



# Exploring the CIS and hidden innovation in a service context

Anne Jørgensen Nordli  
Doctoral dissertation  
Philosophiae Doctor (PhD)



# Exploring the CIS and hidden innovation in a service context

Anne Jørgensen Nordli  
Doctoral thesis submitted  
for the degree of PhD

Inland Norway University of Applied Sciences - INN University

© **Anne Jørgensen Nordli**

*Doctoral dissertation submitted to Inland Norway University of Applied Sciences - INN University*

ISSN: 1893-8337

ISBN: 978-82-7184-413-4 (Printed version)

ISBN: 978-82-7184-412-7 (Published online)

All rights reserved. No part of this publication may be reproduced or transmitted, in any form or by any means, without permission.

inn.no

Frontpage illustration: Colourbox

Photo: Morten Nordli

Layout: Gro Vasbotten/Inland Norway University of Applied Sciences

Printed in Norway by Flisa Trykkeri A/S

## Abstract

The overall goal of this thesis is to investigate the use of the Community Innovation Survey (CIS) in a service context. The CIS is a quantitative innovation instrument originally designed to measure innovation in manufacturing but after some years expanded to be used for services innovation research also. One objective of this thesis is to determine whether the CIS is a useful instrument for measuring innovation in services. Another is to discover more about what the CIS measures and what it may not measure. The literature points out that some innovation is not identified by the CIS (hidden innovations). This thesis examines the CIS from different perspectives using tourism as an empirical service context.

This thesis argues that understanding the processes behind services innovations provides better insights into the measurement of innovation and hidden innovation; for example, how innovations start and develop, and who is involved. Such knowledge may reveal how and why some innovations remain hidden. It is argued that the process of a services innovation is so crucial to the innovation outcome that it should be acknowledged in innovation measurement. This thesis addresses how the CIS tends to focus excessively on innovation output, and it is unclear whether the process that leads to services innovation is acknowledged. Consequently, this thesis investigates CIS measurement of innovation and hidden innovation by relating process perspectives on services innovation to the measurement of the services innovation output.

This thesis uses both quantitative and qualitative methods/designs to investigate and analyse the research goals. It argues that such combined insights into the phenomenon will provide a deeper understanding of measurement of innovation and may contribute to the development of a better measure. Accordingly, this thesis uses a mixed methods approach to achieve the research goal. The thesis consists of four papers that contribute to the overall goal of the thesis. Paper 1 is quantitative, Paper 2 is a theoretical and methodological discussion, and Papers 3 and 4 are qualitative.

The findings of the thesis reveal several examples of hidden innovation and suggest four different types of hidden innovation. These types follow one of two locally anchored services innovation processes, and both are categorized as accelerated innovation processes. One of them is a new type of service innovation process that has not been addressed in the services innovation literature previously. Additionally, because hidden innovations follow one of two accelerated processes, they seem to be either unknown, misinterpreted or forgotten by senior management. The thesis also examines the drivers of services innovation and how the inclusion of indicators of these drivers in the CIS is important to reflect distinct activities of the process of services innovation. The thesis identifies two drivers of CIS-measured innovation—“use of external information” and

“use of cross-functional work-teams”—and two drivers of hidden innovation: “formal and informal evaluation”.

The analysis of the CIS, CIS-measured innovation and hidden innovation suggest that there are four ways to improve the CIS for use in tourism or similar services in the future. These four areas of improvement relate to operationalization of the services innovation concept, respondents’ interpretation of questionnaires and the importance of including specific driver indicators. First, innovation should not be separated into four different innovation types as in earlier CIS surveys. Second, it should be clearer in the CIS that innovation can be a series of incremental changes that together constitute an innovation. Third, to make it easier for respondents to understand, to interpret and to answer the survey questions, the language and format should be improved, along with guidelines about the type of information required in the survey answers. Fourth, the drivers identified in the thesis should be included in future CIS questionnaires.

In summary, this thesis suggests that the CIS can be used to measure innovation in tourism and services. The CIS instrument should not be dismissed but rather improved. One way of improving the instrument for innovation measurement in tourism or similar services would be to follow the suggested recommendations in this thesis.

## Aknowledgement

JUHU! Jeg har levert og blitt godkjent!

Jeg har publisert to artikler, et bokkapittel, og har en artikkel i prosess. Kappen som favner alt er godkjent, jeg er så glad og samtidig er det vemodig siden jeg har trivdes og på mange måter nytt hvert sekund av mitt PhD - forløp. Dette på tross av at det har vært en prøvelse for min tålmodighet og at jeg til tider har vært frustrert. Alle mine positive opplevelser overskygger alt. Jeg har fått de utfordringer jeg søkte. Jeg har lært masse og utviklet på områder som jeg ønsket. Jeg har blitt kjent med nye fantastiske mennesker; veiledere, stipendiatkollegaer, andre HiL/INN-kollegaer og faglige kollegaer både nasjonalt og internasjonalt. Jeg har fått fastansettelse på HINN, og gleder meg til å gjøre en god jobb i mange år fremover innen akademia. Men viktigst av alt, jeg har klart å komme så langt, uten at det har gått på bekostning av min deilige familie.

Takk til Finn Olsen, Rolf Rønning og Martin Rønningen, dere som satt rundt bordet da jeg var på jobbsamtale til stipendiat-stillingen på HiL. Takk fordi dere hadde troen på meg.

En spesiell stor takk til Martin Rønningen som har vært min hovedveileder og stillet opp til enhver tid i tykt og tynt. Tenk at du har holdt ut som veileder for en så sta og egen danske i et helt PhD-forløp! Du aner ikke hvor takknemlig jeg er for det. Jeg hadde ikke klart det uten diskusjonene med deg, din støtte, inspirasjon og veiledning. Jeg håper vi blir gode kollegaer og «CO-writere» i mange år fremover.

Takk til Christer Thrane, min biveileder som har vært mitt kvantitative metode orakel, som nok hadde håpet på en rent kvantitativ stipendiat. Beklager Christer at det ble mixed method! Uansett, du var til stor hjelp i mitt kvantitative arbeide og det setter jeg pris på. Takk til opponenter under 50%-seminaret, Erik Haugom og Randi Bredvold og til opponert på 80% seminar Sverre Herstad som også var god støttespiller i sluttarbeidet med paper 1. Takk for nyttige kommentarer, diskusjoner og innspill til kappen Rolf Rønning og Marit Engen.

Takk til alle gode kolleger som har stilt opp, støttet meg, diskutert med meg og kommentert på deler av avhandlingen. Takk til alle mine engasjerte og inspirerende stipendiat kollegaer, jeg hadde ikke kommet meg i mål uten dere. Takk for alle fine opplevelser. Ta godt vare på hverandre og det flotte stipendiat-miljøet vi har. Takk Randi KB, for fin mottakelse og al omtanke, din rolle er viktig for INTOP. Til dere Iveta, Gunhild og Line, som har vært rett på den annen side av kontorveggene i sluttfasen, og blitt eksponert mye for mine besøk i en mentalt krevende sluttfase! Takk fordi dere har vært der, lyttet, støttet, delt, diskutert og oppmuntret. Det har betyd mer enn dere aner.

Takk til alle mine respondenter som har stilt opp.

Takk til NORSI (Norwegian Research School in Innovation) for muligheten til å være en del av et nasjonalt innovasjonsnettverk.

Og til sist men aller viktigst, takk til mine kjære der hjemme. Min kjære mann og våre 3 vidunderlige barn. I den krevende arbeidssituasjonen det er å gjennomføre en PhD, har jeg hatt et spesielt hjertenært mål. Dere skulle på ingen måte sviktes i fravær av mamma og fru gjennom PhD-forløpet. Jeg har forsøkt til det siste å legge igjen jobben på kontoret og ikke tenke jobb i de mest verdifulle timene, familietimene. På grunn av dere har jeg klart å koble av og reise på jobb neste morgen med ny energi og fullt PhD - fokus. Også takk fordi dere har gitt meg tid og rom til trening. Jeg vet ikke hvor mange PhD - utfordringer jeg har løst på min sykkel og i joggeskoene, men det er mange! Harmonien og balansen mellom familielivet, trening, søvn og PhD - jobben er kanskje den viktigste grunnen til at jeg er kommet i mål.



# Content

## Abstract

## Aknowledgement

<b>1. Introduction.....</b>	<b>1</b>
1.1 Measurement of innovation and hidden innovation.....	2
1.2 The road to the goal: the PhD process.....	4
1.3 The story of the Oslo Manual: Framing hidden innovation.....	6
1.4 Tourism as the service-context.....	9
1.5 The overall goal and research questions.....	10
1.6 The structure of the thesis.....	12
<b>2. Theoretical perspectives.....</b>	<b>15</b>
2.1 Definition of innovation and characteristics of services innovation.....	15
2.2 Theoretical background.....	18
2.2.1 The high-tech/low-tech discussion.....	18
2.2.2 The manufacturing/service discussion.....	20
2.3 Services innovation processes.....	23
2.3.1 Strategic stage-wise services innovation processes.....	23
2.3.2 Practice-based services innovation processes.....	25
2.3.3 Services innovation processes in between stage-wise and practice-based innovations—accelerated processes.....	26
2.3.4 The relevance of process perspectives for measurement of services innovation.....	27
2.4 Final comments.....	28
<b>3. Methods.....</b>	<b>31</b>
3.1 Philosophical foundations.....	31
3.2 Mixed methods approach.....	33
3.2.1 The sequential mixed methods design.....	34
3.3 Research design: Samples, data and analysis.....	37
3.3.1 Phase 1.....	37
3.3.2 Phase 2.....	38
3.4 Research credibility: Reliability and validity.....	40
3.4.1 Reliability and Validity of the quantitative study.....	41
3.4.2 Research validity in the qualitative studies (trustworthiness).....	42
3.4.3 The mixed methods validity.....	42
3.5 The ethics of the research.....	43
3.6 Final comments on methodology.....	44

<b>4. Summary of the papers.....</b>	<b>45</b>
4.1 Paper 1.....	45
4.2 Paper 2.....	46
4.3 Paper 3.....	47
4.4 Paper 4.....	48
<b>5. Contribution, implications and future research.....</b>	<b>51</b>
5.1 Drivers and process characteristics of services innovation outputs.....	52
5.1.1 Identified drivers of innovation.....	52
5.1.2 Process characteristics of 1) CIS measured innovation outputs and 2) hidden innovation outputs.....	54
5.1.3 Visualizing process characteristics of (1) CIS measured innovation outputs and (2) hidden services innovation outputs....	55
5.2 Measuring services innovation.....	60
5.2.1 Division into types.....	61
5.2.2 Innovation as a series of incremental improvements.....	62
5.2.3 Respondents and language interpretation.....	63
5.2.4 The importance of indicators related to organization of work indicators and organizational learning.....	64
5.3 Reflections and future research.....	65
<b>References.....</b>	<b>69</b>

### **Figure list**

Figure 3.1: The multiphase design.....	34
Figure 3.2: Validity of the mixed methods study.....	43
Figure 4.1: CIS, the tip of the innovation iceberg.....	48
Figure 5.1: The innovation iceberg and drivers of innovation.....	54
Figure 5.2: Organizational learning and innovation (Jon Sundbo, 1997).....	56
Figure 5.3: Innovation modes (Tether 2005).....	56
Figure 5.4: Measurable service innovations and other improvements.....	57
Figure 5.5: Hidden Service innovations as an accelerated process.....	58

### **Table list**

Table 3.1: Purpose, applied approach, method and empirical base.....	37
Table 3.2: The cases in Papers 3 and 4.....	39
Table 4.1: An overview of the appended papers.....	45

## Appendix

Appendix 1: The CIS instrument (English version Eurostat)

Appendix 2: The CIS instrument (Norwegian version/Statistic Norway)

Appendix 3: Interview guide (Norwegian version)

## Appended papers

### Paper 1:

Nordli, A. J. (2017). Information use and working methods as drivers of innovation in tourism companies. *Scandinavian Journal of Hospitality and Tourism*, 1–15.

(This paper is the most recently published; however, the analysis was conducted at the start of the PhD research.)

DOI: <https://doi.org/10.1080/15022250.2017.1343682>

### Paper 2:

Rønningen, M. & Nordli, A. J. (2016). *Er reiselivsnæringene innovative eller ikke?* In E. Merok & T. Arnesen (eds.), *Innovasjon i fragmenterte næringer*. Opplandske Bokforlag.

(This paper was accepted for publication in an anthology in 2013, but the completion of the anthology was delayed, and thus the paper was published in 2016.)

The paper is not published online but is published in the printed version of the dissertation. More information about the book (in Norwegian): <http://www.opplandskebokforlag.no/index.php?do=product&id=236>

### Paper 3:

Nordli, A. J. (2016). Measuring innovation in tourism with Community Innovation Survey: A first step towards a more valid innovation instrument. *Scandinavian Journal of Hospitality and Tourism*, 1–18.

DOI: <https://doi.org/10.1080/15022250.2016.1247382>

### Paper 4:

Nordli, A. J. & Rønningen, M. (In review). Tracking hidden innovation in tourism. Submitted for publication in *Tourism Management Perspectives*.

Is still in review.



## 1. Introduction

This thesis considers the *measurement of services innovation* and *hidden innovation* at a company level. The expression “services innovation” refers to innovation that unfolds in a service organization. Hidden innovation is innovation that goes unnoticed (or is under-reported) using conventional quantitative instruments developed to measure innovation (Camisón & Monfort-Mir, 2012; Green, Miles, & Rutter, 2007). The European Community Innovation Survey (CIS) is probably one of the most widely used examples of a survey often referred to as a conventional innovation instrument (<http://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>) and is the instrument that is the focus of this thesis.

