service development. *Management Review*, February, 24-27.

Tidd, J., Bessant, J., Pavitt, K., 2001. *Managing Innovation - Integrating Technological, Market and Organizational Change*, John Wiley & Sons, 2nd edition.

Van der Aa, W., Elfring, T., 2002. Realizing innovation in services. *Scandinavian Journal of Management* 18(2), 155-171.

Van Riel, A. C. R., Lemmink, J., Ouwersloot, H., 2004. High-Technology Service Innovation Success: A Decision-Making Perspective. *Journal of Product Innovation Management* 21(5), 348-359.

Vermeulen, P., 2001. *Organizing Product Innovation in Financial Services*, Nijmegen University Press.

Vermeulen, P. A. M., de Jong, J. P. J., O'Shaughnessy, K. C., 2005. Identifying key determinants for new product introductions and firm performance in small service firms. *Service Industries Journal* 25(5), 625-640.

Zeithaml, V. A., Parasuraman, A., Berry, L. L., 1985. Problems and Strategies in Service. *Marketing Journal of Marketing* 49, 33-46.

Wernerfeldt, B., 1984. A resource-based view of the firm. *Strategic Management Journal* 5, 171-180.

Paper V¹⁴

¹⁴ Aas, T.H. (2009), "Service Innovation Management: Designing an Ex-ante Value Assessment Tool", in Huizingh, K.R.E., Conn, S., Torkkeli, M. and Bitran, I. (Eds.), *Proceedings of the 2nd ISPIM Innovation Symposium*, ISBN: 978-952-214-864-3, New York City, the USA, December 6-9.

Service Innovation Management: Designing an Ex-ante Value Assessment Tool

Tor Helge Aas
University of Agder

Abstract

There has been little discussion of how firms may assess the value of service innovation projects ex-ante in the extant research literature. This paper aims to fill this literature gap by suggesting what requirements an ex-ante value assessment tool should fulfil and by evaluating to what degree existing ex-ante value assessment tools comply with the suggested requirements. Based on this it is also suggested how an ex-ante value assessment tool can be constructed for service innovation projects. The ex-ante value assessment tool suggested in this paper is composed of three modules that combine business strategy methods, scenario analysis, capital investment-appraisal techniques, scoring models and foresight methods. The suggested tool may provide considerable assistance to managers struggling to assess the value of their service innovation ideas.

Keywords: Service innovation; Innovation management; Management control; Ex-ante value assessment.

1 Introduction

Service innovation is a complex, risky and resource-demanding task with potential long-term benefits for firms in the service and manufacturing industries [1]. Most researchers agree that service innovation is different from other types of innovation [2] and that the impacts of service innovations are more difficult to evaluate than the impacts of traditional process and product innovations [3]. Despite these considerations, the discussion of management control issues is almost absent in the existing service innovation management literature, and according to several authors [4], normative managerial guidance in this area is not readily available.

From a management perspective, this gap in the literature is concerning. Management control literature [5] stresses the importance of controlling resource-demanding and strategically important activities in firms to avoid financial losses, reputation damage or organizational failure [6]. Therefore, it is particularly worrying that management lacks guidance on how to assess the value of their service innovation projects ex-ante. Ex-ante value assessment of innovative ideas is a fundamental management task for a number of reasons. For example, from a portfolio management perspective, ex-ante value assessment is needed to select and prioritize new projects [7]. From a project management perspective, ex-ante value assessment is required to define targets for new projects and to control the development and implementation of projects [8].

This paper aims to fill the gap in the literature by designing and proposing an ex-ante value assessment tool customized for service innovation project ideas. To structure the design in line with Cooper, Edgett and Kleinschmidt's [7] design tips, three research questions (RQs) are raised:

RQ1: What requirements should an ex-ante value assessment tool for service innovation projects fulfil?

RQ2: To what degree do existing ex-ante value assessment tools comply with the requirements?

RQ3: How may an ex-ante value assessment tool satisfying the requirements be constructed?

In the next section, we review the relevant literature. Then we describe the method chosen to answer the research questions. The results are reported in the following three sections. Finally, the implications of the study and the needs for further research are discussed.

2 Literature review

It is necessary to have knowledge related to ex-ante value assessment *tools* and *measures* to derive requirements and suggest how an ex-ante value assessment tool for service innovation projects may be constructed. We reviewed four research streams in search of this knowledge, and learned that: 1) the management control and capital budgeting literature provided general normative guidance related to both tools and measures, 2) the innovation management literature also provided normative guidance related to tools and measures, 3) the service innovation literature provided knowledge on the potential effects of service innovation, and thus on relevant measures, and 4) the foresight literature provided knowledge related to tools. The findings from our literature review are discussed in greater detail below.

2.1 The management control and capital budgeting literature

The most commonly employed capital budgeting or investment-appraisal techniques in the finance and accounting literature [9] are used for analysing the expected incremental cash flows of projects. The different techniques may account for factors, including time horizons, project risk, market risk, time value of money, weighted average cost of capital, option values, value chain analysis, game theories and simulations [10]. Some of the commonly used techniques are payback period (PP), new present value (NPV), internal rate of return (IRR) and real options (RO).

The capital investment-appraisal techniques solely consider the financial effects of an investment. A recent study in the management control literature [6] warns that these capital investment-appraisal techniques might cause managers to act myopically by ignoring intangible assets with predominantly future payoffs. Several solutions to this investment myopia problem are discussed in the management control literature. For example, Merchant and Van der Stede [6] suggest that one possible remedy is to complement financial measures with non-financial value drivers of performance.

In line with the view that purely financial measures of performance are insufficient from a management control perspective, Malina and Selto [11] reviewed a number of management

control and strategy theories [12] and identified desirable attributes of performance measures. They identified the following eight attributes of performance measures: 1) diverse and complementary, 2) objective and accurate, 3) informative, 4) more beneficial than costly, 5) causally related, 6) strategic communication devices, 7) incentives for improvement, and 8) supportive of improved decisions.

Another perspective provided by the recent management control literature [13] highlights the importance of using management control systems both diagnostically and interactively. The diagnostic use is a top-down approach that links a firm's strategy with relevant performance goals and monitors whether these strategic goals are achieved. Meanwhile, the interactive use is a bottom-up approach where important information flows from subordinates to management. This bottom-up information may highlight the need for shifts in procedures and changes in the value proposition, or it may alter aspects of the business strategy.

2.2 The innovation management literature

The innovation management literature aims to provide normative guidance to innovation managers [14]. Guidance is often provided in innovation handbooks and toolbooks from product development and management associations [15]. This prescriptive literature strongly highlights the importance of measuring and evaluating the effects and performance of innovation both ex-ante and ex-post [16].

However, the literature focusing on which measures firms should consider constitutes a heterogeneous body of knowledge. For instance, Tidd [17] suggests two broad classes of relevant performance measures: 1) accounting and financial, and 2) market performance measures. Meanwhile, Tidd, Bessant and Pavitt [18] suggest that the impact of innovation is three-fold and includes: 1) financial benefits, 2) increased customer value, and 3) strategic success. Furthermore, Griffin and Page [19] suggest that the performance measures of new product development may be divided into three categories: 1) measures of customer-based success, 2) measures of financial success, and 3) measures of technical performance success.

In a comprehensive textbook [7] and in several research articles [20], Cooper, Edgett and Kleinschmidt discuss portfolio management for product innovation projects. In rank order of popularity, they found that the following tools were used to value product innovation ex-ante: 1) financial methods, where profitability, return, payback or economic value is

determined, 2) business strategy methods, where the business's strategy is the basis for allocating money for different types of projects, 3) bubble diagrams, where projects are plotted on an X-Y portfolio map, 4) scoring models, where projects are rated or scored on scales for a number of criteria, and 5) checklists, where projects are evaluated via a list of yes/no questions. In addition, analytical hierarchy approaches (e.g. expert choice models) and behavioural approaches (i.e. methods designed to bring managers to consensus, e.g. Delphi and Q-Sort) were used by some firms.

Cooper, Edgett and Kleinschmidt's [20] findings revealed that there are major differences between the value assessment tools used by the top performers and the rest of the firms. For example, they observed that top performers employed more formal and explicit tools, and they tended to use multiple tools. Their results also indicated that strategic methods and scoring approaches yielded the best portfolios, while financial methods yielded poorer portfolio results.

An alternative view on valuation of innovation projects is provided by Perrin [21]. Referring to a previous study [22], Perrin argues that most traditional evaluation methods do not consider that innovation by nature is unpredictable. Therefore, most attempts at innovation are risky and should fail, and for this reason, it is difficult to assess the value of innovation correctly. Perrin [21] also has several suggestions on how innovation projects should be valued. For example, he suggests that firms should focus on learning and the degree on innovation, rather than "successes", when projects are valued.

2.3 The service innovation literature

Due to the growing importance of services, both at the firm-level and society-level, *service innovation* is a topic of growing interest for researchers, policy makers, and managers [23]. Most authors seem to agree that service innovation is critical for the success of manufacturing and service firms, both in short- and long-term perspectives [24]. The literature reveals several definitions of the term *service innovation*. For example, Menor et al. [25] suggests that service innovation is "*an offering not previously available to a firm's customers resulting from the addition of a service offering or changes in the service concept that allow for the service offering to be made available*" (p. 138).