The CIS has its roots in manufacturing and has from its development been the centre of debate and discussion about the degree to which the instrument captures innovations implemented in the organization. One focus on innovation in manufacturing relates innovation more specifically to technological development, and research and development (R&D), regarding which the CIS has been criticized. For example, Tether (2005) provides evidence of how the innovation process in services is different from that in manufacturing. Innovation in services is often “soft”, rather than primarily technological, involving organizational and relational changes within the supply chain or networks (Tether & Tajar, 2008). Tether and Tajar (2008) argue that services innovation relates to organizational innovation, about which less is known compared with forms of technological innovation. Furthermore, Drejer (2004) also point to the strong presence of organizational innovation as a peculiarity of services innovation, in addition to other peculiarities such as strong involvement of multiple actors in the innovation process. Services innovation can be described as a process that unfolds among the people involved and such process characteristics should be considered in measurement. As the CIS was originally designed for manufacturing and has been criticized regarding an over focus on technological innovation and R&D, it is uncertain to what degree the CIS can be used to measure innovation in services. Debate in the literature is ongoing, and more research is needed. These issues are central to this thesis and will be explained in greater detail in this introductory chapter, which also presents the overall research questions.

The overall aim of the thesis is to study and evaluate the CIS, and to understand the

degree to which it can be used to measure innovation in specific parts of the service industry and whether the CIS can be improved to be a better instrument for measuring services innovation in the future. I use the Norwegian tourism industry as the context for the research.

In Section 1.1, I discuss the knowledge gap related to the measurement of innovation and hidden innovation. In Section 1.2, I describe how I became interested in the measurement of innovation and hidden innovation using the CIS, and how the appended papers evolved, and I describe their focus. In Section 1.3, I review of the origins and development of the CIS. In Section 1.4, the research context is addressed, emphasizing benefits of the context and also addressing the gap in innovation research in tourism. Finally, in Section 1.5, the overall goal for the thesis is stated, and I explain how the synopsis seeks to compile and sum up the research findings from the individual papers by answering two distinct research questions.

## **1.1 Measurement of innovation and hidden innovation**

CIS-based innovation statistics are part of the European Union's science and technology statistics (Eurostat). The CIS provides statistics by country, type of innovation, economic activity and size. The CIS is conducted on a biennial basis by EU member countries and a number of ESS member countries, and is a survey of innovation activity in enterprises in the manufacturing and service industries. The CIS seeks to measure the companies' innovation output by asking questions that aim to measure four different innovation types (innovation outputs). In Norway, CIS surveys are conducted by Statistics Norway (SN). This means that the CIS is a widely used survey that aims to measure and compare innovation in manufacturing and service industries alike. Innovation statistics such as these provide important information about businesses and provide an indication of the organizations' ability to change and innovate. The CIS instrument was, as mentioned, originally designed for manufacturing, and thus it is important to address whether such an instrument is appropriate for measuring services innovation, as well as how it works and whether there is hidden innovation not captured by this instrument.

The specific expression "hidden innovation" (innovation not reported in conventional innovation surveys) is not just related to whether it is possible to measure innovation in services with conventional innovation instruments. The expression is used more broadly than that, one of the first being Serin and Hansen (1997), in which hidden innovation processes are examined in low-technology companies. Moreover, the expression "hidden innovation" is used in several other publications not related to services (Barrett, Abbott, Sexton, & Ruddock, 2007; Green et al., 2007; NESTA, 2007; Trigo, 2013). Although the term "hidden innovation" is used explicitly in these publications, corresponding themes and issues are widely discussed more implicit in the general innovation literatu-

re. One example is the debate addressing how low-tech innovation patterns differ from high-tech innovation patterns (Heidenreich, 2009; Kirner, Kinkel, & Jaeger, 2009; Santamaría, Nieto, & Barge-Gil, 2009). In this debate, it is questioned critically whether common innovation approaches manage to take all sides of the innovation phenomenon into account, or whether some innovation patterns are emphasized over others. Jensen, Johnson, Lorenz, and Lundvall (2007), for example, refer to two different modes of innovation—the doing, using and interacting mode (DUI) and the science, technology and innovation mode (STI)—and they specifically address how there might be bias related to whether DUI innovation is reflected in quantitative instruments. The high-tech/low-tech debate and the DUI and STI modes of innovation will be given more attention in Chapter 2. The key point to note is that these discussions relate to the broad and more general discussion of how to conduct innovation research that reflects all dimensions of the innovation phenomenon. The broad and general debate is addressed to underline the extensive need for more knowledge about the measurement of innovation and hidden innovation and to underline that the knowledge gap is not only related to services innovation but rather is much broader. This thesis, however, focuses on the knowledge gap related to the measurement of innovation in services.

Some publications address the issue of “hidden innovation” in service industries (Abreu, Grinevich, Kitson, & Savona, 2008, 2010; Savona, Abreu, Grinevich, & Kitson, 2008). However, these publications focus on an early version of the CIS instrument (CIS 4), which is described in detail in Section 1.3. Camisón and Monfort-Mir (2012) address hidden innovation in a tourism service context and argue that innovation in tourism can be biased by measurement approaches based on scoreboards developed for manufacturing or general service industries. These publications are, as far as I know, the only ones that address hidden innovation in services explicitly. Besides, there is an ongoing debate in the services innovation literature about whether surveys such as the CIS can be used to measure innovation in services. Various publications address two competing approaches to services innovation research, assimilation and demarcation (Coombs & Miles, 2000; Drejer, 2004; Tether, 2005). The CIS is often related to the assimilation approach, which treats services as similar to manufacturing and has roots in the well-established stream of research in manufacturing innovation. Djellal and Gallouj (2000) refer to a group of services innovation surveys (subordinate surveys) conducted during the period 1988–1999 and belonging to the assimilation approach. They classify the early CIS surveys into this category. The demarcation approach developed in response to criticisms about the assimilation approach. The demarcation approach argues that services innovation is distinctively different from innovation in manufacturing and requires new theories, methods and instruments (Coombs & Miles, 2000; Drejer, 2004). For example, Tether (2005) states that services innovate differently from manufacturing, and Drejer (2004) addresses peculiarities of services innovation. The demarcation approach

underlines scepticism about assimilation surveys (and CIS surveys) and the uncertainty about whether CIS surveys capture particular services innovations. Debate about the assimilation and demarcation approaches is thus central to the measurement of services innovation and hidden innovation. Accordingly, the different approaches are explained and addressed in three of the papers and in the theoretical framework.

## **1.2 The road to the goal: the PhD process**

My PhD research includes four research papers that are appended to the thesis. These result from two phases of the PhD process. The first phase was an explorative phase, in which I examined the CIS and its use. The second phase was a more in-depth phase in which I investigated the types of innovation that the CIS measures and the types of innovation that it does not measure.

My research was focused initially on the tourism industry, which is a significant industry for Norway (see the latest white paper considering tourism in Norway (<https://www.regjeringen.no/no/dokumenter/meld.-st.-19-20162017/id2543824/>)). This was the start of the explorative phase of the thesis. My initial aim was to identify drivers of innovation in the tourism industry. This quickly led to an examination of the CIS and the available CIS data for 2010 for the tourism industry conducted by SN. As I became familiar with the CIS instrument, I also became familiar with the extensive discussions about the instrument and whether, or to what degree, it captures innovation. Despite the discussions, the critiques of the instrument and the fact that the innovation rates were very low in the data set, I decided to use the data for my analysis anyway, which I do in Paper 1. Although the innovation rates were low and perhaps only reflected some of the innovations that had taken place, it might still be possible to identify the drivers of the CIS-reported innovation. I performed statistical analysis that produced results of scientific interest (Paper 1). However, around the same time, I discovered that a CIS-like survey had been conducted for the Norwegian tourism industry some years earlier. This survey used an adjusted version of the CIS in which the innovation rates were quite high. An obvious question to ask was: why did these two surveys show such different results? Could it be because of hidden innovation in the CIS 2010 survey that had low innovation rates? These questions made me even more uncertain around the CIS instrument. Consequently, Paper 2 is a book chapter that discusses the methodological and theoretical reasons that these two surveys could produce rather different results. My work in Papers 1 and 2 substantially affected the course of my subsequent research. After having explored the CIS and its use in Papers 1 and 2, I decided to pursue some of the research issues highlighted in Paper 2. In particular, I wanted to understand better what kind of innovation the CIS captures. The CIS is, after all, a widely used instrument, and my research would help me to understand better the findings of earlier CIS surveys and would have implications for how the CIS could be improved.



In this phase of my research, I qualitatively investigated the type of innovation identified by the CIS and hidden innovation. I started with one qualitative study that later became two papers (Papers 3 and 4), with Paper 4 requiring some additional data gathering. The papers have certain similarities because the work started out as one research project, but Paper 3 ultimately focuses on the methodological reasons that innovation remains hidden for the CIS, while Paper 4 examines hidden innovation and the characteristics of the process of hidden innovation, and suggests four types of hidden innovation. This research highlighted the importance of understanding the innovation process when aiming to measure innovation output. A model illustrating the phases of my PhD is presented in the methodology discussion of Chapter 3, which also describes how the research questions in each of the papers emerged. Two final research questions are posed in Section 1.5.

Through previous research, I gained insights into how the CIS instrument has evolved and been adapted over the years. I discovered that the CIS is a way of implementing the recommendations/guidelines from the “Oslo Manual”. The first version of the Oslo Manual contained guidelines for conducting innovation surveys in manufacturing (OECD, 1992), after which second and third versions extended the recommended measurement so that it is appropriate to use for services innovation (OECD/Eurostat, 1997, 2005). Similarly, different improved versions of the CIS have been used. These improvements are rarely discussed in the literature, where the CIS is referred to as a conventional innovation instrument. It seems that whether these improvements have actually led to the instrument being more reliable and valid has not been discussed or evaluated. Djellal and Gallouj (2000) evaluate some services innovation surveys but only those that existed up to the year 2000. Newer versions of the CIS that are based on newer versions of the Oslo Manual have not been evaluated in relation to measurement of innovation in services. Accordingly, I argue that the history of the Oslo Manual is central to the thesis, which aims to explain how the CIS measures innovation in service industries. Therefore, the next section presents the history of the Oslo Manual and thus provides the basis of the discussions in Chapter 5 about the contribution of the chapter.

To obtain a detailed history of the Oslo Manual, I interviewed Svein Olav Nås from the Research Council of Norway. Svein Olav Nås is the chair of the Working Party of National Experts on Science and Technology Indicators (NESTI), and he has been involved in the development of the Oslo Manual almost since it was first published. I am very thankful that he agreed to talk with me. He provided important insights, which are used in the subsequent section. Svein Olav Nås has additionally commented on parts of this introduction chapter that are related to my discussions with him, to ensure that I did not misinterpret him or write anything with which he disagrees.

### 1.3 The story of the Oslo Manual: Framing hidden innovation

This section investigates the issue of hidden innovation through the story of the Oslo Manual. The story of The Oslo manual is partly inspired by my conversation with Svein Olav Nås but mainly based on information from the Oslo Manual, the Frascati Manual (further explained below) and relevant publications.

The story of the Oslo Manual started with the interest in comparing the R&D efforts made by different countries and identifying the key features that underpin them. In 1963, the OECD met with national experts on R&D statistics at the Villa Falconieri in Frascati, Italy (Manual, 2015). This resulted in the first version of the Frascati Manual, “Guidelines for Collecting and Reporting Data on Research and Experimental Development: The Measurement of Scientific, Technological and Innovation activities”. The Manual (2015) is the seventh edition of the Frascati manual, which has been developed in line with changing economical and geographical contexts. The manual states how R&D is increasingly viewed as an input to innovation in the context of the overall efforts made in a knowledge-based global economy. Throughout the development of the Frascati Manual (now in its seventh edition), it was recognized that R&D is neither a necessary nor the only part of companies’ innovation activities (Svein Olav Nås). Thus, there was a need for an extended innovation instrument involving a more coherent set of concepts and tools. This was the start of a considerable body of work undertaken in the 1980s and 1990s, aimed at developing models and analytical frameworks for studying innovation. This led to the first edition of the Oslo manual, published by the OECD in 1992. The Oslo Manual proposed guidelines for collecting and interpreting technological innovation data (OECD, 1992) and received its name because the meetings took place in Oslo. This manual focuses on the measurement of technological product and process innovation outputs in the manufacturing industry (OECD, 1992) and became the reference for various large-scale surveys examining the nature and impact of innovation in this business sector, including the European Community Innovation Survey (CIS). Results from such surveys have driven further refinements in the Oslo Manual in terms of concepts, definitions and methodology, leading to a second edition published in 1997. The second edition of the Oslo Manual expanded, among other things, the coverage of service sectors (OECD/Eurostat, 1997). This second edition still focused on technological product and process innovation (TPP) but suffered from a problematic definition of the term “technological”, which caused difficulties in interpretation when the guidelines were implemented in surveys (Bloch, 2007). Perhaps it is precisely the focus on the meaning of “technological” and the uncertainty about the concept that led to theoretical discussions about whether the guidelines are really suitable for capturing innovation in service companies and also in low-tech companies (discussions that will be further addressed in the theoretical discussion in Chapter 2). Gradually, innovation surveys that implemented the guidelines moved away from the term “technological”

(Bloch, 2007). One reason was to avoid any misinterpretation. Another was to make surveys less manufacturing oriented (Bloch, 2007). Because of the growing sense that much innovation in service sectors is not adequately captured by the TPP concept and also to recognize the importance of innovation in less R&D-intensive industries and low-tech industries, it was decided to address non-technological innovation in a third edition of the Oslo Manual (OECD/Eurostat, 2005). As Gault (2010) indicates, the first thing to notice about the third edition is the title of the manual—*Oslo Manual: Guidelines for collecting and Interpreting Innovation Data* (OECD/Eurostat, 2005)—and its comparison with the title of the second edition—*Proposed Guidelines for Collecting and Interpreting Technological Innovation Data – Oslo Manual* (OECD/Eurostat, 1997). The words “technological” and “proposed” were removed. The scope of what is considered to be an innovation was expanded to include two new types of innovation: marketing and organizational innovation (OECD/Eurostat, 2005). The focus also shifted from “technological” to “characteristics or intended use” in this edition. In this third edition, innovation is defined as *the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations*. The minimum requirement for an innovation is that the product, process, marketing method or organizational method must be *new (or significantly improved) to the firm* (OECD/Eurostat, 2005). In the foreword of this edition, it is stated that there are, as with other such guidelines, limitations, but each edition of the Oslo Manual continues to develop our understanding of the innovation process. Thus, we can consider the extent of the improvements regarding the identification of innovation in services. Services were included in the second version, and further improvements were made in the third version, but uncertainty exists regarding whether service industries are treated adequately.