There is not a great deal of discussion of ex-ante value assessment tools and measures in this research stream; however, the literature suggests that there is a great variety of service innovation effects, which may constitute the basis for deriving relevant measures. Based on a review of the literature, Aas and Pedersen [26] suggest that the potential effects of service innovation may be categorized into six broad categories: 1) business process effects, 2) capability effects, 3) relationship effects, 4) external effects, 5) financial performance effects, and 6) competitiveness effects. *Business process effects* refer to effects embracing changes in the firm's business processes. Changes in these internal business processes may be observed, for example, by changes in the service delivery capacity [27] or by changes in the operational cost of the firm [28]. *Capability effects* refer to effects changing the internal capability of the innovating firms. For example, learning effects [29] may change the innovator's capability for conducting new service innovation projects. Other examples of capability effects are culture effects [30] and employee satisfaction effects [31]. *Relationship effects* refer to the proposition that service innovation may have effects on the innovator's relationship with other stakeholders, primarily customers. Examples of relationship effects include effects on the customer's value [32], customer satisfaction [33], and customer loyalty [34], as well as lock-in effects [35] and image effects [36]. *External effects* refer to the effects that service innovation may have on stakeholders other than the innovating firm. Examples of external effects are environmental effects [37] and industry structure effects [38]. Effects in these four categories may also indirectly cause *competitiveness effects*, which are observed as an increased ability to survive [39], and *financial performance effects*, which are observed as effects on market share [40] or sales [41].

This broad list of the potential effects of service innovation illustrates its complexity. Additionally, the list emphasises the need for designing a customised ex-ante value assessment tool for service innovation activities.

2.4 The foresight literature

Foresight methods may be divided into four categories [42, 43]: 1) input methods, 2) analytical methods, 3) interpretive methods, and 4) prospective methods. Delphi approaches [44] and 'environmental scanning' [45] are commonly used as input methods. These methods assist managers in understanding their organisations' environments [42]. Analytical methods, such as trend analysis, are used to categorize the information gathered by input methods [42]. Interpretive methods, such as causal layered analysis [46], seek to analyse data in an in-depth

manner [42]. Prospective methods seek to find an answer to the question “*what might happen? and they are seeking to develop a view of alternative futures for an organisation*” [42, p. 8]. One well-known prospective method is scenario planning [47].

3 Method

3.1 RQ1

The literature review reported in Section 2 constituted the basis for deriving theoretical requirements for the ex-ante value assessment tool. Thus, to answer RQ1, we first derived the theoretical requirements based on the literature review. To complement these theoretical requirements, we also collected empirical data from firms considering service innovation to be of strategic importance. Due to the explorative nature of RQ1, we chose a qualitative approach to obtain these empirical data. To identify relevant firms, we contacted a Norwegian research consortium that aims to improve its member firms’ abilities to carry out service innovations. We carried out in-depth interviews with the management of four firms in this consortium that volunteered to participate in our study. The four firms were members of the graphic arts industry. A focus group consisting of between one and four managers was interviewed from each firm. Each focus group interview lasted approximately two hours. Some characteristics of the participating firms are presented in Table 1.

Table 1 The firms in our sample

<i>Firm</i>	<i>Number of employees</i>	<i>Annual turnover (2007)</i>	<i>Focus group interviewed</i>
A	200	NOK* 231.1 mill	CEO, Marketing director, R&D director, Project manager
B	22	NOK* 38.8 mill	CEO
C	26	NOK* 40.1 mill	CEO
D	6	NOK* 5.1 mill	CEO and CTO

*Norwegian kroner (the Norwegian currency)

3.2 RQ2 and RQ3

To answer RQ2, we searched for existing ex-ante value assessment tools and evaluated to which degree these tools fulfilled the derived requirements. Then based on the answers to RQ1 and RQ2, we were able to suggest how an ex-ante value assessment tool could be constructed to answer RQ3.

4 Results RQ1 - Requirements an ex-ante value assessment tool should fulfil

4.1 Requirements derived from the literature

The review of the capital budgeting literature provided a general list of factors that should be taken into consideration when investments are to be valued. From this research, we derived the first requirement for an ex-ante value assessment tool.

***Requirement 1:** The ex-ante value assessment tool should take several factors, including cost, benefit, risk, and time value of money, into consideration.*

Both the management control literature and the innovation management literature warn that using solely financial indicators to value investments may cause managers to act myopically. This problem may be especially relevant for service innovations, since the review suggested that service innovation often results in long-term success. Our review of the service innovation literature revealed a number of potential direct and indirect non-financial effects of service innovation, including business process, capability, and relationship effects. We suggest that the ex-ante value assessment tool must be able to account for the whole range of potential non-financial effects of service innovation. Based on these considerations, we derive the second requirement for an ex-ante value assessment tool.

***Requirement 2:** Financial measures should be complemented with measures of non-financial service innovation effects.*

The reviewed management control literature lists a number of preferred attributes that non-financial measures should fulfil. These attributes are also relevant for the ex-ante value assessment tool proposed in this paper. Based on this research, we derive the third requirement for the ex-ante value assessment tool.

***Requirement 3:** The non-financial measures chosen should as far as possible be: 1) diverse and complementary, 2) objective and accurate, 3) informative, 4) more beneficial than costly, 5) causally related, 6) strategic communication devices, 7) incentives for improvement, and 8) supportive of improved decisions.*

This paper aims to suggest a tool that will assist managers in determining the value of a given service innovation project ex-ante. This may appear to be an entirely interactive problem.

However, we cannot disregard the fact that the value of one particular service innovation project may vary considerable from one firm to another due to differences in the firms' missions and strategic intentions. Therefore, the value assessment tool should include a top-down diagnostic element in addition to the more evident interactive element. This view is supported by the innovation management literature, which suggests that an ex-ante value assessment tool should preferably consist of multiple valuation methods (e.g. strategic approaches in combination with scoring models). Based on these considerations, we derive the fourth requirement for the ex-ante value assessment tool.

***Requirement 4:** The ex-ante value assessment tool should consist of multiple valuation methods, including both bottom-up and top-down elements to enable value assessment.*

4.2 Requirements derived from in-depth interviews

All of the interviewed firms considered service innovation to be an activity of strategic importance. However, despite the perceived strategic importance of service innovation, none of the interviewed firms was using an explicit or formal tool to assess the value of service innovation projects ex-ante. All of the interviewed firms considered their evaluation practices to be problematic and believed that the use of more explicit tools would assist them in selecting new projects and defining targets for selected projects. Thus, the firms expected that these tools would allow them to gain additional benefits from their service innovation activities.

The interviewed firms all believed that it is important for an ex-ante value assessment tool to assist them in identifying the potential effects of a project. They also highlighted that the tool should assess the more negative cost and risk aspects of conducting a service innovation project. Requirements related to these areas are already covered by the requirements derived from literature.

Some firms highlighted the relationship between the ex-ante and ex-post measures. For example, the CEO of firm C stated:

“I often have a feeling that we are not able to realize all the potentials of a project, but since we have not evaluated this beforehand it is very difficult for me to pinpoint exactly what we are missing. Thus, we need to identify the potentials, and derive the

project targets beforehand and thereafter manage the projects according to these potentials. It is important that an evaluation tool is able to assist me in this task.”

The CTO of firm D stated:

“It is not only important to evaluate the new services before development. It is likewise important to evaluate after development, and also after a period in operation. Thus, in my opinion it is important that the ex-ante value assessment tool prepare for later ex-post evaluations.”

In practice, this means that the measures chosen for the ex-ante value assessment should be possible to follow up ex-post. From these considerations, we derive the fifth requirement:

Requirement 5: *The measures chosen for the ex-ante value assessment should also be measurable in ex-post evaluations.*

One CEO (firm A) called attention to an important fact that complicates the valuation of potential effects ex-ante, by stating:

“The value potential of a service development project is often very dependent upon how the commercial situation for the new service develops.”

Based on this statement, we may argue that the ex-ante value assessment should assist managers in deriving value in different prospective commercial situations. From this, we derive the sixth requirement for the ex-ante value assessment tool.

Requirement 6: *The ex-ante value assessment tool should assist managers in deriving the value in different prospective commercial situations.*

All of the firms pointed out that the amount of resources it is reasonable to spend on ex-ante value assessment of a particular service innovation project depends upon the potential cost of accomplishing the development project. The CEO of firm A stated:

“The amount of resources sensible to spend on ex-ante evaluation, is dependent on the cost and complexity of the project. It is not desirable to spend a great amount of

resources on evaluation of small projects, but we would like to spend a lot on the evaluation of large projects.”

The CEO of firm C stated:

“The majority of our service innovation projects are incremental in nature and are relatively small. Thus, for a typical service innovation project in our firm it does not make sense to spend more than one day working time on ex-ante value assessment.”

This means that the tool should be designed in such a way that it is possible to use only a small number of elements to conduct a ‘fast track’ value assessment for small projects. From these considerations, we derive the seventh requirement.

Requirement 7: The evaluation tool should be ‘scalable’.

5 Results RQ2 – Compliance of existing tools

Armed with these requirements, we were ready to evaluate the compliance of existing ex-ante value assessment tools. Since there were no tools designed specifically for the purpose of service innovation found in the literature, we evaluated existing tools in the related product innovation literature. This literature [20] commonly groups ex-ante value assessment tools into four large categories; 1) financial methods, 2) business strategy methods, 3) bubble diagrams, and 4) scoring models and checklists.

The financial methods presented in the finance and accounting literature comply with our first requirement. This is because the requirement is derived from finance and accounting research tradition. However, the pure capital investment-appraisal techniques fail to comply with Requirement 2, suggesting that financial measures should be complemented with non-financial measures. Even if all service innovation effects are causally related to financial performance, we argue that it is unrealistic to expect to derive the financial impact of all the effects ex-ante. In many cases, the time lag between the realizations of effects, such as capability effects, to the realization of financial performance is extensive.

The intention of business strategy methods is to evaluate whether a project idea complies with a firm’s strategic direction. Thus, strategic approaches comply partly with Requirement 4, but

fail to comply with the other requirements. Bubble diagrams may be useful to plot various parameters against each other, but they are not sufficient to derive the value of a project idea. Thus, bubble diagrams do not comply with the requirements derived in this paper.

If we accept that we are not able to derive the financial impact of all potential service innovation effects ex-ante, then we must introduce some sort of scoring model or checklist to comply with Requirements 2, 3 and 5. To define the prospective commercial situation of new services and to satisfy Requirement 6, prospective foresight methods seem highly relevant.

Our evaluation of existing ex-ante value assessment tools is summarized in Table 2.

Table 2 Evaluation of existing ex-ante value assessment tools

<i>Tools/Requirement</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Financial methods	yes	no	no	partly	yes	no	no
Business strategy methods	no	no	no	partly	no	no	no
Bubble diagrams	no	no	no	no	no	no	no
Scoring models and checklists	no	yes	yes	partly	yes	no	no
Foresight methodologies	no	no	no	no	no	yes	no

6 Results RQ3 – Suggested design of ex-ante value assessment tool

To comply with the requirements we suggest combining different existing tools. We recommend using scoring models to comply with Requirements 2, 3, and 5. We suggest using financial methods to comply with Requirement 1. We suggest using a combination of financial methods, business strategy methods, and scoring models to comply with Requirement 4. Additionally, we recommend using foresight methods to comply with Requirement 6. Lastly, to comply with Requirement 7, we suggest that the tool be built from three modules. The suggested modules are described as follows.

6.1 Module 1: Business strategy assessment

Module 1 is the top-down element of the tool, which is necessary to comply with Requirement 4. This module recognizes that the value of a service innovation project is dependent upon a firm’s strategy. Thus, to derive the value of a service innovation project, we

first need to assess whether the new service complies with the business strategy. Alternatively, we must assess if the new service conforms to a novel, desired strategic direction for the firm.

How this business strategy assessment may be accomplished in practice may vary considerably among firms. For example, some firms have a clearly defined and detailed strategy, while other firms rely on more vague visions. Due to these vast differences, it is not meaningful within the scope of this paper to derive a detailed procedure on how firms should assess whether the new service idea complies with the strategy. We suggest, however, that the assessment may be done by answering a number of pre-defined questions based on the business strategy of the particular firm.

If the result of the business strategy assessment is that the service innovation project does not comply with the firm's business strategy, or alternatively does not define a new, desired business strategy, then we suggest that the value of the service innovation project should be considered zero. In this case, further assessment of the project value is in principle needless. Otherwise, the value should be further assessed by conducting Modules 2 and 3.

6.2 Module 2: Scenario assessment

Module 2 is included to enable compliance with Requirement 6. This module aims to define potential scenarios related to the prospective commercial situation of the service under development. We suggest that Schoemaker's [47] highly cited scenario planning technique may be used to construct scenarios relevant for the service.

6.3 Module 3: Value assessment

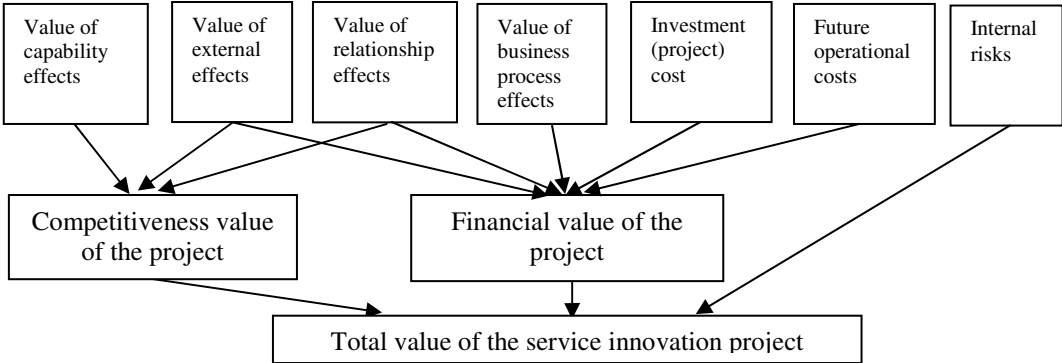
Module 3 is included to derive the value of a business strategy compliant service innovation project for the different scenarios derived in Module 2. Module 3 will enable compliance with the remaining requirements. We suggest basing the design of this module on the list of potential effects of service innovation discussed in Section 2. Based on the research literature, we suggest that business process effects, relationship effects, capability effects and external effects are potential direct effects of service innovation. Therefore, these effects may cause both financial performance effects and competitiveness effects. To enable valuation of the service innovation effects, we suggest a two step procedure: 1) assess (for example, on a scale 0-5) to what degree the service innovation project will lead to the different direct effects, and

2) assess how the value of these direct effects will influence financial performance and competitiveness. We suggest expressing the financial performance in monetary terms as present values by using a non-risk interest (to comply with Requirement 1), and we recommend expressing the competitiveness effects as scores on a scale of 0 to 5. When the financial and competitiveness values of all the effects are derived, sum the financial value, and compute the total score on the competitiveness value (for example, as percentages of the maximum score).

To derive the total value of a new service idea, and to comply with Requirement 1, it is necessary to assess the downside of developing the new service, which is compounded by costs and risks. Both the development costs and future operational costs are relevant, and we suggest expressing the estimation of these costs in monetary terms as present values (non-risk interest). The internal risks associated with the development must also be assessed. Please note that the external market related risk should not be assessed here, since the development of scenarios in Module 2 take external uncertainties into account. Thus, here in Module 3, it is only relevant to assess the internal risk related to the service innovation project. For example, Module 3 could assess the risks associated with the technology to be used or the risks associated with the internal knowledge in the firm.

Having completed the assessment of both the upside and downside of the service innovation project, it is possible to express the value of the project in three dimensions: 1) the financial dimension (the present value of the effects minus the present value of the costs), 2) the competitiveness dimension (for example, expressed as a percentage of maximum score), and 3) the internal risk (for example, expressed as a score on 0-5 scale). Figure 2 summarizes the value dimensions suggested in Module 3.

Figure 2 Suggested value dimensions to be assessed and their relationships (Module 3)



6.4 Scalability

We suggest the use of three modules to comply with Requirement 7. Firms aiming for a thorough value assessment should carry out all three modules, but firms aiming for a more superficial assessment may deploy just one or two modules.

7 Implications and further research

This research helps fill a gap in the management literature by deriving the requirements an ex-ante value assessment tool for new service innovation ideas should fulfil, and by suggesting how a suitable tool may be constructed. Ex-ante value assessment of service innovation projects is important both from a project and portfolio management perspective, and the ex-ante value assessment tool suggested in this paper may provide considerable assistance to managers struggling to assess the value of their service innovation ideas. Additionally, the proposed assessment tool may stimulate the recovery of service innovation management.

However, we emphasise that the research reported in this paper is only a first step towards an ex-ante value assessment tool for service innovation projects. Further research is needed. We suggest that additional research be completed in two directions. First, it may be necessary to conduct both qualitative and quantitative research to gain more knowledge of service innovation effects and to understand more fully the complexity of the causal chain linking service innovation activities to measurable financial results. Improved knowledge in this area will improve the basis for designing an ex-ante value assessment tool. Second, interventionist research may be necessary to test the usability of different ex-ante value assessment tools empirically, including the tool suggested in this paper. We suggest that the constructive approach, described by Jönsson and Lukka [48], may be suitable in this area.

References and Notes

1. For instance, Berry, L.L., Shankar V., Turner Parish J., Cadwallader S. and Dotzel T. (2006) 'Creating New Markets Through Service Innovation', *MIT Sloan Management Review*, Vol. 47, No. 2, pp. 56-63. De Jong, J.P.J., Bruins A., Dolfsma W. and Meijgaard J. (2003) *Innovation in service firms explored: what, how and why? Strategic study B200205*, Zoetermeer, Holland: EIM Business & Policy Research. Matear, S., Gray B.J. and Garrett T. (2004) 'Market orientation, brand investment,

new service development, market position and performance for service organisations’, *International Journal of Service Industry Management*, Vol. 15, pp. 284-301. Miles, I. (2005) ‘Innovation in services’, in: Fagerberg J., Mowery, D.C., Nelson R.R. (eds.) *The Oxford Handbook of Innovation*, Oxford: Oxford University Press. Tidd, J. and Hull F.M. (2003) *Service Innovation: Organizational Responses to Technological Opportunities & Market Imperatives*, London: Imperial College Press. Bryson, J.R. and Monnoyer C.M. (2004) ‘Understanding the relationship between services and innovation: The RESER review of the European service literature on innovation, 2002’, *The Service Industries Journal*, Vol. 24, No. 1, pp. 205-222. Lu, I.Y., Lin L.H. and Wu, G.C. (2005) ‘Applying options to evaluate service innovations in the automotive industry’, *International Journal of Technology Management*, Vol. 32, No. 3/4, pp. 339-349.