The CIS is not identical to the Oslo Manual but is a concrete way of implementing recommendations and guidelines in the manual. Since 1992, the CIS has been the most extensive implementation of the rules in the Oslo Manual (Gault, 2013). All of the CIS questionnaires—CIS 1-4, CIS 2006, CIS 2008, CIS 2010 and CIS 2012—incorporate improvements in measurement consistent with the new editions of the Oslo Manual (<http://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>). Each version of the CIS includes both minor and substantive changes to the questions in an effort to improve data quality or to solve problems with the interpretation of the data (Arundel & Smith, 2013). Until the year 2000, the definition of innovation only focused on product and process innovation in the CIS (consistent with the first and second editions of the Oslo Manual). The CIS 3 released in 2000 included a Section 12 titled “Other important strategical and organizational changes”. This section covered activities that can be related to organizational innovation and marketing innovation. CIS 4 (still based on the second edition of the Oslo Manual) was launched in most co-

untries in 2005, based on the reference period 2004 and the observation period 2002 to 2004 (Götzfried, 2006). This survey was conducted in around 30 European countries plus some non-European countries (Götzfried, 2006). In CIS 4 (2004), the expression “product innovation” was changed to “product (good or service) innovation”, in addition to changing the headline title of the last section to “Organizational and marketing innovation”. The questionnaire and methodology from CIS 4 (2004) to CIS 2006 was unchanged, probably to allow comparability between the two surveys. CIS 2008 is thus the first CIS survey that implements the new guidelines in the third edition of the Oslo Manual. “Organizational and marketing innovation” (as one section) is split into two sections: “Organizational innovation” and “Marketing innovation”. These sections are left to the end of the questionnaire, and as Gault (2013) states, they are not yet developed to the same degree as information on product and process innovation in the CIS. All four innovation types are measured using several items.

CIS 2008, CIS 2010, CIS 2012 and CIS 2014 are all based on the third edition of the Oslo Manual, and the changes in these questionnaires are minimal. These small changes, however, show that there is ongoing improvement and testing of the questionnaire. This is evident by comparing the introduction pages in CIS 2008, 2010 and 2012, where the survey aims and the definition of innovation are presented. Small adjustments were made to the introduction. In CIS 2010 and CIS 2012, under the heading “product innovation” information was added about the difference between a **good** and a **service**: a **good** is usually a tangible object such as a smartphone, furniture or packaged software, but downloadable software, music and film are also goods. A **service** is usually intangible, such as retailing, insurance, educational courses, air travel, consulting, etc. These lines do not appear in the Norwegian CIS 2010, showing how different countries adjust their national CIS questionnaires. There is also a final module after the marketing innovation module in each version of the CIS, a supplementary module that differs from survey to survey. CIS 2008 addresses innovations with environmental benefits. CIS 2010 addresses creativity and skills. CIS 2012 addresses public sector procurement and innovation in addition to strategies and obstacles for reaching your enterprise’s goals. Of all the new versions of the CIS based on the third edition of the Oslo Manual, this PhD thesis uses the Norwegian version of the CIS 2010 questionnaire and also the supplementary module on creativity and skills. Paper 1 uses CIS 2010 data from SN. Paper 2 compares two surveys: one is the SN’s CIS 2010, and the other is an adjusted version of the CIS instrument. Papers 3 and 4 are based on the qualitative studies that investigate the Norwegian version of CIS 2010. Thus, both the English and Norwegian versions of CIS 2010 are examined in this thesis (see appendix).

When SN conducts CIS surveys, they engage with the management/administrative level of the companies (the senior level of the company). After stating the aim of the survey,

SN recommends that the survey should be answered by someone with overall knowledge of the enterprise's activities, including long-term strategy and planning. The survey is answered through Altinn,<sup>1</sup> and before answering, the company is given some general information about the observation period, what is meant by the term "innovation", innovation types and where to print a version of the questionnaire for drafting.

It is especially interesting to evaluate the use of more recent versions of the CIS, because the services innovation literature lacks evaluation of these. Djellal and Gallouj (2000) evaluate in detail the conducting of services innovation surveys up to the year 2000, and they categorize CIS2 in the group of subordinate surveys (assimilation approach). As mentioned, there have been several newer versions since CIS2, and it has not been discussed in the literature whether the newer versions should still be categorized as adhering to the assimilation approach. As mentioned, I focus on CIS2010 in this thesis.

Svein Olav Nås describes how the work on a fourth edition of the Oslo Manual has been occurring over the last two years and is expected to be finalized in December 2017 and released mid-2018. He was unable to provide me with details about the content, but a main issue is to make the concept of innovation applicable to all sectors, which may indicate that the third version does not adequately meet requirements for including services. Nås also mentions that the methodological requirements are being prioritized to produce data that are as comparable as possible across countries and industries, and to allow different uses of the data, such as time series analysis at the micro (firm) level. It will be interesting to see whether the improvements and revisions in the guidelines can be linked to the findings in this dissertation. At the same time, the findings in the dissertation may provide insights that provide a better basis for meeting the most critical issues when the Oslo Manual's fourth edition is used in new versions of the CIS and similar surveys, at least for services and tourism.

The next section provides insights into the contextual issues of the thesis.

## 1.4 Tourism as the service-context

Research on services innovation is still a young field that requires more research (Gallouj & Djellal, 2011). Moreover, the literature calls for more innovation research in the tourism sector (Alsos, Eide, & Madsen, 2014a; Hjalager, 2010). Tourism companies operate in a competitive sector where innovation is often a condition for survival (Jon Sundbo, Orfila-Sintes, & Sørensen, 2007). Therefore, it is believed that innovation is frequently carried out in the industry, even though surveys may show innovation rates that are too low. Accordingly, we should examine what kinds of innovations are not

<sup>1</sup> Altinn is a web portal for electronic dialogue between the business/industry sector, citizens and government agencies. Altinn is also a technical platform that the public sector can use to produce digital services.

captured by CIS. In other words, the survey probably needs to be improved to carry out adequate and valid quantitative research on tourism innovation.

Tourism businesses belong to the service sector (Alsos, Eide, & Madsen, 2014b; Rønningen & Slåtten, 2012; Wilhelmsen & Foyn, 2012). Accordingly, some knowledge should be relevant to other related service trades with characteristics similar to those of tourism; e.g., many small business, close interaction with customers, weak links to R&D, low use of R&D and strong elements of experience-based knowledge (Alsos et al., 2014a). Accordingly, research in the tourism context may generate knowledge for the services innovation literature in a broader sense. Further on in the thesis when the term services innovation is used, it is meant more specific this relevant category of service business.

The CIS and the Oslo Manual have been criticized for focusing primarily on R&D and technology, resulting in less attention being given to other kinds and sources of knowledge, and other kinds of technology than hardware or advanced hi-tech (this is further explained in the theoretical framework). Tourism companies, however, rarely have R&D departments or other dedicated resources for innovation (Hjalager, 2010; Wilhelmsen & Foyn, 2012), although the industry is regarded as innovative (Hjalager, 2010). This points to a possible mismatch when aiming to measure and capture innovation in the industry with a CIS instrument. This seems to be consistent with the argument of Camisón and Monfort-Mir (2012): low official rates of technological innovation in the tourism industry can be explained by the existence of hidden innovations. Thus, the industry seems to be an interesting case for investigating whether, or to what degree, today's CIS instrument captures services innovations implemented in the industry, and how the measurement can eventually be improved to identify innovations in those service trades.

## 1.5 The overall goal and research questions

As stated in the introduction, the overall aim of this thesis is to understand the degree to which the CIS can be used to measure innovation in services, and whether the CIS can be improved to be a better instrument for measuring innovation in services in the future. Specifically, the recent versions of the CIS based on the third version of the Oslo Manual, the CIS 2010, are the focus of this thesis. Each of the four appended papers contributes to addressing the overall aim, and in the synopsis, I summarize and compile the findings from the four papers and discuss the implications for the CIS 2010.

Good operationalization and measurement of concepts is about reflecting all aspects of the theoretical definition/characteristics of a concept. Services innovation as a concept includes both the **output** and the **process** through which output is achieved

(Engen, 2016; Toivonen, Tuominen, & Brax, 2007). Thus, the synopsis seeks to discuss whether both output and process are acknowledged in the CIS 2010 measure.

For instance, in the Oslo Manual, there are several statements underlining the importance of innovation as a process, such as: “innovation is a continuous process” (OECD/Eurostat, 2005, p. 15), “innovation activity in services also tends to be a continuous process (OECD/Eurostat, 2005, p. 38) and “innovation is a continuous process and therefore difficult to measure” (OECD/Eurostat, 2005, p. 40). However, despite 163 pages of guidelines, it seems that the manual fails to relate a process understanding of services innovation to discussions of the measurement of the final innovation output, at least as I see it, which may lead to hidden innovation. The CIS operationalization focuses on measuring a **final innovation output** that can be a product innovation (good or service), a process innovation, an organizational innovation or a market innovation (see Section 1.3 and the extension in Chapter 2). Contrary to the acknowledgement of innovation output, it is not clear whether the **process** is acknowledged in CIS measurement. Better acknowledgement of the services innovation process might lead to a measure that captures more of the hidden innovation.

Therefore, the thesis investigates the processes behind the innovation output that the CIS seeks to measure in order to identify hidden innovations. I argue that characterizing CIS-reported innovation processes as well as hidden innovation processes may provide useful insights for evaluating the CIS.

Accordingly, the first research question for the synopsis addresses the theoretical findings in the thesis.

### **Research Question 1**

*How can the process of (1) a CIS measured innovation and (2) a hidden services innovation be characterized, from the initial idea to the services innovation output?*

This means that while earlier services innovation studies often took either an output perspective on innovation (as in CIS studies) or a process perspective on services innovation (addressed in Section 2.3), this thesis combines the output perspective (the CIS) and process perspective on services innovation, and relates this combination to discussing the CIS measurement of services innovation. Moreover, the Oslo Manual suggests supplementing measurement of distinct activities undertaken with the intention of accomplishing the process of innovation. Because some findings in the papers relate to such activities, called drivers or triggers to innovation in this thesis, the discussion will also focus on how the process of services innovation is driven or triggered, and whether this can be reflected in additional items in CIS surveys.

Answering this first research question will provide a better understanding of the overall

aim the degree to which the CIS can be used to measure innovation in services. Moreover, this insight has some methodological implications addressed in the second and last research question in the thesis.

## **Research Question 2**

*How can the CIS measure be improved?*

These are the two overall research questions that the contribution chapter (Chapter 5) seeks to discuss and answer. This also means that the contribution of this thesis is twofold: one aspect is theoretical (research question 1), and the other is methodological (research question 2) (see also Chapter 5). Each of the four papers has, in addition, its own (underlying) research questions (explained in the methodology discussion of Chapter 3).

## **1.6 The structure of the thesis**

The thesis consists of two parts: Part 1, the synopsis, which includes five chapters, and part 2, the four appended papers and appendix (the CIS 2010 questionnaire English and Norwegian version).

This first chapter of the synopsis introduces the reader to the broad topics of the thesis and the central knowledge gap that the thesis seeks to address. The PhD process is also addressed in the introduction, in addition to the focus of the four papers. Last, is the two main research questions presented.

Chapter 2 presents the theoretical perspectives for the thesis. First, in Section 2.1, definitions of innovation and the characteristics of services innovation are presented. This is done because theoretical definitions are the basis for the operationalization or development of quantitative measurements of a concept, and this is relevant to the CIS. Thus, in order to evaluate and discuss the CIS, it is crucial, as I see it, to relate the discussion to definitions of the concept and also the characteristics of the concept. Next, in Section 2.2, the theoretical background is presented and linked to the development of the CIS and the Oslo Manual. Sections 2.1 and 2.2, as well as the introduction, explain why it may be useful to relate measurement of services innovation to process perspectives on services innovation. Finally, Section 2.3 provides a review of the services innovation processes literature. In some sense, this section provides the analytical framework of the thesis.

Chapter 3 describes the dissertation's scientific perspectives, research design, methodology and empirical basis. This chapter offers a detailed description of all the steps conducted in the thesis research. Chapter 4 presents summaries of the four appended papers, and Chapter 5 presents a discussion of how the findings of the individual papers contri-



---

bute to answering the two main research questions presented in Section 1.5.



## 2. Theoretical perspectives

This chapter presents the theoretical perspectives relevant for the thesis.

Quantitative instruments designed to measure services innovation, such as the CIS, need a clear definition of services innovation as a basis for a good working operationalization of the concept. Thus, it is relevant to examine the definition of the concept and how it is operationalized. Section 2.1 addresses definitions of innovation. Section 2.2 presents the theoretical background and reviews two streams of theoretical discussions that are closely related to the history of the Oslo Manual and the CIS. Sections 2.1 and 2.2 also suggest the need for relating process perspectives on services innovation to measurement of the concept. Section 2.3 addresses different process perspectives on services innovation. The process perspectives are also addressed in Paper 4, although the literature review in the synopsis is broadened significantly. Finally, Section 2.4 summarizes the knowledge gaps that the thesis addresses.

### 2.1 Definition of innovation and characteristics of services innovation

This section starts by considering the central elements included in many definitions of innovation and how the Oslo Manual and the CIS incorporate these. Additionally, it shows how the Oslo Manual and the CIS focus on innovation as an outcome. Then, it examines how parts of the services innovation literature emphasize the services innovation process, which is done to underline the importance of shedding light on the question of whether the process as well as the outcome is acknowledged in the CIS 2010 measurement. A basic thought for the Oslo Manual and the CIS—and thus also for this thesis—is that innovation can be defined generally, and the definition can be operationalized and applied to innovation research in both manufacturing and services. This means, that if innovation in manufacturing typically is characterized by technological development and services innovation has specific peculiarities, both aspects should be acknowledged in a measurement. There should not be an excessive concern with some characteristics over others.

I start by introducing some classic definitions of the general concept of innovation.