2. For instance, OECD (2000) *Promoting innovation and growth in services*, Paris: Organisation for Economic Cooperation and Development. Johne, A. and Storey C. (1998) ‘New Service Development: A Review of the Literature and Annotated Bibliography’, *European Journal of Marketing*, Vol. 32, No. 3/4, pp. 184-252. Bitran, G. and Pedrosa L. (1998) ‘A structured product development perspective for service operations’, *European Management Journal*, Vol. 16, No. 2, pp. 169-189. De Jong, J.P.J., Bruins A., Dolfsma W. and Meijgaard J. (2003) *Innovation in service firms explored: what, how and why? Strategic study B200205*, Zoetermeer, Holland: EIM Business & Policy Research.
3. De Jong, J.P.J., Bruins A., Dolfsma W. and Meijgaard J. (2003) *Innovation in service firms explored: what, how and why? Strategic study B200205*, Zoetermeer, Holland: EIM Business & Policy Research.
4. For instance, Storey, C. and Kelly, D. (2001) ‘Measuring the Performance of New Service Development Activities’, *The Service Industries Journal*, Vol. 21, No. 2, pp. 71 – 90.
5. For instance, Simons, R. (2000) *Performance Measurement & Control Systems for Implementing Strategy*, New Jersey: Pearson Education International. Merchant, K.A.

- and Van der Stede, W.A. (2007) *Management Control Systems: Performance Measurement, Evaluation and Incentives*, Edinburgh: Pearson Education Limited.
6. Merchant, K.A. and Van der Stede, W.A. (2007) *Management Control Systems: Performance Measurement, Evaluation and Incentives*, Edinburgh: Pearson Education Limited.
 7. Cooper, R.G, Edgett, S.J. and Kleinschmidt, E.J. (2001a) *Portfolio Management for New Products 2nd Edition*, New York: Basic Books.
 8. Irani Z. and Love, P.E.D. (2002) 'Developing a frame of reference for ex-ante IT/IS investment evaluation', *European Journal of Information Systems*, Vol. 11, pp. 74-82.
 9. For instance, Sangster, A. (1993) 'Capital investment appraisal techniques: A survey of current usage', *Journal of Business Finance & Accounting*, Vol. 20, No. 3, pp. 307 – 332. Drury C. and Tayles M. (1997) 'The misapplication of capital investment appraisal techniques', *Management Decision*, Vol. 35, No. 2, pp. 86-93. Haka, S.F. (2007) 'A review of the literature on capital budgeting and investment appraisal: Past, Present and Future Musings', in: Chapman, C.S., Hopwood A.G. and Shields M.G (eds.) *Handbook of Management Accounting Research Vol. 2*, Oxford: Elsevier.
 10. Haka, S.F. (2007) 'A review of the literature on capital budgeting and investment appraisal: Past, Present and Future Musings', in: Chapman, C.S., Hopwood A.G. and Shields M.G (eds.) *Handbook of Management Accounting Research Vol. 2*, Oxford: Elsevier.
 11. Malina M.A and Selto F.H. (2004) 'Choice and change of measures in performance measurement models', *Management Accounting Research*, Vol. 15, pp. 441–469.
 12. For instance, Ittner, C.D., Larcker, D.F. (2002) 'Determinants of performance measure choices in worker incentive plans', *Journal of Labor Economics*, Vol. 20, No. 2, pp. 58-90. Libby, T., Salterio, S., Webb, A. (2002) 'The balanced scorecard: the effects of assurance and process accountability on managerial judgment', Wilfred Laurier University Working Paper. Antle, R., Demski, J.S. (1988) 'The controllability principle in responsibility accounting', *The Accounting Review*, Vol. 63, No. 4, pp.

- 700–718. Merchant, K. (1998) *Modern Management Control Systems: Text and Cases*, New Jersey: Prentice-Hall. Simons, R. (2000) *Performance Measurement & Control Systems for Implementing Strategy*, New Jersey: Pearson Education International. Kaplan, R.S., Norton, D.P. (1996) *The Balanced Scorecard*, Boston: Harvard Business School Press.
13. For instance, Simons, R. (2000) *Performance Measurement & Control Systems for Implementing Strategy*, New Jersey: Pearson Education International. Tuomela, T.-S. (2005) 'The interplay of different levers of control: A case study of introducing a new performance measurement system', *Management Accounting Research*, Vol. 16, pp. 293–320.
 14. Tidd, J., Bessant J. and Pavitt K. (1997) *Managing Innovation - Integrating Technological, Market and Organizational Change*, Chichester: John Wiley & Sons.
 15. For instance, Kahn, K.B. (2005) *The PDMA Handbook of New Product Development*, New Jersey: John Wiley & Sons. Belliveau, P., Griffin A. and Somermeyer S. (2002) *The PDMA ToolBook 1 for New Product Development*, New York: John Wiley & Sons. Belliveau, P., Griffin A. and Somermeyer S. (2004) *The PDMA ToolBook 2 for New Product Development*, New Jersey: John Wiley & Sons.
 16. Chan, A. (2005) 'Using an effective metrics program to support business objectives', in: Kahn, K.B. *The PDMA Handbook of New Product Development*, New Jersey: John Wiley & Sons.
 17. Tidd, J. (2001) 'Innovation management in context: environment, organization and performance', *International Journal of Management Reviews*, Vol. 3, No. 3, pp. 169-183.
 18. Tidd, J., Bessant J. and Pavitt K. (2001) *Managing Innovation - Integrating Technological, Market and Organizational Change (2nd edition)*, Chichester: John Wiley & Sons.

19. Griffin, A. and Page A.L. (1996) 'PDMA success measurement project: recommended measures for product development success and failure', *Journal of Product Innovation Management*, Vol. 13, No. 6, pp. 478-496.
20. For instance, Cooper, R.G, Edgett, S.J. and Kleinschmidt, E.J. (1997) 'Portfolio Management in New Product Development: Lessons from the Leaders-I', *Research Technology Management*, Vol. 40, No. 5, pp. 16-28. Cooper, R.G, Edgett, S.J. and Kleinschmidt, E.J. (1999) 'New Product Portfolio Management: Practices and Performance', *Journal of Product Innovation Management*, Vol. 16, pp. 333-351. Cooper, R.G, Edgett, S.J. and Kleinschmidt, E.J. (2001b) 'Portfolio management for new product development: results of an industry practices study', *R&D Management*, Vol. 31, No. 4, pp. 361-380.
21. Perrin, B. (2002) 'How to – and How Not to – Evaluate Innovation', *Evaluation*, Vol. 8, No. 1, pp. 13-28.
22. For instance, Hargadon, A. and Sutton, R.I. (2000) 'Building an Innovation Factory', *Harvard Business Review*, Vol. 78, No. 3, pp. 157–166. Al-Dabal, J.K. (1998) 'Entrepreneurship: Fail, Learn, Move On', unpublished, paper, Management Development Centre International, The University of Hull. Peters, T. (1988) *Thriving on Chaos: Handbook for a Management Revolution*. London: Pan Books. Zider, B. (1998) 'How Venture Capital Works. The Discipline of Innovation', *Harvard Business Review*, Vol. 76, No. 6, pp. 131–139.
23. Miles, I. (2005) 'Innovation in services', in: Fagerberg J., Mowery, D.C., Nelson R.R. (eds.) *The Oxford Handbook of Innovation*, Oxford: Oxford University Press.
24. For instance, Berry, L.L., Shankar V., Turner Parish J., Cadwallader S. and Dotzel T. (2006) 'Creating new markets through service innovation', *MIT Sloan Management Review*, Vol. 47, No. 2, pp. 56-63. De Jong, J.P.J., Bruins A., Dolfsma W. and Meijgaard J. (2003) *Innovation in service firms explored: what, how and why? Strategic study B200205*, Zoetermeer, Holland: EIM Business & Policy Research. Matear, S., Gray B.J. and Garrett T. (2004) 'Market orientation, brand investment, new service development, market position and performance for service organisations',

- International Journal of Service Industry Management*, Vol. 15, No. 3, pp. 284-301.
- Miles, I. (2005) 'Innovation in services', in: Fagerberg J., Mowery, D.C., Nelson R.R. (eds.) *The Oxford Handbook of Innovation*, Oxford: Oxford University Press.
- Tidd, J. and Hull F.M. (2003) *Service Innovation: Organizational Responses to Technological Opportunities & Market Imperatives*, London: Imperial College Press.
25. For instance, Menor, L.J., Tatikonda M.V. and Sampson S.E. (2002) 'New service development: areas for exploitation and exploration', *Journal of Operations Management*, Vol. 20, No. 2, pp. 135-157.
 26. Aas, T.H. and Pedersen P.E. (in press) 'The firm-level effects of service innovation: A literature review', *International Journal of Innovation Management*, forthcoming.
 27. Lievens, A. and Moenaert R.K. (2000) 'Communication flows during financial service innovation', *European Journal of Marketing*, Vol. 34, No. 9/10, pp. 1078-1110.
 28. For instance, Lawler, J.P. (2005) 'Case study of customer relationship management (CRM) in the on-line affluent financial services market', *Journal of Internet Commerce*, Vol. 4, No. 4, pp. 153-164. Panesar, S.S. and Markeset T. (2008) 'Industrial service innovation through improved contractual relationship: A case study in maintenance', *Journal of Quality in Maintenance Engineering*, Vol. 14, No. 3, pp. 290-305.
 29. For instance, Stevens, E. and Dimitriadis S. (2005) 'Managing the new service development process: towards a systemic model', *European Journal of Marketing*, Vol. 39, No. 1/2, pp. 175-198.
 30. Kaner, M. and Karni R. (2007) 'Design of service systems using a knowledge-based approach', *Knowledge & Process Management*, Vol. 14, No. 4, pp. 260-274.
 31. For instance, Van Riel, A.C.R., Lemmink J. and Ouwersloot H. (2004) 'High-technology service innovation success: a decision-making perspective', *Journal of Product Innovation Management*, Vol. 21, No. 5, pp. 348-359.