Innovation is more than invention. Invention is the first occurrence of a new idea, while innovation is the first attempt to carry it out in practice (Fagerberg, 2005). Both invention and new ideas reflect an aspect of newness, which is met in almost every definition of innovation. To make it possible to develop the new idea further into an innovation, a company normally needs to combine several different types of knowledge, capabilities, skills and resources (Fagerberg, 2005) corresponding to the broad definition of Schumpeter (1934) that innovation is carrying out “new combinations”. Lundvall (1992a) credits the expression “new combinations” as being illuminating because almost all innovations reflect existing knowledge combined in new ways. This means that the term “new” accepts or includes new combinations of already existing resources. Consequently, many theories of innovation refer back to Schumpeter (Jon Sundbo & Fuglsang, 2002). To “carry out in practice” is synonymous to implementation also common in definitions of innovation. De Jong and Vermeulen (2003) refer to many definitions including the development and implementation of something new. Moreover, “put into practice” is used synonymously with “implementation” and “carrying out in practice” (Toivonen & Tuominen, 2009).

Innovation may also be described as an “output” or a specific “type” of innovation. Following Schumpeter, there is a distinction between five types of innovation: (1) the introduction of a new good (new to the market) or a new quality of a good; (2) the introduction of a new method of production; (3) the opening of a new market; (4) the conquest of a new source of supply of raw material or half-manufactured goods and (5) the carrying out of a new organization (Schumpeter, 1934, p. 66). Multiple research studies are based in some sense on this categorization of innovation, but with different nuances of use (Engen, 2016). The Oslo Manual and the CIS represent one example of using Schumpeter’s categorization with some adjustments.

“An Innovation is the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relationships.”  
Oslo Manual: (OECD/Eurostat, 2005)

Comparing the Oslo Manual’s definition to the above review, we see that the two central elements of many definitions of innovation are included: something new (which can also be new combinations of already existing resources) and implementation. Additionally, the definition in the Oslo Manual focuses on the innovation as an output that belongs to one of four output types: product innovation, process innovation, marketing innovation and organizational innovation. These output types are used in the implementation and operationalization of CIS 2010 (see appendix CIS 2010). The four types are operationalized using multiple questions about each innovation type. It is clear how output is acknowledged in both the definition and operationalization. The focus of this

thesis is to discuss whether the process is also acknowledged. Thus, the next part seeks to show how part of the service innovation literature emphasizes services innovation as a process.

Services innovation often involves incremental changes in processes and procedures (Carvalho, 2008; De Jong & Vermeulen, 2003; J Sundbo & Gallouj, 1999), and services innovation is rarely radical but is normally a more practical process (J Sundbo & Gallouj, 1999). Additionally, the services innovation process is described as an interactive process (Fuglsang, 2008; Jon Sundbo & Gallouj, 2000) that includes interaction with customers. Moreover, it is a complex process related to delivering services (Jon Sundbo, 2008), a process in which innovation is often integrated, which means that there are product, process, organizational, delivery and market renewals at the same time. The innovation types are much more intertwined than in manufacturing (Eide & Mossberg, 2013; Tether, 2005), which is problematic if a measure aims to measure a specific output type. Van Ark, Broersma, and den Hertog (2003) define services innovation as multidimensional and argue that compared with, for example, manufacturing, services innovation is characterized by much more emphasis on the organizational dimension of innovation relative to the technological options, in line with Tether (2005) and Tether and Tajar (2008). The emphasis on the services innovation process in the literature is followed by studies on process perspectives on services innovation (Alam & Perry, 2002; Fuglsang, 2008; Toivonen, 2010; Toivonen et al., 2007), which are addressed in Section 2.3 on services innovation processes.

This section also illustrates that the concept of innovation is broad and complex. Even though most definitions include the element of something new and the implementation of it, it is shown how some definitions emphasize some dimensions over others; for example, output and the process. What is emphasized or in focus affects again the approach to how innovation is investigated, which probably explains the growing number of different approaches to innovation research. We have seen in the introduction how the CIS in the early years was criticized for having a strong focus on technological characteristics compared with characteristics more specific to services. In Section 2.2, I present two different discussions in the innovation literature that reflect a disagreement regarding how to conduct research on innovation. The first is called the high-tech/low-tech discussion, which is primarily included to show how the issue of hidden innovation has a much broader scope than just the services innovation literature. The second discussion is the manufacturing/service discussion rooted in the services innovation literature, which is the discussion in which this thesis is rooted and to which it responds. These discussions seem to have started from disagreements about what to emphasize concerning the innovation phenomenon. Both discussions can be related to the development of the Oslo Manual and the CIS.

## 2.2 Theoretical background

### 2.2.1 *The high-tech/low-tech discussion*

Serin and Hansen (1997) were among the first to address how innovation processes in low-tech companies are more invisible and hidden. A debate exists about why low-tech innovation patterns diverge from high-tech innovation patterns (Heidenreich, 2009; Kirner et al., 2009; Santamaría et al., 2009). This debate has developed from the criticism of “high-tech myopia”; i.e., the idea that economic growth and employment are mainly the result of research-intensive industries (Heidenreich, 2009; Von Tunzelmann & Acha, 2005). This high-tech myopia tendency may be the one that appears in the first versions of the Oslo Manual, with the main focus on R&D and technological innovation. However, already in the 18th century, Adam Smith was aware of diversity in the sources of technical change and of its dynamic nature (Pavitt, 1984; Smith, 1827). Many elements of Smith’s work are again reflected in the work of Pavitt (1984), who describes and explains three sectorial patterns of technical change: (1) supplier dominated, (2) production intensive and (3) science based. The first of these refers generally to small firms with weak R&D and engineering capabilities and focus less on technological advantages. It is on the basis of classical studies such as these that the “high-tech myopia” and the Oslo Manual are heavily criticized. For example, Santamaría et al. (2009) and Serin and Hansen (1997) agree that studies of innovation have been overly concerned with the role of R&D activities. Santamaría et al. (2009) show how R&D is just one of many innovation determinants. They indicate design as another determinant; likewise, Serin and Hansen (1997) and Pavitt (1984) address design innovations as relying on resources in the firm other than the traditional process of innovation based on R&D.

The discussion above emphasizes that innovation can take place without R&D, which revisions of the Oslo Manual seem to show recognition of by broadening the innovation concept (see Chapter 1). Other ways to bring about innovation include, for example, acquisition of tacit and practical knowledge (Heidenreich, 2009). Knowledge developed by the firm in the form of learning processes are products of its own organizational structure and capabilities (Serin & Hansen, 1997). These processes are often referred to as incremental (Hirsch-Kreinsen, 2008), non-linear, complex, collaborative multilevel processes (Lundvall, 1992b) and are contrary to the classical linear understanding of the innovation process, where R&D plays the leading role (Kirner et al., 2009).

This means that the debate on low-tech innovations involves an attempt to include innovation processes that are rather practical and experience based, and often entail implicit knowledge (Heidenreich, 2009). Jensen et al. (2007) address this by identifying two ideal modes of learning and innovation. One mode is based on the production and use of codified scientific and technological knowledge, the science, technology and innovation

(STI) mode of innovation. The other mode is an experienced mode of learning based on doing, using and interacting: the DUI mode. As Jensen et al. (2007) mention, there is already an important body of empirical and historical work showing that both modes of learning and innovation play a role in most sectors. However, the role is different depending on context as well as strategy (Jensen et al., 2007; Pavitt, 1984; Rosenberg, 1982; Rothwell, 1977; Von Hippel, 1976).

The STI mode of innovation refers to the way that firms use and further develop the body of science and technology-like understanding in the context of their innovative activities (Jensen et al., 2007). The major source of the development of this knowledge is R&D departments or research institutes. R&D activities and collaborations among scientists often occur within universities and research institutes, which are used as indicators of the STI mode in quantitative studies. This is the case in, for example, Jensen et al. (2007).

The DUI mode of innovation is also crucial to successful innovation. The DUI mode is acquired for the most part on the job as employees face ongoing changes that confront them with new problems (Jensen et al., 2007). Employees work on finding solutions to such problems and thus enhance their skills and extend their repertoires. They learn by doing and using in their work situation, and often this also involves interaction within and between teams. The DUI mode of knowledge is often tacit and locally developed and may be unintended in the beginning. However, the mode can be intentionally fostered by building structures and relationships that enhance and utilize learning by doing, using and interacting (Jensen et al., 2007). For example, Serin and Hansen (1997) point out that especially in small low-tech firms, the “practical man” and his “tacit knowledge” play a central role in innovation processes.

A body of literature has applied the STI/DUI thinking to innovation research (Apanasovich, 2014; Aslesen, Isaksen, & Karlsen, 2012; Fitjar & Rodríguez-Pose, 2013; González-Pernía, Parrilli, & Peña-Legazkue, 2015; González-Pernía, Parrilli, & Peña, 2012; Isaksen & Karlsen, 2012a, 2012b; Isaksen & Nilsson, 2013; Nunes, Lopes, & Dias, 2013; Parrilli & Elola, 2012). Parts of the literature address how the most successful firms are those employing the STI+DUI mode of innovation (Isaksen & Nilsson, 2013; Nunes et al., 2013). According to Jensen et al. (2007), conventional innovation instruments such as the CIS are closely related to STI-mode innovation, while they address a possible bias related to whether DUI-mode innovations are reflected in such instruments.

The criticism and scepticism associated with excessive concern about R&D and technology in innovation research go far beyond the services innovation literature. The concern is that the measurement of innovation is too focused on R&D and technology. The de-

bates reflect a concern about whether other variants/modes/types of innovation do not get the attention that they deserve. The debates above may represent some of the reasons for developing new versions of the Oslo Manual as well as corresponding debates in the service innovation literature. The next chapter addresses a similar discussion in the services innovation literature that is related to the question of whether service innovation remains hidden in CIS surveys. This discussion is the one that this thesis responds to.

### *2.2.2 The manufacturing/service discussion*

The scepticism about instruments such as the CIS is evident in the development of the different approaches to services innovation research. In the early services innovation research between 1960 and 1970, some studies examined innovation in medical services, psychiatry and welfare services (Coleman, Katz, & Menzel, 1966; Ford & Reed, 1969; Riessman & Hallowitz, 1967). These were followed by services studies examining innovation in banking services between 1970 and 1980 (Adcock Jr, Hirschman, & Goldstucker, 1977; Safeena & Date, 1970). Then in 1986, Barras presented a services innovation publication that was more ambitious in a theoretical sense, titled “Toward a theory of services innovation” (Barras, 1986; Jon Sundbo & Gallouj, 2000). This may have prompted the series of services innovation publications since the late 1980s/early 1990s. This means that services innovation research is quite young compared with innovation research in manufacturing. Research on innovation in tourism services is even younger. Tourism innovation publications have been appearing since the late 1990s (Hjalager, 2010). The following explains the different approaches to services innovation research.

#### **Assimilation approach**

Until recently, efforts to explore innovation in services have been undertaken in two contrasting traditions. The first tradition is the “assimilation approach” (Coombs & Miles, 2000), which assumes that services, and innovation in services, are fundamentally similar to manufacturing and innovation in manufacturing (Tether, 2005). This approach is based on the use of the same definition of innovation in manufacturing and services. This approach is the oldest and the most dominant in terms of the number of contributions. It considers innovation in services as strictly represented by technology-related changes in products (Gallouj & Savona, 2008).

The argument for using this approach is that innovation in services is often driven primarily by the adoption of technologies and capital equipment, with non-technological innovations being marginal. The technological dimension of innovation in services emerged relatively recently with the diffusion of information communication technologies (ICTs) (Djellal, Francoz, Gallouj, Gallouj, & Jacquin, 2003; Gallouj & Savona, 2008).



Using this approach, services and innovation in services can be studied by utilizing or adapting the concepts and tools developed for studying innovation in manufacturing (Tether, 2005), likewise the Oslo Manual do. Something that probably is the reason that the CIS and the Oslo Manual are mostly referred to as belonging to the assimilation approach. The assimilation approach is associated with the still widely held “traditional or conventional view” of services, which is that they are relatively unprogressive, with restricted capacities for change, especially from within (Tether, 2005). Because of the material nature of a product in manufacturing (a good), the limits between each dimension of innovation are relatively clear. The nature of service products is more complex, and characteristics can be material, immaterial, interactive and co-productive. Scholars disagree about whether it is possible to distinguish between product, process and organizational innovations in services business. As mentioned in Section 2.1, the services innovation literature address the intertwining of innovation types (Eide & Mossberg, 2013; Gallouj & Savona, 2008) and questions the operationalization by type.

When the CIS is assumed to belong to the assimilation approach, the substantial revisions that the Oslo Manual has gone through and how these are implemented in the CIS are often not taken into account. The CIS did indeed in the beginning belong to the assimilation approach, but there is now doubt about whether it still does.

### **Demarcation approach**

The second approach to services innovation research is the “demarcation approach” (Coombs & Miles, 2000; Tether, 2005). From this perspective, it is argued that innovation in services and services output has intrinsic characteristics of being immaterial, interactive, co-productive and processual (see also Section 2.1). In particular, the interactive and dynamic characteristics of services outputs make the traditional analytical categories of innovation—product, process and organizational innovation—inadequate and also possible reductive, and they are not easily separable when dealing with services (Gallouj & Savona, 2008).

Because services outputs tend not to have an independent physical existence, changes and services innovation can be invisible and will therefore be difficult to address and record. Services can also be difficult to reproduce consistently or exactly time after time, which makes the nature of services more flexible and adaptable. Services firms often constantly adapt and reform their activities to provide solutions to changing and differentiated customer requirements. Furthermore, the co-production of services, where the provider and client work closely together to produce the outcome, complicates identification of innovation. The origin and attribution of any innovation may be difficult to determine.

A number of researchers examine the demarcation approach (Djellal & Gallouj, 2000;

Gadrey & Gallouj, 1998; Gallouj & Weinstein, 1997; Jon Sundbo & Gallouj, 2000). Overall, demarcation researchers argue that by failing to recognize the specificities and characteristics of services and their innovation activities, mainstream economic and innovation studies have overlooked both the important contributions of services to manufacturing and some of the most important dimensions of innovation behaviour within service firms themselves (Tether, 2005). Under the demarcation approach, services and innovation in services are far from standard activities but are instead dynamic and interactive, constantly changing to meet customer needs.