32. For instance, Sigala, M. (2006) 'Mass customisation implementation models and customer value in mobile phones services: Preliminary findings from Greece', *Managing Service Quality*, Vol. 16, No. 4, pp. 395-420. Van Riel, A.C.R. and Lievens A. (2004) 'New service development in high tech sectors: a decision-making perspective', *International Journal of Service Industry Management*, Vol. 15, No. 1, pp. 72-101.
33. For instance, Lyons, R.K., Chatman J.A. and Joyce C.K. (2007) 'Innovation in services: corporate culture and investment banking', *California Management Review*, Vol. 50, No. 1, pp. 174-191.
34. For instance, Blazevic, V., Lievens A. and Klein E. (2003) 'Antecedents of project learning and time-to-market during new mobile service development', *International Journal of Service Industry Management*, Vol. 14, No. 1, pp. 120-147.
35. For instance, Dolfsma, W. (2004) 'The process of new service development - issues of formalization and appropriability', *International Journal of Innovation Management*, Vol. 8, No. 3, pp. 319-337.
36. For instance, Matear, S., Gray B.J. and Garrett T. (2004) 'Market orientation, brand investment, new service development, market position and performance for service organisations', *International Journal of Service Industry Management*, Vol. 15, No. 3, pp. 284-301.
37. For instance, Wong, P.K. and He Z.-L. (2005) 'A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms', *Service Industries Journal*, Vol. 25, No. 1, pp. 23-42.
38. For instance, Xu, H., Sharma S.K. and Hackney R. (2005) 'Web services innovation research: towards a dual-core model', *International Journal of Information Management*, Vol. 25, No. 4, pp. 321-334
39. For instance, Cowell, D.W. (1988) 'New service development', *Journal of Marketing Management*, Vol. 3, No. 3, pp. 296-312.

40. For instance, López, L.E. and Roberts E.B. (2002) 'First-mover advantages in regimes of weak appropriability: the case of financial services innovations', *Journal of Business Research*, Vol. 55 No.12, pp. 997-1005.
41. For instance, Mansury, M.A. and Love J.H. (2008) 'Innovation, productivity and growth in US business services: A firm-level analysis', *Technovation*, Vol. 28, No. 1/2, pp. 52-62.
42. Conway, M. (2008) *An Overview of Foresight Methodologies: An introduction to the range of methods available to explore the future*, Australia: Thinking Futures, downloadable at <http://www.thinkingfutures.net/downloads>.
43. Voros, J. (2003) 'A Generic Foresight Process Framework', *Foresight*, Vol. 5, No. 3, pp. 10-21.
44. For instance, Conway, M. and Stewart, C. (2005) *Creating and Sustaining Foresight in Australia: A Review of Government Foresight*, Monograph 8, Australian Foresight Institute, Melbourne: Swinburne University of Technology.
45. For instance, Choo, W.C. (1998) *Information Management for the Intelligent Organization. The Art of Scanning the Environment*, ASIS Monograph Series, Medford: Information Today Inc.
46. Inayatullah, S. (ed) (2004) *The Causal Layered Analysis (CLA) Reader*, Taipei: Tamkang University Press.
47. Schoemaker, P.J.H. (1995) 'Scenario Planning: A Tool for Strategic Thinking', *Sloan Management Review*, Winter, pp. 25-40.
48. Jönsson S. and Lukka K. (2007) 'There and Back again: Doing Interventionist Research in Management Accounting', in: Chapman, C.S., Hopwood, A.G. and Shields, M.G. (eds.) *Handbook of Management Accounting Research Volume 1*, Oxford: Elsevier.

Paper VI¹⁵

¹⁵ Aas, T.H. (2010), "Implementing a Value Assessment Tool for Service Innovation Ideas", in Huizingh, K.R.E., Conn, S., Torkkeli, M. and Bitran, I. (Eds.), *Proceedings of the 21st ISPIM Innovation Conference*, ISBN: 978-952-214-926-8, Bilbao, Spain, June 6-9, (the paper won "The Conference Best Student Paper Award").

Implementing a Value Assessment Tool for Service Innovation Ideas

Tor Helge Aas
University of Agder

Abstract

There has not been much discussion of how firms may assess the value of service innovation projects ex-ante in the extant research literature. This paper theoretically derives a value assessment tool for service innovation ideas called QSI (Qualify Service Innovations). Thereafter QSI is implemented in three firms and it is explored to what degree the implementation improved managerial decision making on service innovation projects and investments. The findings indicated that the implementation of QSI had effects both in a portfolio management and a project management perspective. From a portfolio management point of view deployment of QSI improved the participating managers' decision basis for prioritizing and selection of projects. From a project management point of view implementation of QSI enabled the participating managers to define more relevant, realistic and ambitious targets for service innovation projects than they were able to define without deploying the tool.

Keywords: Service innovation; Innovation management; Management control; Ex-ante value assessment.

1 Introduction

Service innovation is a complex and resource-demanding activity with potential long-term benefits for firms in the service and manufacturing industries (e.g.; Matear, Gray and Garrett, 2004; Miles, 2005; Tidd and Hull, 2003). It has been argued that the effects of service innovations are more difficult to evaluate than the effects of traditional process- and product innovations (e.g. de Jong et al., 2003). Despite this, there has not been much discussion of how firms may assess the value of service innovation projects ex-ante in the extant research literature. This is concerning since value assessment of innovation ideas has been argued to be a fundamental management task both in a portfolio management perspective (e.g. Cooper, Edgett and Kleinschmidt, 2001), and in a project management perspective (e.g. Irani and Love, 2002).

By combining insights from different research streams (e.g. Merchant and Van der Stede, 2007; Simons, 2000; Haka, 2007; Tidd and Bessant, 2009; Conway, 2008; Droege, Hildebrand and Forcada, 2009; Aas and Pedersen, 2010), this paper suggests how an ex-ante value assessment tool for service innovation projects may be designed. Hereinafter we refer to this theoretically derived ex-ante value assessment tool adapted to service innovation projects as QSI (Qualify Service innovations).

The paper then aims to explore to what degree the implementation of QSI improves managerial decision making on service innovation projects and investments. The following research questions are raised: What are the effects of implementing QSI on managers' ability to: i) assess the value of service innovation ideas, ii) manage service innovation projects, iii) manage the portfolio of service innovation projects, and iv) manage innovation activities in general?

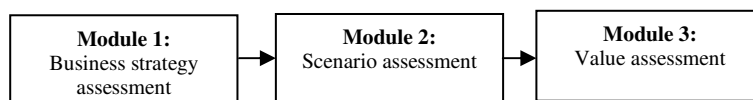
The paper is structured in the following way: In the next section we derive QSI from theory. Thereafter we describe the methodological method chosen to answer the research questions. The findings are reported in the following section. Then the study's limitations and the needs for further research are discussed. Finally, some implications and concluding remarks are provided.

2 Deriving QSI from theory

By combining general insights about value assessment from the management control literature (e.g. Merchant and Van der Stede, 2007; Simons, 2000), the financial management literature (e.g. Haka, 2007), the innovation management literature (e.g. Tidd and Bessant, 2009) and the foresight literature (e.g. Conway, 2008), with service specific insights from the service innovation literature (e.g. Droege, Hildebrand and Forcada, 2009; Aas and Pedersen, 2010) we may suggest that QSI should enable assessment of the value in different prospective commercial situations and should consist of both bottom-up and top-down valuation methods where financial measures are complemented with measures of non-financial effects relevant for service innovation (see Aas, 2009).

Consequently, we suggest that QSI may consist of three modules: 1) a business strategy module designed to assess whether the service innovation idea complies with the business strategy, 2) a scenario assessment module designed to define potential scenarios related to the prospective commercial situation for the new service, and 3) a value assessment module designed to derive the value of a service innovation idea for the different scenarios. The modules are illustrated in Figure 1.

Figure 1 QSI's modules



We suggest that a firm's business strategy may provide a basis to create company-specific checklists that can be used in Module 1. In Module 2 we suggest that Schoemaker's (1995) method for scenario construction may be used. For Module 3 we suggest that the categorization of service innovation effects suggested by Aas and Pedersen (2010) may serve as a framework. Aas and Pedersen (2010) reviewed the service innovation literature and suggested that the potential effects of service innovation may be categorized into five broad categories: 1) business process effects, 2) capability effects, 3) relationship effects, 4) financial performance effects, and 5) competitiveness effects. Each of these categories contained a number of sub-effect categories, as indicated in Table 1.

Table 1 Service innovation effect categories suggested by Aas and Pedersen (2010)

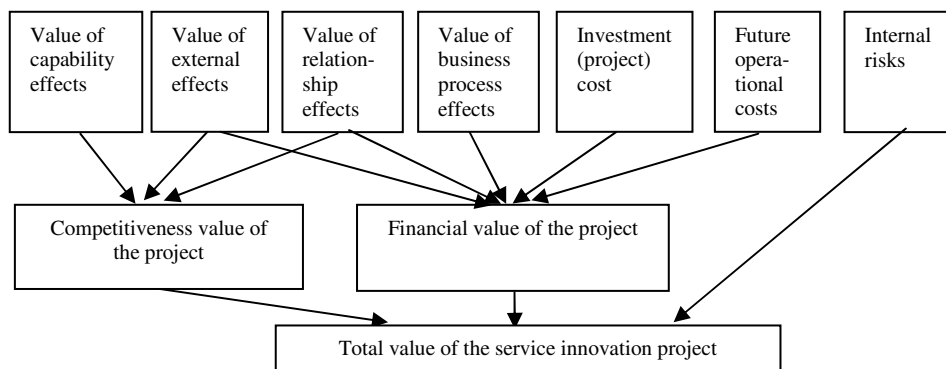
Effect category	Sub-effect category
A. Business process effects	A-1. Internal business process effects A-2. Service delivery capacity effects A-3. Internal cost effects A-4. Productivity effects A-5. Flexibility effects A-6. Risk reduction effects
B. Capability effects	B-1. Learning effects B-2. Culture effects B-3. Employee growth effects B-4. Employee satisfaction effects
C. Relationship effects	C-1. Effects on customer's value C-2. Customer satisfaction effects C-3. Customer loyalty effects C-4. Lock-in effects C-5. Image effects C-6. Business partner relationship effects C-7. Service quality effects
D. Financial performance effects	D-1. General financial performance effects D-2. Market share effects D-3. Sales (of new services) effects D-4. Sales (of existing goods/services) effects D-5. Effects on the market value of the firm
E. Competitiveness effects	E-1. Effects on the competitive position E-2. Effects on the ability to survive E-3. Creation of new markets effects E-4. Strategic performance effects

Business process effects embrace changes in the firm's business processes, and may be observed, for example, by changes in the service delivery capacity (e.g. Lievens and Moenaert, 2000), productivity (e.g. Hipp, Tether and Miles, 2000; Schulz, 2005) or flexibility (Hipp, Tether and Miles, 2000; Wong and He, 2005). *Capability effects*, like for example learning effects (e.g. Blazevic and Lievens, 2004), and employee satisfaction effects (e.g. Van Riel, Lemmink and Ouwersloot, 2004), change the internal capability of the innovating firms. *Relationship effects* refer to the proposition that service innovation may have effects on the innovator's relationship with other stakeholders. Examples of relationship effects include effects on the customer's value (e.g. Sigala, 2006; van Riel and Lievens, 2004), customer satisfaction (e.g. Lyons, Chatman and Joyce, 2007; Matear, Gray and Garrett, 2004), and customer loyalty (e.g. Blazevic, Lievens and Klein, 2003; Ching-Chow, 2007). *Competitiveness effects* may be observed as an increased ability to survive (e.g. Cowell, 1988). *Financial performance effects* may be observed as effects on market share (e.g. de Brentani, 1991) or sales (e.g. Avlonitis, Papastathopoulou and Gounaris, 2001). Aas and Pedersen (2010) suggest an additional category called *external effects*. These effects refer to

the effects that service innovation may have on stakeholders other than the innovating firm. Examples of external effects are environmental effects (e.g. Wong and He, 2005) and industry structure effects (e.g. Xu, Sharma and Hackney, 2005).

Based on their review Aas and Pedersen (2010) suggested that business process effects, relationship effects, capability effects and external effects may be perceived as direct effects of service innovation, and that these direct effects may lead to the more indirect results of service innovation, that is financial and competitiveness effects. Thus, when we also take the potential downsides of investments in innovation, i.e. costs and risks, into account, the value of a service innovation idea may be expressed in three dimensions; 1) a financial performance dimension, 2) a competitiveness dimension, and 3) a risk dimension. The service innovation value dimensions are illustrated in Figure 2, and are used as a framework for QSI's Module 3 (see Aas, 2009).

Figure 2 The value dimensions in QSI's Module 3 (based on Aas and Pedersen (2010) and Aas (2009))



Based on Aas and Pedersen's (2010) detailed list of potential effects of service innovation it is possible to construct scoreboards for the value dimensions in Figure 2. These scoreboards may guide the value assessment in Module 3. The suggested scoreboards are listed in the appendix of this paper.

3 Method

To find the managerial effects of implementing QSI, and answer the research questions, we applied an interventionist research approach (see Jönsson and Lukka, 2007), in the form of field experiments, where the researcher worked together with the management in three case organizations. In this research process active participant observation was used as a research

method. Thus, the research design may be characterized as a multiple case study with strong intervention.

The three case organizations were for-profit firms and were selected because they had an exceptional focus on service innovation and because their motivation to participate in the study was very high. It was also an advantage that the three firms, prior to the initialisation of the research project, did not use any formal method or tool to find the value of their service innovation ideas. Consequently, our findings were not influenced by the managerial effects of other value assessment tools.

The three firms were all members of the graphic arts industry. The business areas of Firm A and B were graphic design, web-design and graphic production for both digital and printed channels, whereas the business area of Firm C was web-based media services. An implementation- and test-team consisting of between one and four managers and a researcher was appointed in each firm. Some characteristics of the participating firms and implementation- and test-teams are presented in Table 2.

Table 2 The firms in our sample

<i>Firm</i>	<i>Number of employees (2009)</i>	<i>Annual turnover (2007)</i>	<i>Implementation- and test-team</i>
A	200	NOK* 231.1 mill	Researcher, CEO, Marketing director, R&D director, Project manager
B	26	NOK* 40.1 mill	Researcher, CEO
C	9	NOK* 5.1 mill	Researcher, CEO and CTO

*Norwegian kroner (the Norwegian currency)

QSI was implemented to assess the value of one real service innovation idea in each firm. In Firm A QSI was used to assess the value of a project idea called “TIMLI”. Here the idea was to develop a new service where preparation of information for different channels would be less complex than how this preparation is done today. In Firm B QSI was used to assess the value of a project idea called “kindergarten-calendar”. This project idea was to develop a web-based service where customers, in this case kindergartens, could design their own calendar and then place a printing order on this calendar to Firm B. In Firm C QSI was used to assess the value of a project idea called “OnDesign”. Here the idea was to develop a new web-based service to assist customers in designing documents for printing or digital publication on their own.

All three modules of QSI were used to assess the value of “TIMLI” and “OnDesign”. To assess the value of “kindergarten-calendar”, however, we only deployed Module 1 and 3 of QSI. This was done because the development of a “kindergarten-calendar” service would require a relatively small investment sum, and for this reason the management of Firm B wanted to use a small amount of resources on the value assessment. Thus, the implementation of this simplified QSI version for the “kindergarten-calendar” idea constitutes a good test of QSI’s scalability.

During the implementation process the usefulness of QSI was continuously evaluated by the implementation- and test-teams. In addition, the teams were continuously searching for potential improvements of the tool.

4 Findings

4.1 Experiences

To assess the value of the project ideas called “TIMLI” in Firm A and “OnDesign” in Firm C all three modules of QSI were deployed. To concretize and exemplify the experiences with deployment of the full version of QSI we report the value assessment results for the project idea called “OnDesign” in Firm C here. The value assessment results for “TIMLI” had a similar character.

The implementation and test teams started the assessment of “OnDesign” by deriving a checklist to be used in QSI’s Module 1. This checklist consisted of six questions derived from Firm C’s strategy. Some questions were related to whether the new service could be based on the technological platform that the firm had chosen, and some were related to whether the new service was relevant for the type of customers the firm was addressing. By using this checklist it was found that “OnDesign” complied with Firm C’s strategy.

To derive scenarios for “OnDesign”, in QSI’s Module 2, the two greatest uncertainties related to the prospective commercial situation for the service were identified. The first uncertainty was related to customers’ future needs and the second was related to technology. Based on these uncertainties four scenarios for “OnDesign” were derived. Scenario 1, called “idyll”, was recognized by few competing technological solutions and a high degree of fulfilment of customers’ needs. Scenario 2, called “techno”, was recognised by many competing technological solutions and a low degree of fulfilment of customers’ needs. Scenario 3, called

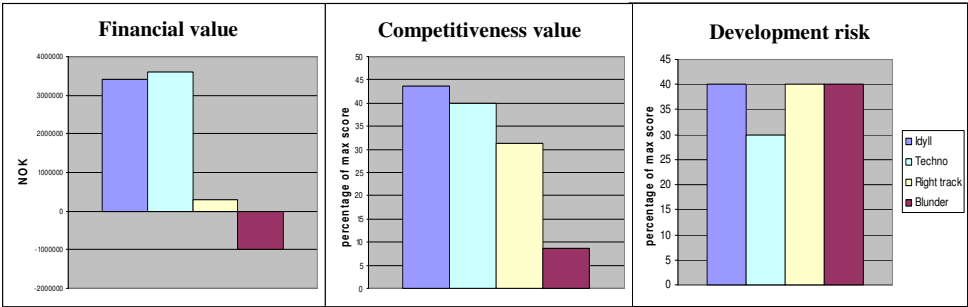
“right track”, was recognized by few competing technological solutions and a low degree of fulfilment of customers’ needs. Scenario 4, called “blunder”, was recognized by many competing technological solutions and a low degree of fulfilment of customers’ needs. The scenarios derived for “OnDesign” is illustrated in Figure 3.