### **Integrative/Synthesis approach**

Among scholars (Djellal & Gallouj, 2000; Gadrey & Gallouj, 1998; Gallouj & Savona, 2008; Gallouj & Weinstein, 1997; Mattsson, Sundbo, & Fussing-Jensen, 2005), it is argued that the assimilation approach underestimates the variety of non-technological dimensions of innovation in services. In the demarcation approach, there is a main focus on immaterial, interactive and co-productive features. In today's economy, the boundaries between goods and services become more blurred. Immaterial components of goods have become more important, and technology such as IKT should not be ignored in service industries. Service functions are spread all over the economy, and services innovations are relevant, although to different degrees, in all industries (Hertog & Bilderbeek, 1999). A synthesis that encompasses both aspects is becoming more necessary.

Recently, a third approach to understanding innovation in services has arisen. The third perspective is called the "integrative approach" (Gallouj & Savona, 2008) or the "synthesis approach" (Coombs & Miles, 2000). This approach covers both goods and services innovation (Gallouj & Weinstein, 1997) and makes it possible to compare innovation between industries in a more powerful way. This approach is still in a very early stage of development. Drejer (2004) argues that many of the claimed peculiarities of services innovation, such as the strong presence of organizational innovation and the involvement of multiple actors in the process of innovation, also apply to manufacturing. Drejer (2004) suggests that the assimilation approach is too narrow for manufacturing as well and also highlights the need for more integrative approaches. Gallouj and Weinstein (1997) suggest the characteristic-based approach as an integrative approach to services innovation research (see Paper 2 for further explanation).

Looking back at the introduction, it seems that the CIS with its development and improvements has moved towards a more integrative approach. In some sense, this thesis examines how far this approach has been developed by considering the degree to which services innovation is measured by the CIS in the specific services context of tourism. For example, as Djellal and Gallouj (2000) suggest, the debate that took place prior to the revision of the Oslo Manual in 1996 opened a number of new and very fruitful paths of research, both services oriented and integrative in scope (Djellal & Gallouj,

2000). However, these new paths were not then taken into account in revising the Oslo Manual in 1996 (Djellal & Gallouj, 2000). The question is whether a more integrative approach is reflected in the third version of the Oslo Manual and its implementation in CIS 2010. The debates above reflect a criticism of the CIS, which raises the question of whether there are innovations not captured by the CIS (hidden innovation) or whether the CIS already has been developed into a more integrative instrument.

Toivonen (2010) indicates the three approaches—assimilation, demarcation and integration—as lacking a more specific focus on the services innovation process. She states that “all three approaches have increased and structured our understanding of services innovation in a valuable way—each from a different angle”. However, none of them has attempted to describe the services innovation processes at a detailed level (Toivonen, 2010), something that she addresses in her publication. What I seek to do in my thesis more specifically is to go one step further and to link process knowledge about services innovation back to the approaches (more precisely, to the CIS). I do this by examining whether the CIS measurement of innovation acknowledges the process dimension of services innovations.

Accordingly, the next section addresses process perspectives on services innovation.

## **2.3 Services innovation processes**

This section reviews the literature on services innovation processes and suggests why these perspectives may be relevant for measurement of the concept. Services innovation processes have not yet been given much attention in the literature. To explain the scope of services innovation processes, I find that the clearest perspectives in the literature belong to the opposite ends of a scale. At one end are the strategic stage-wise services innovations, explained in Section 2.3.1, and at the other end are the practice-based services innovation processes explained in Section 2.3.2. These two main perspectives are reviewed first. Next, Section 2.3.3 refers to recent research on services innovation processes that emerged as intermediate to the above perspectives. Section 2.3.4 explains how these process perspectives may be relevant for measurement of innovation in services.

### *2.3.1 Strategic stage-wise services innovation processes*

The strategic linear services innovation perspective is referred to as the model transferred from manufacturing to services (Toivonen, 2010), also referred to as the R&D model. Studies have shown how this is rare in services (Jon Sundbo & Gallouj, 2000) and therefore has largely been rejected within the services innovation literature. However, the stage-wise thinking that is present in the linear model has been adopted to an independent processes perspective on services innovation, as reflected in the following publications:

(Alam & Perry, 2002; De Brentani, 1991; Edvardsson, Haglund, & Mattsson, 1995; Edvardsson & Olsson, 1996; Scheuing & Johnson, 1989). This research stream views innovation as a strategically managed task that to a large extent implies that activities need to be pre-planned and formalized, managed and controlled, and to evolve through some main stages (Engen, 2016). Moreover, these processes are referred to as a project separated from service practice (Toivonen, 2010), a process that is planned with a clear objective. In this category, researchers have transferred the basic idea of new product development (NPD) to services under the corresponding concept of new service development (NSD). Adopted from the manufacturing context, this perspective implies models analysing services innovation processes as formal and planned processes. Among some of the NSD studies are the following: (Alam & Perry, 2002; De Brentani, 1991; Edvardsson et al., 1995; Edvardsson & Olsson, 1996; Scheuing & Johnson, 1989). Common to all of these studies is stage-wise thinking. Even though Edvardsson et al. (1995) refer to overlapping phases, Scheuing and Johnson (1989) refer to sequential stages and (Alam & Perry, 2002) refer to a linear stage-wise model versus a parallel stage-wise model, they all focus on stages. Although adopted from manufacturing, the new service development process is still described by De Brentani (1991) as being more complex than that of products.

As NSD relies on a strategic and management-led process, the idea is primarily discussed within a top-down perspective (Engen, 2016), a perspective where the top managers or decision makers are seen at the forefront of the process. It is often comprehensive innovations that are related to this perspective, as the empirics in Alam and Perry (2002) show. They use multinational companies introducing either new-to-the-world services innovation, new service lines or line extensions.

With management at the forefront, this perspective contrasts with the other main perspectives that will be discussed in Section 2.3.2. Because of good pre-planning, multiple stages and management involvement, this process is time and resource consuming. The specific term “innovation” has only been used in some NSD studies and has been discussed only briefly (Toivonen, 2010). The NSD studies refer mainly to new service processes, and thus innovation, in the form of a new service (product innovation, when referring to innovation in the Oslo Manual). Some NSD studies refer to other dimensions such as development of the service system (resource structure) and development of the service process (Edvardsson & Olsson, 1996).

As these processes often are very clear and visible in addition to being management led (the top level of the organization is somehow involved), these processes are considered to be easily reported in CIS surveys.

### 2.3.2 *Practice-based services innovation processes*

As mentioned in the introduction to Section 2.3, this perspective represents a perspective opposite to the one presented in Section 2.3.1 (the strategic stage-wise perspective). While the strategic stage-wise services innovation process relies on pre-planned activities, primarily initiated by management, the practice-based process, on the other hand, has a bottom-up approach, meaning that it relies on activities initiated from different work practices within the organization (Engen, 2016). In this perspective, the innovation process does not start from a deliberate aim to create new solutions as in the strategic stage-wise process (Toivonen, 2010). The practice-based innovation process has a less deliberated starting point in the work practice.

Gallowj and Weinstein (1997) was one of the earliest studies to find that the services innovation process can also start in the services practice. Examples of services innovation processes rooted in practice are: ad hoc innovation (Gallowj & Weinstein, 1997), a posteriori recognition of innovation (Gallowj, 2002; Toivonen et al., 2007) and bricolage innovation (Fuglsang, 2010). Gallowj and Weinstein (1997) describe ad hoc innovation as a solution to a particular problem posed by a given client. A Posteriori innovation refers to an innovation process that continues subconsciously for a short or long period; the tacit idea included in practical operations is recognized afterwards (Toivonen, 2010). The last mentioned example, bricolage, is innovation implying, for example, a service put together during delivery following a do-it-yourself principle (Fuglsang, 2010), where employees use resources at hand. The bricolage innovation is an emergent rather than an intentional activity (Fuglsang, 2010).

As shown, there is a broad stream of research on practice-based innovation processes. These innovations are often small and incremental innovations. This is emphasized, for example, by being unintentional and hence also difficult to distinguish from pure change (Fuglsang, 2010). This is strongly opposite to the strategic stage-wise processes that are more likely to be associated with comprehensive innovations.

The nature and size of the practice-based innovation processes make them mainly beyond the requirements of being an innovation as defined in the Oslo Manual and the CIS. The Oslo Manual and the CIS use the terms “new” and “significant” improvements. If innovations are difficult to distinguish from change in general, have a less deliberated aim and, for example, can be innovations related to employees’ daily practice involving the use of resources at hand, these are probably not innovations that are possible to capture in a survey directed at the top level of a company.

Because of the difference between the two streams of innovation processes, in terms of both the size of the innovation and the execution of the process, I ask, are there intermediate processes—for example, intentional processes partly rooted in practice, stage-wise

processes not necessarily top management-driven, or other variants that fall more in between? If strategic stage-wise innovations appear to be easy to capture in a CIS survey, while the practice-based innovations are not in the scope of the Oslo Manuals guidelines, it seems that if there are hidden innovations, they may follow another variant of processes in between the stage-wise and the practice based. Thus, this points to the need for more knowledge about services innovation processes that fall between the two ends of the scale. Therefore, the next section focuses on services innovation processes as such a variant.

### *2.3.3 Services innovation processes in between stage-wise and practice-based innovations—accelerated processes*

Research on services innovation processes located between the stage-wise and practice-based processes is limited.

Rapidly developing industries require competitive organizations with the ability to act, to change and to innovate quickly. A study on product development in large computer companies identified two ways that such organizations can achieve rapid adaptation through product innovation (Eisenhardt & Tabrizi, 1995). The two ways to accelerate the product development process are the compression model and the experimental model. The compression model assumes a well-known rational process (the stage-wise process) and relies on compressing the sequential steps in such a process (Eisenhardt & Tabrizi, 1995). The experiential model assumes an uncertain process and relies on improvisation, real-time experiences and flexibility, a process that merges planning and execution. Moorman and Miner (1998) address what they call a general phenomenon of organizational improvisation, in which planning and implementation are converged. They argue that it can be an effective choice when a firm faces environmental turbulence that requires action in a short time frame (Moorman & Miner, 1998). The time framing point corresponds to the main argument of Eisenhardt and Tabrizi (1995).

One study in the service innovation literature considers such an alternative services innovation process, the model of rapid application. Toivonen (2010) suggests the process model of rapid application for services innovation based on the above literature. None of the publications above discusses the accelerated process theories in a services innovation context, as in Toivonen (2010). She concludes that some services innovations follow a process, where an idea goes hand-in-hand with planning and implementation. The main part of the innovation process is integrated in services practice and is a process that merges planning and implementation. Thus, the innovation process also occurs more locally, among the people involved in the process. This may be at, for example, the department level. All the authors mentioned above, including Toivonen (2010), describe accelerated processes as deliberated strategies, a central point that differentiates the mo-

del of rapid application from the practice-based process perspective. Toivonen (2010) also refers to Engwall, Magnusson, Marshall, Olin, and Sandberg (2001), who indicate systematization and planning as having little relevance in certain processes. Engwall et al. (2001) argue that constructing a plan for something that is not well known and that involves abundant tacit knowledge is not a reasonable approach. Much more effective is a strategy that enables the creation of shared experiences of the object to be developed (Engwall et al., 2001; Toivonen, 2010), which in a services innovation context would be the process of a rapid application. The suggested model of rapid application is, as far as I know, the first services innovation process suggested and empirically identified that can be placed in between the two extreme types of services innovation processes, the stage-wise model and the practice-based model. The focus on revealing more variants of accelerated services innovation processes still seems to be young. There might be, for example, more variants or executions of services innovation that are accelerated (happen over a shorter period) than only the model of rapid application. As explained earlier, hidden innovation processes might fall between the two main streams; therefore, it is possible that examining hidden innovation will reveal more types of accelerated services innovation processes. At least, it is quite clear that there is a gap in the literature, and future research needs to address the topic of accelerated services innovation processes.

The suggested model of rapid application is, as far as I know, the first services innovation process suggested and empirically identified that can be placed in between the two extreme types of services innovation processes, the stage-wise model and the practice-based model. The focus on revealing more variants of accelerated services innovation processes still seems to be young. There might be, for example, more variants or executions of services innovation that are accelerated (happen over a shorter period) than only the model of rapid application. As explained earlier, hidden innovation processes might fall between the two main streams; therefore, it is possible that examining hidden innovation will reveal more types of accelerated services innovation processes. At least, it is quite clear that there is a gap in the literature, and future research needs to address the topic of accelerated services innovation processes.

#### *2.3.4 The relevance of process perspectives for measurement of services innovation*

In the literature review on services innovation processes in the previous subsections, I consider why services innovations following stage-wise processes are assumed to be easily captured with a CIS instrument. They are often comprehensive strategic innovations that are management led. The CIS questionnaire is, at least in Norway, addressed to the senior management/administrative level of the companies with a recommendation that the survey should be completed by someone with overall knowledge of the enterprise's activities, including long-term strategy and planning. Thus, strategic stage-wise

innovations should be easily identified. The practice-based innovations are, as argued in Section 2.3.2, beyond the scope of the CIS. These innovations are so small and close to the service practice that it would be difficult to identify them. It may even be that the involved persons struggle to understand the particular innovation and consider them to be simply natural improvements, which makes them even more difficult to capture in a survey such as the CIS. However, accelerated services innovation processes have been scarcely addressed. It seems that they can be quite important and large innovations that are strategically planned but following a process that happens faster at a more local level. The rapid application process is one example of an accelerated innovation process, and as addressed in section 2.3.3 this process happens at a more local level among the people involved in the service practice. This raises doubts about whether such innovations are reported in a CIS survey even though they fall under the definition of what is in the Scope of Measuring (according to the Oslo Manual). These innovations may be the ones that become hidden innovations. Additionally, these accelerated processes have received little attention, meaning that there may also be more variants of accelerated processes. It seems that linking the process perspectives to the discussion of how to measure services innovation may contribute to understanding how services innovations unfold and how and why they become hidden in CIS surveys. This is why this thesis aims to link the process of services innovations to the final services innovation output that the CIS aims to capture.

## 2.4 Final comments

I have identified several gaps that are relevant to this thesis. The first is the main gap that I address about evaluating the use of CIS questionnaires based on the third edition of the Oslo Manual in service contexts such as tourism. Thus, I evaluate CIS 2010 in this thesis. Moreover, aiming to evaluate the CIS with a focus on whether processes and outputs are acknowledged, the review of the services innovation process literature reveals a gap in relation to this literature (see Section 2.3). An identified issue is how hidden innovation may follow a group of more accelerated services innovation processes. These processes have received little attention by researchers, and exploring the measurement of services innovation and hidden innovation by focusing on innovation output as well as the process may reveal an improved understanding of accelerated services innovation processes. An understanding which, in turn, has implications for measurement of service innovation.

Last but not least, this thesis uses tourism services to investigate above gaps. The tourism innovation literature generally requires more research on innovation, especially quantitative research such as the CIS. At the same time, Camisón and Monfort-Mir (2012) examine a bias related to hidden innovation in tourism innovation surveys. They attempt to distinguish more clearly between actual and measured innovation by de-



veloping a consolidated theoretical framework, and to clarify associated methodological problems related to public data sources and models when analysing and measuring innovation in tourism. That is what this thesis seeks to do. The thesis also contributes to the gap in knowledge about drivers of innovation in tourism, something that Papers 1 and 4 in particular address.

Answering the two main research questions in this thesis should help to address the knowledge gaps and additionally to provide some methodological implications regarding how best to measure services innovation in the future. The next chapter describes the research methodology used in the thesis.



## 3. Methods

In this chapter, I begin by presenting the philosophical foundation of my PhD thesis (Section 3.1). The philosophical foundation also represents the argument for my decision to use a mixed methods approach. I first conduct quantitative tests of the use of the CIS, followed by qualitative research on what the CIS does and does not measure. In Section 3.2, I explain and present the mixed methods approach and design, focusing on the methodological choices made and how each phase of my approach affects the next phase, as well as how the four papers are linked. Then, in Section 3.3, I present the research design of each paper included in the thesis, focusing on samples, data and analysis. Finally, I evaluate the research credibility of the thesis in Section 3.4 by discussing the reliability, validity and ethics of my PhD project.

### 3.1 Philosophical foundations

It is commonly asserted that quantitative research is based on positivistic assumptions, whereas the qualitative approach is grounded on anti-positivistic positions, often some sort of phenomenology, constructivism, hermeneutics or naturalism (Johnson & Onwuegbuzie, 2004; Lincoln & Guba, 1985; Lund, 2005). Research in the first part of the 20th century was dominated by quantitative research. The qualitative approach developed partly as a protest against the dominance of the quantitative tradition and attained its definitive breakthrough around 1970 (Lund, 2012). From these debates, purists have emerged on both sides (Johnson & Onwuegbuzie, 2004); for example, Lincoln & Guba (1985) as qualitative purists and Maxwell & Delaney (2004) as quantitative purists. The core of the positivistic paradigm has placed an extreme weight on direct observations and rejection of unobserved entities (Lund, 2012). In addition, the quantitative purists believe that time- and context-free generalization are desirable and possible (Johnson & Onwuegbuzie, 2004). Qualitative purists, on the other hand, reject positivism. They contend that multiple constructed realities abound, that time- and context-free generalization is neither desirable nor possible, and that research is value bound (Johnson & Onwuegbuzie, 2004).

One may speak of a quantitative and a qualitative paradigm, where the disagreement between the two has been so great that it is sometimes referred to as the “paradigm

war” (Johnson & Onwuegbuzie, 2004; Lund, 2012). Following this paradigm war, a third paradigm has arrived, or a third methodological movement, the mixed methods movement, representing a blending of quantitative and qualitative methods in research (Johnson & Onwuegbuzie, 2004; Lund, 2012). The basic rationale of the mixed methods research (MMR) strategy is that by combining qualitative and quantitative methods one, can utilize their respective strengths and escape their respective weaknesses (Tashakkori & Teddlie, 1998). Philosophically, MMR makes use of the pragmatic method and system of philosophy (Johnson & Onwuegbuzie, 2004). Taking a pragmatic position will help to improve communication among researchers from different paradigms as they attempt to improve knowledge (Maxcy, 2003). In line with such an argument, research questions in mixed methods studies might be considered to be the most fundamental ones, and the research process should be based on research questions in a way that offers the best chance to obtain useful answers (Johnson & Onwuegbuzie, 2004; Lund, 2012).

Utilizing the strengths of quantitative and qualitative research is a promising approach. In line with Onwuegbuzie, Bustamante, and Nelson (2010), it is possible to develop more reliable and valid quantitative instruments by using qualitative approaches to explore the instrument and the phenomenon that you want to measure. Miles and Huberman (1994) suggest, for example, a qualitative explorative approach leading to development of questionnaires. In contrast, quantitative research examines relationships that are interesting to understand in more depth using qualitative insight. MMR provides answers in such situations, which is why I consider myself to be a mixed methods pragmatist and why I have chosen an MMR approach in my PhD project. The purpose of my project is to explore and obtain a better understanding about how to measure services innovation. I do that by exploring how services innovation processes unfold within tourism services and link this to measurement of the concept.

As I see the development and literature of services innovation research (Coombs & Miles, 2000; Djellal & Gallouj, 2000; Drejer, 2004; Tether, 2005), the various competing understandings of how to do services innovation research are in some sense rooted in the research paradigms or the three methodological moves presented in the literature review (Chapter 2). The “assimilation approach” (Section 2.2.2) is rooted in a positivistic view of knowledge construction. Research related to the assimilation approach is mainly quantitative, attempting to measure innovation and to identify causal relationships such as in the CIS studies. Empirical knowledge is commonly based on data and logical conclusions that are reported in questionnaires. The many studies that use the CIS instrument to measure innovation fall within this group of studies and are dominant within this field because Eurostat (the European statistical agency) and national statistics offices in 20 to 25 countries (such as SN in Norway) use this method to measure innovation in

both manufacturing and service industries. Unlike the assimilation approach, the “demarcation approach” is concerned with the characteristics of services, such as intangible, interactive, dynamic, complex processes and co-creative properties, which are harder to observe and report in a questionnaire aimed at statistical analyses (e.g., see Chapter 2). Thus, the demarcation approach is more interpretive and aims to develop a deeper understanding (e.g., see Chapter 2). As many of these studies use qualitative research methods, I see the approach as more closely related to the qualitative methodological movement. However, there are exceptions such as the autonomous services innovation surveys addressed by Djellal & Gallouj (2000) (see Section 1.1).

Recently, a third approach to understanding innovation in services has arisen, as also presented in the literature review in Section 2.2.2. This third perspective is labelled the “integrative approach” or the “synthesis approach” and argues that both the assimilation and the demarcation approaches should be ignored. There is a call for an approach covering innovation features in relation to notions of both assimilation and demarcation (See also 2.2.2, about integrative approach). I argue that the MMR approach, which is used in this study, represents such an approach. Additionally, the thesis focuses on the extent to which the CIS has improved, towards being a more integrative instrument, from belonging to the assimilation approach.

### **3.2 Mixed methods approach**

Several researchers demonstrate the usefulness of MMR (Bazeley & Kemp, 2012; Creswell, 2007, 2013; Johnson & Onwuegbuzie, 2004; Lund, 2012). I have also chosen a mixed methods approach for my PhD research because the phenomenon of innovation involves such a high level of complexity that the combination of the qualitative and quantitative paradigms is a strength, as I see it. MMR can be defined as follows.

*Mixed methods research* is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm (along with qualitative and quantitative research). It recognizes the traditional quantitative and qualitative research but also offers a paradigm choice that often will provide the most informative, complete, balanced, and useful research results (Johnson, Onwuegbuzie, & Turner, 2007).

In line with Johnson et al. (2007), I argue that MMR captures my combination of qualitative and quantitative analyses to provide a more complete understanding of my identified research questions related to innovation than either approach alone can offer (Creswell, 2013).

In addition, MMR designs can be defined as multiphase (Creswell, 2007), referring to the sequential use of qualitative and quantitative data, and the integration of both

(Creswell, 2013; Johnson & Christensen, 2013). My PhD research follows a sequential MMR design, by being divided into phases that follow each other in a chronological sequence; each phase influencing the next. In the following section, I will account in depth for the research design and methodology used in my PhD project.

### 3.2.1 *The sequential mixed methods design*

Figure 3.1 illustrates how I designed my MMR approach in two phases and what kind of data I collected in each phase. As also mentioned in Section 1.2 in the introduction, the first phase is an explorative phase, and the second is a more in-depth phase. This approach is recognized as a sequential (multiphase) design (Creswell, 2013; Johnson & Christensen, 2013).

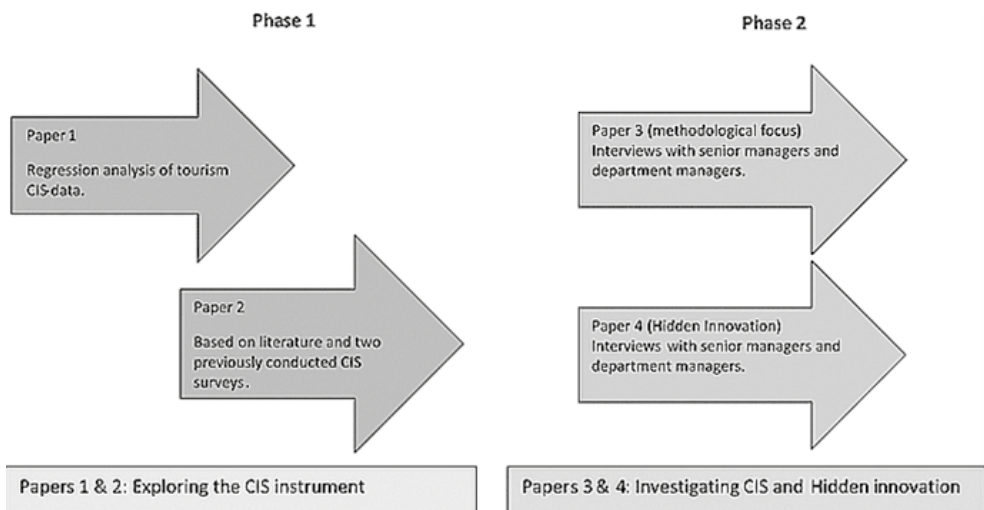


Figure 3.1: *The multiphase design.*

Phases 1 and 2 illustrate my PhD project. As the design illustrates, the first phase is primarily quantitative and the second qualitative. The phases overlap to some degree, but the logical structure of the PhD follows the phases, and in the following, I will explain the work related to each phase. As the research questions are the most fundamental in an MMR design (Johnson & Onwuegbuzie, 2004; Lund, 2012), I will present my research questions for each research phase and argue for the separate methods used in relation to each of the research questions. Additionally, I will explain how the findings in Phase 1 led to the design of Phase 2.

In Phase 1, I get familiar with the critique of the CIS instrument and the Oslo Manual. However, I still decide that I will try to use the data for analysing drivers to innovation in tourism, to see whether the data works out for analysis. In parallel with successful use

of the CIS data in Paper 1, I also investigate the use of the CIS in Paper 2 (Phase 1) of the thesis. Paper 2 is a book chapter that is published in an anthology and highlights the conflicting survey results and literature critical to the use of instruments such as the CIS. After the work involved with Papers 1 and 2, I turn to a more in-depth phase (Phase 2), in which I examine the CIS instrument and investigate what it does and does not measure. Based on the issues addressed in Paper 2, I chose to investigate the concept of hidden innovation in more detail. I do this in Phase 2 by conducting a qualitative interview study. The aim is to explore what is measured by the CIS and whether there are hidden innovations, and if there are, what characterizes the hidden innovation processes. The findings indicate the existence of “hidden innovations” also defined as uncounted innovations (Papers 3 and 4). Paper 3 focuses on a methodological contribution and suggests improvements of the CIS instrument to increase its construct validity. Paper 4 focuses on the “hidden innovation” concept and suggests four different types of hidden innovation. This means that my PhD research complies with a sequential MMR design, where each phase depends very much on the findings in the previous phase.

*Phase 1. In this phase, I focus on testing the use of the CIS by analysing the drivers of innovation in tourism.* I investigate different ways that employees can be involved in triggering and driving innovation, and the formulation of RQs in Phase 1 does thus reflect this interest. Paper 1 addresses the use of the working method, cross-functional work teams and the use of external information.

RQ1 (Paper 1): *What is the effect of external information gathering and use on innovation?*

RQ2 (Paper 1): *What are the effects of the use of the working method (cross-functional work teams initiated by the management) on innovation?*

RQ3 (Paper 1): *Are these two innovation practices complementary in terms of their impact on innovation?*

The aim of a quantitative approach is to test hypotheses and to produce generalizable results. Such studies are useful for answering more mechanistic “what” questions (Marshall, 1996). Thus, in Paper 1, I use a quantitative approach. As mentioned, my expanding knowledge about the CIS and Oslo Manual triggers in this phase my desire to explore the use of the CIS instrument further. The fact that it worked out for me to use the data for analysis because of low innovation rates, and that I got familiar with another survey that showed high innovation rates, emphasized the curiosity, affecting what I do in Paper 2 (Phase 1), in which I ask the following.

RQ4 (paper2): *How is it possible that two previously conducted national CIS surveys in tourism provide different results?*

Based on a literature review, Paper 2 discusses the methodological and theoretical explanations for these questions. The discussion and conclusion in Paper 2 provide the basis for the RQs in Phase 2.

*Phase 2.* Based on the findings in Phase 1, I developed the following RQs for Phase 2.

RQ5 (Paper 3): *How well do the key people answering the CIS relate to and understand the questions and items?*

RQ6 (Paper 3): *To what extent do companies have procedures to capture innovations that are not initiated by, or rooted in, the senior-level management, especially at the departmental or sectional level?*

RQ7 (Paper 3): *To what extent are tourism managers capable of distinguishing between innovation types in the CIS?*

RQ8 (Paper 3): *Why does the CIS fail to capture innovation related to services features?*

RQ9 (Paper 4): *Why are some innovations in tourism hidden?*

RQ10 (Paper 4): *How can hidden innovation be characterized? That is, are there different types? (This question is separated into two new questions during the review process; see paper.)*

Qualitative studies aim to provide illumination and understanding of complex psychosocial issues (such as innovation) and are most useful for answering humanistic “why” and “how” questions (Marshall, 1996). Thus, to answer RQs 5–10, I conducted qualitative interviews with senior managers and department managers after they had completed a CIS questionnaire. Paper 3 focuses on the methodological aspects identified in Paper 2, while Paper 4 focuses on the innovation not captured with a CIS questionnaire—hidden innovation—also indicated in Paper 2.