Figure 3 Scenarios for “OnDesign” (output from QSI’s Module 2)

		<i>Future technological uncertainty</i>	
		Few competing technological solutions	Many competing technological solutions
<i>Future customer need uncertainty</i>	Low degree of fulfilment of customers’ needs	Scenario 1: IDYLL	Scenario 2: TECHNO
	Low degree of fulfilment of customers’ needs	Scenario 3: RIGHT TRACK	Scenario 4: BLUNDER

In Module 3 of QSI the value of “OnDesign” in these four scenarios were assessed. By using the scoreboards (see the appendix) the implementation- and test-teams found that business process effects, capability effects, relationship effects and external effects were relevant in all scenarios. However, to what degree these effects had potential to influence on the financial performance and competitiveness varied in the different scenarios. The output from QSI’s Module 3 for “OnDesign” is illustrated in Figure 4.

Figure 4 Financial value, Competitiveness value and Development risk for “OnDesign” in the four scenarios (output from QSI’s Module 3)



To assess the value of the project idea called “kindergarten-calendar” a simplified version of QSI, without Module 2, was used. Consequently, this assessment gave a less complex result. In Module 1 it was found that the idea was in compliance with Firm B’s strategy and by using the scoreboards in Module 3 a three dimensional value expression was derived. Since scenarios were not developed for “kindergarten-calendar”, however, the value expression found had a large uncertainty. This was reflected by estimating worst-case and best-case values in addition to the most likely value.

4.2 Managerial effects

Prior to the initialisation of the research project the management of the three participating firms expressed that they were struggling to assess the value of their service innovation ideas. None of them used a formal method or tool to find the value of such ideas, and value assessment was done in a rather occasional manner, different from idea to idea, and with a focus on short term financial benefits.

The participating managers stated that deployment of QSI gave them a much broader insight in the real value of their ideas. It was argued that QSI enabled them to identify and value a number of potential qualitative service innovation effects, like for example learning effects, culture effects, employee satisfaction effects and image effects that they were not able to identify and value earlier. Before the implementation of QSI, qualitative effects like this had often been disregarded by the firms. The following statement of Firm B's CEO illustrates this:

“Deployment of QSI has given me a much deeper knowledge of the value of the kindergarten-calendar idea than I would have been able to derive without the tool. Without using the tool I would have been able to give rough estimations of the potential income and expenditure related to this idea. Deployment of QSI has not only improved these financial estimations, but in addition raised my consciousness by telling me that accomplishment of the kindergarten-calendar project may give learning effects that will have the potential to improve our competitiveness.”

The managers of Firm A and C also appreciated that by combining scenario construction with value assessment they were given new insight about the relationship between the prospective commercial situation for the new service and its value. The following statement of Firm A's R&D director illustrates this:

“I have often reflected on that the value of a particular service innovation idea, like TIMLI, is very dependent on a number of factors outside our control. Earlier I have, however, not been able to describe this in a precise manner. By introducing scenario analysis in the value assessment process I have been given a tool to display this vague understanding I had before in a much more precise and explicit manner.”

We found that the improved insight into the value of service innovation ideas had effects both in a *project* management and *portfolio* management perspective. The participating firms had more service innovation ideas than they had resources to carry out. Therefore, *portfolio management*, including prioritizing service innovation ideas and selecting what projects to invest in, was an important task for the management in these firms. The managers argued that the output from Module 1 of QSI enabled them to reject ideas that were not in compliance with the business strategy, or an alternative desired strategy, quicker, and with a higher degree of certainty, than they were able to do before. The following statement from the R&D director in Firm A illustrates this:

“Module 1 of QSI gives a very quick and orderly assessment of the strategic fit of the idea. We did corresponding assessments of strategic fit also before, but they were done in a more unstructured and unconscious manner, and they often gave ambiguous results.”

It was also argued that the insight about scenarios provided by QSI’s Module 2 contributed in a portfolio management perspective. Although decisions to invest in a particular project generally are based on a belief that a specific scenario is likely to occur, the output from Module 2 enables the management to monitor if the expected scenario really appears. Consequently, if it, after a while, turns out that a different scenario is more likely to occur, the management is given an opportunity to reconsider the investment decision.

The participating managers argued that the detailed project value derived by deployment of QSI’s Module 2 and 3 improved the basis for investment decisions. The following statement of Firm C’s CEO illustrates this:

“We have a relative limited amount of available funds to invest in innovation projects. Thus, it is important for us to ensure that an idea is valuable before we decide to invest. In this respect the output from QSI improves our decision basis considerably, and enables us to prioritize and select the most valuable ideas.”

From a *project management* point of view the participating managers argued that the improved insight about value provided by QSI’s Module 3 enabled them to define more relevant, realistic and ambitious targets for selected service innovation projects than they were

able to define without deploying the tool. It was also argued that these improvements laid the foundation for an earlier identification of necessary corrective actions in the subsequent service development stage. These effects on project management may be illustrated by the following statement from the CEO of Firm B:

“I often have a feeling that we are not able to realize all the potentials of service innovation projects, but it is very difficult for me to pinpoint exactly what we are missing. By using the insights provided by QSI we will be able to derive more precise project targets before we start, and this will enable us to manage the projects according to these potentials and realize the potentials.”

The following statement from the CTO of Firm C also illustrates that the output from QSI is important to be able to manage and control service innovation projects:

“It is not only important to evaluate new service ideas before development. It is likewise important to evaluate during and after development, and also after a period in operation. Therefore I appreciate that the output from QSI prepares us for such evaluations by telling us what to measure and what the targets should be.”

It was also argued that the scenario assessment accomplished in Module 2 of QSI, gave an important contribution to project management. Although targets for a particular project generally are based on an expected scenario, the constructed scenarios give the management an opportunity to monitor if the expected scenario really appears, and if it does not, the targets should be reconsidered.

In the simplified version of QSI, implemented in Firm B, Module 2 was skipped. Consequently, some important managerial effects caused by the scenario construction were not realized by Firm B. The implementation- and test-teams argued that accomplishment of Module 2 involved relatively little extra work, and they therefore suggested that a QSI implementation should include all modules.

In addition to the effects related to portfolio and project management, the CEO of Firm C stated that implementation of the tool had effects on the firm’s strategic management process:

“For us implementation of QSI has had some important side effects related to strategic management. Module 1 of the tool has raised our consciousness about our own strategy, and forced us to define a specific innovation strategy and to think more strategically about our innovation decisions.”

Furthermore, the implementation and test teams identified some antecedents related to the realization of QSI’s managerial effects. For example, the marketing director of Firm A stated:

“Here in this firm we have well established routines for how we handle development projects funded by customers. Unfortunately our procedures for how we handle internally funded development projects are not defined that clearly. It is, for example, not clear who has the authority to make an investment decision. We have to put such procedures into place, and use QSI as an integrated tool to realize all its potentials.”

Thus, we suggest that an antecedent for realizing managerial effects is that QSI is implemented as an integrated part of a larger set of innovation management procedures. In addition the CEO of Firm B suggested that to ensure equal treatment of different ideas, QSI should preferably be used by a pre-defined “value assessment team” that was disconnected from the project team.

4.3 Suggested improvements of QSI

Although all participating managers agreed that QSI had a positive influence on portfolio management, some argued that it was relatively difficult to prioritize projects based on the rather complex multi-dimensional value expression provided by the tool. Therefore, based on the experiences, the implementation- and test-teams suggested some improvements. In particular the suggested improvements were related to how value may be visualized in a more appropriate way for project prioritizing and selection. It was for example suggested that by plotting the value of each idea in a three-dimensional co-ordinate system, and by including symbols for resource need and time frames in the diagram, the decision basis for project selection would be improved. For more information about these suggested improvements we refer to QSI’s web-application¹⁶. We also expect that further deployment of QSI will result in additional improvements and expansions of the tool.

¹⁶ See www.qsi.no

5 Limitations and further research

We believe that by deploying a qualitative interventionist approach we were able to identify the true managerial effects of QSI in the studied firms. It is, however, a threat to the internal validity that the test period was relatively short, and the number of ideas assessed was relatively low. We therefore suggest that further research should evaluate the managerial effects of QSI over a longer period, where it for example is evaluated whether the value estimated by QSI ex-ante reflects the real value of the project ex-post.