The applied MMR approach for my PhD project is summarized in Table 3.1.

Paper	Type of paper	Purpose	Applied approach and method	Data
1	Empirical	(1) Identify whether information use and working methods affect innovation. (2) Test how CIS data works out for analysis.	Quantitative, Survey Norwegian Tourism industry CIS (2010)	632 Norwegian tourism firms



Paper	Type of paper	Purpose	Applied approach and method	Data
2	Theoretical and methodological discussion	Discuss possible explanations of why the two national CIS surveys in tourism presented high and low innovation rates (conflicting results).	Theoretical and methodological discussion based on two previously conducted surveys	Literature review (Comparison of CIS results from two national surveys)
3	Empirical	Identify and suggest possible improvements to the CIS (used in tourism). Reveal whether the CIS captures all relevant innovations or whether some innovations are uncounted or "hidden".	Qualitative, Interviews	Eight interviews with managers and department managers of tourism firms
4	Empirical	Identify and develop more knowledge on "hidden" innovation in tourism. Identify process characteristics of hidden innovation and indicate four types.	Qualitative, Interviews	10 interviews with managers and department managers of tourism firms

*Table 3.1: Purpose, applied approach, method and empirical base.*

### 3.3 Research design: Samples, data and analysis

Phase 1 is explorative in nature. At the beginning of Phase 1, I started to focus on the drivers of tourism innovation. I reviewed the services innovation and tourism innovation literature. I participated in multiple PhD courses focusing on innovation, services innovation, innovation and value creation in tourism, etc. All of this helped me to obtain a better understanding of this field. Moreover, I started working with the Norwegian CIS data gathered by SN in the Norwegian tourism industry for the reference period 2008–2010. This work aimed to identify drivers of tourism innovation, which resulted in Paper 1. In parallel with the work with the CIS data, I engaged in co-writing Paper 2 with my supervisor.

#### 3.3.1 Phase 1

##### **Paper 1: Sampling and data collection**

The data used in Paper 1 are from the 2010 CIS (Wilhelmsen & Foyn, 2012). The survey employs the common instrument prepared by Eurostat in co-operation with the various national statistics offices (OECD/Eurostat, 2005) (see also Chapter 1). The sample comprises 632 tourism companies with 10 or more employees. The services included are passenger transport, lodging, restaurants, agencies and tour operators, amusements, theme parks and adventure (Wilhelmsen & Foyn, 2012).

**Paper 1: The model and analysis**

The study tests the two independent variables- (1) gathering and using external information from customers, competitors and suppliers, and (2) use of working method cross-functional work teams- and their effect on tourism innovation. Additionally, the interaction term of the two variables is included in the model.

Initial analyses revealed that a logistic regression would be required. Logistic regression analysis is applied to test the model (Peng, Lee, & Ingersoll, 2002; Tufté, 2000), but first I test whether it meets the four assumptions of Aldrich and Nelson (1984) (see Paper 4). The model is tested in Stata MP 13, with supervision by my second supervisor (see also Section 3.4.2 on the reliability and validity of the study).

**Paper 2: Literature review and critical discussion**

Paper 2 presents a literature review and critical discussion on the use of the CIS instrument for tourism. The paper uses the results from two nationally conducted CIS surveys and addresses the debate about whether the CIS captures all innovations. The paper identifies a bias problem that requires more investigation, which is done in Phase 2. The book chapter (Paper 2) highlights the critical discussion around the CIS and the Oslo Manual, and also developed my writing skills through the co-writing process.

*3.3.2 Phase 2*

Phase 2 consists of two explorative studies. The studies use a qualitative in-depth analysis of the CIS instrument, by assessing the types of innovation that the CIS measures and the types that remain hidden. This is a methodological approach that, as far as I know, has not been used before. This phase uses the approaches presented in Papers 3 and 4. Paper 3 has a methodological focus and addresses how respondents understand questions in the CIS and how they experience to answer them. It aims to understand whether these issues affect under-reported innovation (hidden innovation). This study contributes methodologically to how the CIS can be improved as an instrument. The study in Paper 4 focuses on hidden innovation processes and aims to identify innovation characteristics and types of hidden innovation. The data used in the two studies were gathered at the same time (except that some additional interviews are used in Paper 4).

**Sampling and Data collection**

Papers 3 and 4 used a purposeful sampling strategy (Marshall, 1996; Silverman, 2005), where the researcher actively selects the most productive sample to answer the research questions. Purposeful sampling allows us to choose a case because it illustrates certain features or processes in which we are interested (Silverman, 2005). The sampling process included several criteria. To answer the research questions asked in Papers 3 and 4 (see Section 3.2.1), I needed to speak to people usually get a CIS questionnaire. At the same

time, aiming to address the issue of hidden innovation, I needed to approach organizations not only at the top level but also at a more local level, to get insights into firms' efforts to bring about innovations throughout the organization. I included three organizations in Paper 3 and five organizations in Paper 4. One organization was approached at both the top level and the department level, two were approached at the top level and two were approached at the department level (see Table 3.2 below).

The cases	Paper	Top level	The department level
Company 1 An alpine centre	3&4	Interview with top manager (I6)	Interviews with five department managers (I1–I5)
Company 2 A small hotel	3&4	Interview with top manager (I7)	-
Company 3 A small hotel	3&4	Interview with top manager (I8)	-
Company 4 An alpine centre	4	-	Interview with one department manager (I9)
Company 5 A hotel (one business in a group)	4	-	Interview with the manager of the hotel (I10)

*Table 3.2: The cases in Papers 3 and 4.*

As literature suggests that service businesses delivering experiences are highly innovative (Fuglsang, Højland, Sundbo, & Sørensen, 2008), I purposefully made sure that all of the organizations were offering experience services (see the papers for a more thorough description). In addition, I purposefully selected both small and large businesses, following the CIS sample. Regarding sample validity, it is important to consider whether the samples used generate data that are rich enough. Because of the explorative nature of the studies, in addition to careful sample selection using several criteria (Crouch & McKenzie, 2006), the data and sample are considered to be adequate.

The interviews with the senior managers and department managers were organized and conducted by me. I developed a semi-structured interview guide and planned the interviews with the help of my supervisor. The interview guide was based on the literature on the CIS, the three versions of the Oslo Manual (a guideline to conduct CIS surveys) and the literature addressing hidden innovation. I started the interviews by letting the respondents answer a CIS questionnaire about the four innovation types. The questionnaire is shown in Appendix 1. The interviews are described more thoroughly in Papers 3 and 4.

In general, I used Dalen (2011) and Kvale and Brinkmann (2009) to prepare, plan and conduct the interviews. Regarding the permission (Dalen, 2011) of the Norwegian

Centre for Research Data (Norsk Senter for Forskningsdata), I took the notification test on their webpage and learned that my study did not need to be formally approved (see Section 4.5 about ethics permission).

### **Data analysis**

All interviews were recorded and transcribed by me. Hence, I obtained valuable insights into the data. For the analysis in Papers 3 and 4, I used the same analytical steps. I started the analysis by connecting the relevant key concepts from the literature and keywords related to the RQs directly to specific quotes in the transcribed documents. I then constructed a matrix (Miles & Huberman, 1994) of the same key concepts and keywords. After that, I started to organize quotes from the interviews and interpreted the matrix. I worked with the matrix during multiple stages with the aim of condensing the content. Finally, I constructed the tables that present the main findings of the papers (see Papers 3 & 4).

## **3.4 Research credibility: Reliability and validity**

Research credibility is related to the issue of “defensible research” (Johnson & Christensen, 2013). MMR studies must be designed and conducted to have strong quantitative and qualitative validity (Johnson & Christensen, 2013). In this section, I discuss the reliability, validity and ethical aspects of my PhD research. Reliability and validity are rooted in the positivist perspective and are commonly used in quantitative research (Golafshani, 2003).

*Reliability* is referred to as the degree to which a measurement, taken repeatedly, remains the same: stability of measurement over time and similarity of measurement within a given period (Kirk & Miller, 1986). Joppe (2000) states that validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. Stenbacka (2001) argues that because reliability issues only concern measurements, they have no relevance in qualitative research. Lincoln and Guba (1985) state that “since there can be no validity without reliability, a demonstration of the former (validity) is sufficient to establish the latter (reliability).” Based on these arguments, I outline the reliability and validity aspects of the quantitative part of my PhD project in Section 3.4.1. Moreover, regarding the qualitative studies, I focus on outlining the strategies that I followed to minimize the threats to validity in Section 3.4.2. I do this by referring to the strategies that Johnson and Christensen (2013) suggest promote qualitative research validity (or “trustworthiness”). Finally, I will explain the dimensions of validity that are especially important in relation to the MMR approach in Section 3.4.3

### 3.4.1 Reliability and Validity of the quantitative study

Paper 1 presents the quantitative component of my PhD project. It is based on CIS (2010) data that SN collected (Wilhelmsen & Foyn, 2012). The CIS has already been through two substantial revisions, as mentioned in the literature review (Chapter 2): the 1997 and 2005 revision of the Oslo Manual. The Oslo Manual provides the users of CIS data with a theoretical framework, development of indicators and thorough guidelines for use, samples and statistics, which I regard as ensuring *internal validity* (Cook & Campbell, 1979; Johnson & Christensen, 2013). In addition, I refer to a comprehensive discussion about conducting the data in Wilhelmsen & Foyn (2012).

Regarding construct bias or *construct validity* (Johnson & Christensen, 2013), I attempted to reduce such bias. The literature addresses how the informants struggle to distinguish between innovation types when they answer a CIS questionnaire and how it possibly leads to unreported innovations (see also papers 2 and 3). Aiming to reduce that bias, I decided to merge the four innovation types into one dependent variable: innovation. The innovation variable was then turned into a 0–1 variable showing whether firms had conducted innovation or not. This further strengthened the validity because the innovation rates in each innovation type were very low, and by merging them into one innovation variable showing whether firms had innovated or not, I got 25% reported innovation. The study did not focus on how much innovation the firms had reported but only on whether or not they had implemented innovation. The study uses binary logistic regression analyses (Allison, 2012).

Regarding the independent variables, a PCA loading plot indicated that some of the variables might measure the same construct. Therefore, to ensure *reliability* (Cortina, 1993), I conducted Cronbach Alpha testing and merged some of the variables. Before testing the model, the variables were tested for *multicollinearity* (Allison, 2012) by running a regression analysis and confirming the VIF values. The final logistic regression model was also *goodness-of-fit tested* (Allison, 2012) (see Paper 1 for more details and explanations).

I also used my supervisor and my second supervisor (who has expertise in regression analysis) as a *critical friend* and *peer reviewer* (Johnson & Christensen, 2013) in addition to an *external audit* because the full paper was presented at the *Nordic Symposium on Hospitality and Tourism* conference, and also at my 80% seminar. I have incorporated comments from those two presentations but especially the comments from my opponent at the 80% seminar. Finally, of course, the pre-review process and the publication of the paper support the validity and reliability of the paper.

### 3.4.2 Research validity in the qualitative studies (trustworthiness)

In Papers 3 and 4, which I worked on at the same time, I used several strategies to minimize the threats to validity. During the process, from stating the RQs, developing the interview guides, sampling, conducting the interviews and analysing the data, I used my main supervisor as a *critical friend* and *peer reviewer* (Johnson & Christensen, 2013) for both Papers 3 and 4. Section 3.3 explains how the *sampling validity* is maintained. In addition, I used an *external audit* in two different ways for the two papers. Paper 3 was sent to a professor in Denmark whom I have known since the start of my PhD candidature, who kindly offered constructive comments on my paper and the method, comments that I used to strengthen my PhD project. In addition, the pre-review process and the publishing also support the validity of the study. Paper 4 was developed during a theory development workshop at Lillehammer University College. Two associate professors in the field of services innovation in charge of the workshop provide comments on my analysis and paper. Paper 4 was also presented at the *Nordic Symposium of Hospitality and Tourism* conference, where comments were integrated into the paper. Paper 4 represents the highest degree of interpretation, especially in relation to the evaluation concept; thus, I contacted relevant informants and *member-checked* my interpretation by asking them whether I understood them correctly (Creswell, 2013; Johnson & Christensen, 2013). Paper 4 has also been subject to a review process and has been improved based on the review comments, something that has strengthened the paper substantially. In general, I argue that Papers 3 and 4 require a relatively low degree of interpretation, which supports *interpretive validity* (Johnson & Christensen, 2013).

### 3.4.3 The mixed methods validity

Showing *multiple validities* in relation to the qualitative and the quantitative parts of the mixed methods study suggests the overall validity of the MMR design (Johnson & Christensen, 2013). The use of an MMR approach contributes to validity in and of itself, in terms of each phase influencing the design of the next, using *sequential validity*; and also by comparing multiple data sources throughout the phases, as well as using multiple theoretical perspectives, it contributes to *triangulation* (Brevik, 2015; Johnson & Christensen, 2013). *Sequential validity* is ensured because Paper 1 (Phase 1) affects Paper 2 (Phase 2), which again affects the qualitative methodological choices taken in Papers 3 and 4 (Phase 3). *Triangulation* is ensured because multiple methods are used and also because multiple theoretical perspectives are used in the individual studies.

The *inside–outside validity* (Johnson & Christensen, 2013), also recognized as the emic-etic viewpoint, is also ensured. The emic viewpoint regards the extent to which the researcher accurately understands, uses and presents the participants' subjective inside or "native" views (Johnson & Christensen, 2013), which I argue are ensured in my PhD

project because I use member checking in the most interpretive parts that I was unsure about. The etic viewpoint considers whether the researcher manages to enter the world of the objective researcher, which I tried to ensure by directing the interviews, by not engaging too much in the conversation and by letting the informants lead the conversation. I just made sure that they were talking about relevant questions. In figure 3.2, I sum up the multiple validities ensured in my PhD project.