The fact that QSI is tested on relatively few service innovation ideas that all have a technological aspect, and in relatively few firms from one industry, may also be a threat to the external validity. However, since QSI is based on theory applicable for for-profit firms in general we find no reason why the findings should not be generalizable to all for-profit firms. Nevertheless, further research should investigate this in more detail empirically by implementing QSI in firms belonging to various industries and by testing the tool on different types of service innovation projects.

Another limitation with the study is the fact that QSI is the only tool that is tested. QSI was intentionally implemented in firms that did not have a formal value assessment tool implemented before participation in the research study. For this reason we were only able to conclude on what managerial effects QSI had, whereas we were not able to say anything about the managerial effects of other value assessment tools. Thus, further research should suggest alternative designs of service innovation value assessment tools and implement them and compare the managerial effects of these tools with the managerial effects of QSI.

6 Implications and concluding remarks

By deriving, implementing and testing a value assessment tool, called QSI, in three firms, the paper contributes to our knowledge on how ex-ante value assessment may be accomplished for service innovation projects. It was found that the implementation of QSI had effects both in a project management and a portfolio management perspective. Thus, the practical experiences reported in the paper provide considerable assistance and guidance to managers searching for ways to assess the value of their service innovation ideas.

7 References

Aas, T.H. (2009) 'Service Innovation Management: Designing an ex-ante value assessment tool', in: Huizingh, K.R.E., Conn, S., Torkkeli, M. and Bitran, I. (eds.) *Proceedings of the 2nd ISPIM Innovation Symposium*, Manchester: ISPIM.

Aas, T.H. and Pedersen P.E. (2010) 'The firm-level effects of service innovation: A literature review', *International Journal of Innovation Management*, forthcoming.

Avlonitis, G.J., Papastathopoulou P.G. and Gounaris S.P. (2001) 'An empirically-based typology of product innovativeness for new financial services: Success and failure scenarios', *Journal of Product Innovation Management*, Vol. 18 No. 5, pp. 324-342.

Blazevic, V. and Lievens A. (2004) 'Learning during the new financial service innovation process: Antecedents and performance effects', *Journal of Business Research*, Vol. 57 No. 4, pp. 374-391.

Blazevic, V., Lievens A. and Klein E. (2003) 'Antecedents of project learning and time-to-market during new mobile service development', *International Journal of Service Industry Management*, Vol. 14 No. 1, pp. 120-147.

Ching-Chow, Y (2007). A Systems Approach to Service Development in a Concurrent Engineering Environment. *Service Industries Journal*, Vol. 27 No. 5, 635-652.

Conway, M. (2008) *An Overview of Foresight Methodologies: An introduction to the range of methods available to explore the future*, Australia: Thinking Futures, downloadable at <http://www.thinkingfutures.net/downloads>.

Cooper, R.G, Edgett, S.J. and Kleinschmidt, E.J. (2001) *Portfolio Management for New Products 2nd Edition*, New York: Basic Books.

Cowell, D.W. (1988) 'New service development', *Journal of Marketing Management*, Vol. 3, No. 3, pp. 296-312.

De Brentani, U. (1991) 'Success Factors in Developing New Business Services', *European Journal of Marketing*, Vol. 25 No. 2, pp. 33-59.

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

Droege, H., Hildebrand, D. and Forcada, M.A.H. (2009) 'Innovation in services: present findings, and future pathways', *Journal of Service Management*, Vol. 20 No. 2, pp. 131-55.

Haka, S.F. (2007) 'A review of the literature on capital budgeting and investment appraisal: Past, Present and Future Musings', in: Chapman, C.S., Hopwood A.G. and Shields M.G (eds.) *Handbook of Management Accounting Research Vol. 2*, Oxford: Elsevier.

Hipp, C., Tether B.S. and Miles I. (2000) 'The Incidence and Effects of Innovation in Services: Evidence from Germany', *International Journal of Innovation Management*, Vol. 4 No. 4, pp. 417-453.

Irani Z. and Love, P.E.D. (2002) 'Developing a frame of reference for ex-ante IT/IS investment evaluation', *European Journal of Information Systems*, Vol. 11, pp. 74-82.

Jönsson S. and Lukka K. (2007) 'There and Back again: Doing Interventionist Research in Management Accounting', in: Chapman, C.S., Hopwood, A.G. and Shields, M.G. (eds.) *Handbook of Management Accounting Research Volume 1*, Oxford: Elsevier.

Lievens, A. and Moenaert R.K. (2000) 'Communication flows during financial service innovation', *European Journal of Marketing*, Vol. 34, No. 9/10, pp. 1078-1110.

Lyons, R.K., Chatman J.A. and Joyce C.K. (2007) 'Innovation in services: corporate culture and investment banking', *California Management Review*, Vol. 50, No. 1, pp. 174-191.

Matear, S., Gray B.J. and Garrett T. (2004) 'Market orientation, brand investment, new service development, market position and performance for service organisations', *International Journal of Service Industry Management*, Vol. 15, pp. 284-301.

Merchant, K.A. and Van der Stede, W.A. (2007) *Management Control Systems: Performance Measurement, Evaluation and Incentives*, Edinburgh: Pearson Education Limited.

Miles, I. (2005) 'Innovation in services', in: Fagerberg J., Mowery, D.C., Nelson R.R. (eds.) *The Oxford Handbook of Innovation*, Oxford: Oxford University Press.

Schoemaker, P.J.H. (1995) 'Scenario Planning: A Tool for Strategic Thinking', *Sloan Management Review*, Winter, pp. 25-40.

Schulz, M. (2005) 'Guest Editor's Introduction: Is Japan Finally Catching Up on Service Innovation?', *Japanese Economy*, Vol. 33 No. 3, pp. 3-9.

Sigala, M. (2006) 'Mass customisation implementation models and customer value in mobile phones services: Preliminary findings from Greece', *Managing Service Quality*, Vol. 16, No. 4, pp. 395-420.

Simons, R. (2000) *Performance Measurement & Control Systems for Implementing Strategy*, New Jersey: Pearson Education International.

Tidd, J. and Bessant, J. (2009) *Managing Innovation: Integrating Technological, Market and Organizational Change (ed. 4)*, Chichester: Wiley.

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

Van Riel, A.C.R. and Lievens A. (2004) 'New service development in high tech sectors: a decision-making perspective', *International Journal of Service Industry Management*, Vol. 15, No. 1, pp. 72-101.

Van Riel, A.C.R., Lemmink J. and Ouwersloot H. (2004) 'High-technology service innovation success: a decision-making perspective', *Journal of Product Innovation Management*, Vol. 21, No. 5, pp. 348-359.

Wong, P.K. and He Z.-L. (2005) 'A comparative study of innovation behaviour in Singapore's KIBS and manufacturing firms', *Service Industries Journal*, Vol. 25, No. 1, pp. 23-42.

Xu, H., Sharma S.K. and Hackney R. (2005), 'Web services innovation research: Towards a dual-core model', *International Journal of Information Management*, Vol. 25, No. 4, pp. 321-334.

Appendix: Suggested scoreboards to be used in module 3 of QSI

**Module 3 of QSI
Scoreboard**

Name of service innovation idea: _____

Name of scenario: _____

Value of business process effects

	Anticipated influence on financial performance in monetary terms (present value)	Anticipated influence on competitive position (0-5)	Comment
To what degree will the service change the internal business process?			
To what degree will the service change the capacity of delivering existing services?			
To what degree will the service change the quality of existing services/products?			
To what degree will the service change the internal operational costs within the firm?			
To what degree will the service have productivity effects?			
To what degree will the service change the flexibility of the firm?			
To what degree will the service reduce the risk of the firm's operations?			
SUM			

Value of external effects

	Anticipated influence on financial performance in monetary terms (present value)	Anticipated influence on competitive position (0-5)	Comment
To what degree will the service have environmental effects?			
To what degree will the service influence on industry structure?			
To what degree will the service have political kudos effects?			
To what degree will the service contribute to regulations and standards fulfilment?			
SUM			

Value of relationship effects

	Anticipated influence on financial performance in monetary terms (present value)	Anticipated influence on competitive position (0-5)	Comment
To what degree will the service influence on customer's value (i.e. have effects on the customer's competitiveness, effects on the customer's internal process, or effects on the customer's perceived value)?			
To what degree will the service influence on customer satisfaction?			
To what degree will the service influence on customer loyalty?			
To what degree will the service have lock-in effects?			
To what degree will the service influence on image?			
To what degree will the service influence on business partner relationships?			
To what degree will the service change the quality of existing services/products?			
SUM			

Value of capability effects

	Anticipated influence on financial performance in monetary terms (present value)	Anticipated influence on competitive position (0-5)	Comment
To what degree will development of the service have learning effects?			
To what degree will development of the service have enterprise culture effects?			
To what degree will development of the service have employee growth effects?			
To what degree will development of the service have employee satisfaction effects?			
SUM			

Costs

	Anticipated cost	Comment
Investment (project) costs (present value in monetary terms)		
Future operational costs related to the service (present value in monetary terms)		
SUM		

Development risks

	Anticipated internal risk (0-5)	Comment
To what degree are there internal *) risks (e.g. technological risk, knowledge risks etc..) related to the development process?		

*) External risk (market risk) not relevant here since this is covered through scenario descriptions

Total value of the service innovation idea

	Value
Financial value (present value in monetary terms, i.e. financial value of effects – financial value of costs)	
Competitiveness value (percent of max score)	
Development risk (percent of max score)	