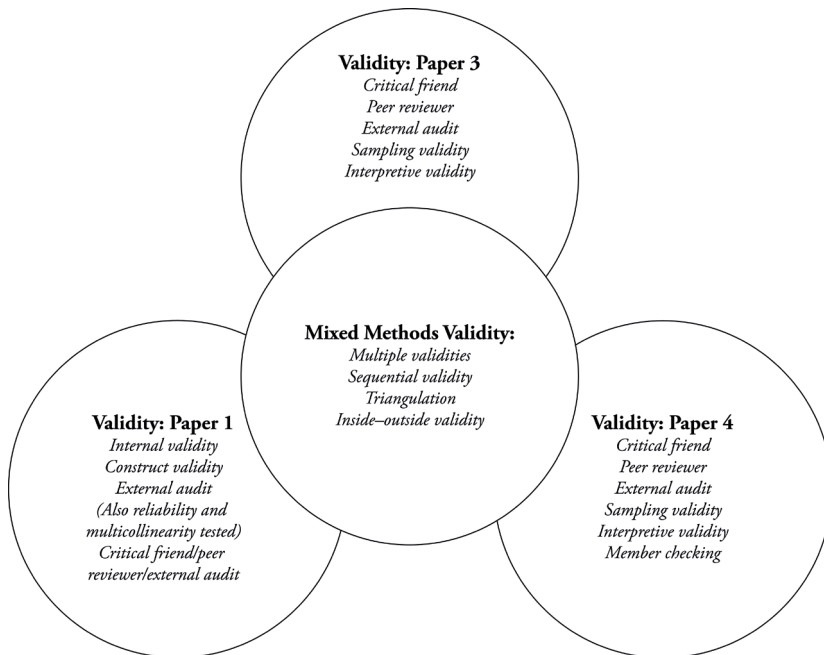


Figure 3.2: *Validity of the mixed methods study.*

### 3.5 The ethics of the research

All the participants in the qualitative studies were fully informed about what the studies involved, and they gave their voluntary consent before, during and after the data collection (Miles & Huberman, 1994). They were informed that they could withdraw from the project at any time. The data collection and processing of data were completed in line with the ethical guidelines of the Norwegian Centre for Research Data. I used the test on their webpage to check whether Papers 3 and 4 needed to be approved by Norwegian Centre for Research Data (see: <http://www.nsd.uib.no/personvern/meldeplikt/meldeplikttest>). They were not, but to be 100% sure that I followed ethical guidelines, I used the sections in the test to double check that I handled the data correctly. To ensure that information was not interpreted or used in a manner that the participants would not agree to, the analysis in Paper 4 was subjected to member checking (see also Section

3.4.2). The qualitative Papers 3 and 4 were also considered to represent a low degree of sensitive information, confirmed by none of the informants feeling uncomfortable with the interviews and the information that they gave (checked by asking them). To ensure the anonymity of the participants, their real names were not used, either in the interview transcriptions or in the papers and the synopsis of the thesis, and neither were the names of the companies used.

Considering that the quantitative study used survey data from SN, they have, as the Norwegian national statistic organization, taken due account of ethical issues.

### **3.6 Final comments on methodology**

In this chapter, I have discussed the main methodological choices and challenges for my PhD project. Through these considerations, I have hopefully conducted a reliable, valid and ethical study (Johnson & Christensen, 2013). In the following chapter, I summarize the main findings in each of the appended papers.



## 4. Summary of the papers

In this chapter, the four appended papers and their findings are summarized. Table 4.1 provides an overview of the main contribution of each of the four papers. Moreover, Table 4.1 shows my role in the writing process of each paper.

Paper	Title	Contribution	The Authors Contribution
1	Information use and working methods as drivers of innovation in tourism companies	Contributes by identifying drivers of innovation in tourism. Additionally gives insight into whether CIS data from the tourism industry are suitable for the analysis.	I am the sole author.
2	<i>Er reiselivsnaeringene innovative?</i>	Provides theoretical and methodological reasons why innovation rates are different in two nationally conducted CIS surveys.	Co-authored by Martin Rønningen & Anne Nordli
3	Measuring innovation in tourism with the Community Innovation Survey: A first step towards a more valid innovation instrument	Hidden innovations are revealed. The paper contributes to how CIS can be improved to be a better instrument for measuring innovation in tourism.	I am the sole author.
4	Tracking hidden innovation	Contributes new knowledge about hidden innovation by suggesting process characteristics of four types of hidden innovation	Co-authored by Anne Nordli & Martin Rønningen. I am the first author.

Table 4.1: An overview of the appended papers.

### 4.1 Paper 1

Nordli, A. J. (2017). Information use and working methods as drivers of innovation in tourism companies. *Scandinavian Journal of Hospitality and Tourism*, 1–15.

Paper 1 focuses on the drivers of tourism innovation. As described in the previous chapter, the study uses data from the Norwegian tourism industry collected by SN in the Community Innovation Survey, 2010 (CIS, 2010) and is the only paper that uses a quantitative approach.

More specifically, the paper demonstrates how strategic use of external information and the internal working method, cross-functional work teams increase the probability that tourism companies will innovate. At the same time, and contrary to expectations in much of the literature, it shows that the two practices are not complementary to each other, as their interaction effect is negative. Still, the companies win by using both external information and cross-functional work teams. Even though the effect of each variable is reduced, the companies manage to handle the strategies well enough to maximize the total effect. The effects of each variable and their interaction effect are described in the article.

A logistic regression analysis is used to test the model, on a sample including 632 tourism companies with more than 10 employees.

As the study uses CIS data, it contributes to knowledge about the drivers of CIS-reported innovation in tourism. It also responds to a call for more quantitative research and the use of the CIS in the tourism sector. The contribution of this paper is to the tourism innovation literature (see appended Paper 1). I use the term “CIS-reported” innovation because the thesis also focuses on whether there is hidden innovation (innovation not captured with the CIS) (see Chapters 1 and 2). It is thus important to underline that the drivers found in the study are drivers of CIS-reported innovation.

The study shows that even though the results indicate low innovation rates (something that Paper 2 suggests might be because of hidden innovation), some business innovation is still captured, and it is possible to conduct useful analysis on the data, even though the results for the logistic regression have some limitations (see Paper 1).

## 4.2 Paper 2

Rønningen, M. & Nordli, A. J. (2016). *Er reiselivsnæringene innovative?* In T. Arnesen, M. Lurfald and E. Merok (eds.), *Innovasjon i fragmenterte næringer*. Oplandske Bokforlag.

Paper 2 is a book chapter published in the anthology «Innovation in fragmented industries» (Arnesen, Lurfald, & Merok, 2016). The paper uses two nationally conducted CIS surveys that present apparently divergent results. The first national survey is the one that Paper 1 is based on, the Norwegian part of the European Community Innovation Survey, which was conducted by SSB in the period 2008–2010 (Wilhelmsen & Foyen, 2012).

The other one was carried out by Lillehammer University College in 2008 (Rønningen, 2009). This study measures innovation activity in a tourism business during a four-year period (2004–2007).

The two surveys present diverging results, one with high innovation rates and the other with low innovation rates. Specific innovation rates are presented and compared between types in paper 2. The Paper suggests several explanations for why two innovation surveys conducted at about the same time in the Norwegian tourism industry show respectively high innovation rates and low innovation rates in the industry. The first explanation addresses the disparities in the understanding of innovation and also the instrument used to measure innovation. The second explanation addresses the decision to combine R&D and innovation questions. The Norwegian innovation survey is carried out biannually in combination with the business enterprise R&D survey. Wilhelmssen (2012) finds a significantly higher share of innovators using a survey questionnaire covering only innovations and not R&D, compared with the results from a corresponding sample from the regular, combined R&D and innovation survey. Moreover, Wilhelmssen (2012) finds that the reported innovation rates are even higher when looking at an additional sample where the same innovation survey was voluntary instead of mandatory. This is the third explanation of the paper. The fourth explanation addresses the effects of the financial crisis, which occurred between the conducting of the two surveys.

The first explanation is further investigated in Papers 3 and 4, because explanations two and three have already been scientifically addressed, and explanation four relates to external economic conditions, which do not affect the validity of the survey and the instrument. In this way, Paper 2 provides the foundations for Papers 3 and 4.

### 4.3 Paper 3

Nordli, A. J. (2016). Measuring innovation in tourism with the Community Innovation Survey: A first step towards a more valid innovation instrument. *Scandinavian Journal of Hospitality and Tourism*, 1–18, DOI:10.1080/15022250.2016.1247382.

Paper 3 has a methodological focus. The purpose of the study is to explore and identify how the CIS can be improved and be a more valid instrument for measuring innovation in tourism. This is done through a qualitative study where eight managers and department managers from three tourism companies are interviewed after completing a CIS questionnaire. The qualitative study follows the qualitative elements of the mixed research tool of Onwuegbuzie et al. (2010) for developing instruments and construct validity. This is a validating method that has not been used to test and improve the CIS or other quantitative innovation measurements before, as far as I know.

The findings indicate that the CIS is too concerned with R&D and technology, and does not capture important innovation in relation to service characteristics. In addition, it is indicated that the terminology and the categorization of four innovation types distract and confuse the respondents. Furthermore, the survey lacks procedures for cap-

turing all innovations developed at the departmental level within the companies. Thus, the findings indicate that significant innovations are hidden. The findings are presented in a figure of an iceberg (See figure 4.1 below). The CIS only captures the tip of an innovation iceberg. Hidden innovation lies under the surface waiting to be reported and differs from smaller changes and improvements that might include practice-driven innovation.

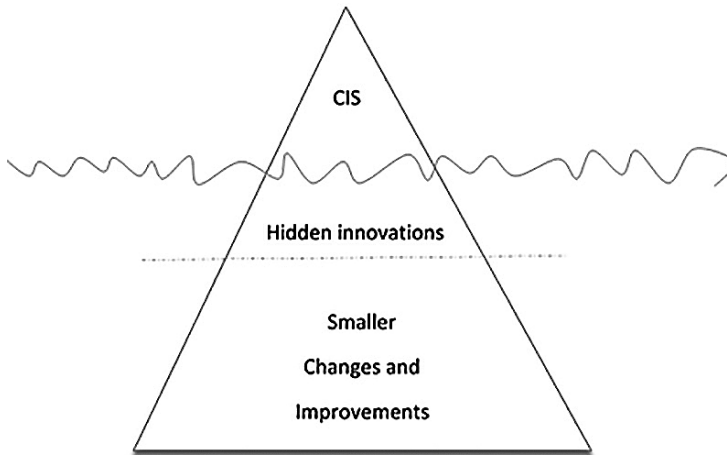


Figure 4.1: CIS, the tip of the innovation iceberg.

The article contributes several suggestions regarding how the CIS can be improved in a more integrative direction. First, the technical language and formulations should be modified to allow the respondents to understand better the measurement aims of the survey. Second, the distinction between innovation types can be removed because respondents struggle to distinguish between the four innovation types and therefore forget or overlook innovations. This would also allow statistical techniques such as factor analysis to identify underlying innovation dimensions. Further suggestions in the paper consider how respondents are introduced to the questionnaire, development of new items, routines for reporting innovation from departments, and separation of type 1 and type 2 innovations (see Paper 3).

It is concluded that the CIS should not be dismissed as an instrument for measuring innovation but rather should be improved.

#### 4.4 Paper 4

Nordli, A. J. & Rønningen, M. (in review). Tracking hidden innovation in tourism. Submitted for publication in *Tourism Management Perspectives*.

This study is a qualitative study exploring hidden innovation. Its aim is to characterize

hidden innovation and to uncover what processes they follow and whether there are several types. This is done through a qualitative study where 10 managers and department managers from five tourism companies are interviewed after they have completed a CIS questionnaire.

The study relates process perspectives to researching hidden innovation. It is argued that one needs to understand the processes behind innovations, and how they are managed and unfold, to understand why the innovations remain hidden when applying a CIS instrument to a tourism service context.

The findings reveal a number of innovations that are overlooked, forgotten or ignored; that is, several examples of hidden innovation. Based on the findings, it is suggested that hidden innovation can be divided into the four types of hidden innovation: (1) penumbra innovations, (2) innovations “out of mind”, (3) umbra innovations and (4) refused innovations. All of these hidden innovations follow more accelerated innovation processes at a local level. The first two types follow a local stage-wise process, while the last two follow a rapid application process (see Paper 4 for further explanation). The paper also finds formal and informal evaluation to be drivers of innovation in tourism services.

Finally, the paper suggests some improvements to the CIS and how managers can better take care of innovation processes in their organizations.



## 5. Contribution, implications and future research

This chapter discusses and concludes the contribution of this thesis. The chapter is in two parts: Section 5.1 focuses on the theoretical contribution, and Section 5.2 focuses on the methodological implications.

The overall aim of the thesis has been to investigate the use of the CIS to measure innovation in services—specifically tourism—and the degree to which innovation is measured. The thesis confirms that analysis of CIS data can generate significant results despite a low degree of reported innovation (Paper 1). Moreover, Paper 2 addresses how the theoretical understanding of services innovation and how the CIS operationalizes innovation may have an effect on the innovation that is reported. This issue is further investigated in Papers 3 and 4, which again reveal several examples of hidden innovation not captured by CIS 2010. Paper 3 suggests methodological improvements regarding how some hidden innovation can be reflected, and Paper 4 identifies different types of hidden innovation and the processes behind them. The hidden innovation types do indeed meet the criteria in the Oslo Manual's third edition for being an innovation and should thus have been captured (as explained in Paper 4). Additionally, Papers 1 and 4 also identify drivers of CIS-reported and hidden innovation. All four papers relate somehow to the two overall research questions, some papers more clearly to the theoretical research question and some to the methodological research question.

I argue in the thesis that seeing and understanding measurement of services innovation output in relation to the process behind the innovation may promote understanding of why the innovations remain hidden and give insight into the degree to which innovation is measured with the CIS. Consequently, this chapter seeks to answer the question: *How can the **process** of (1) a CIS-measured innovation and (2) a hidden services innovation be characterized, from the initial idea to the services innovation **output**?*

This question is the one that Section 5.1 focuses on answering. Because two of the papers (Papers 1 and 4) identify drivers that are relevant to the services innovation process, they are also related to the process characteristics. Section 5.1.1 begins by addressing the identified drivers of the innovation process. Next, Section 5.1.2 addresses the process characterization from the initial idea to the final innovation output. The process charac-

teristics of services innovations are then further related to the degree of their visibility and how measurable they are, something that is illustrated visually. Section 5.1 (theoretical contribution) lays the basis for Section 5.2, which seeks to answer the research question: *How can the CIS measurement be improved?* Because the contribution in Paper 3 is methodological, Paper 3 is specifically relevant to this section, in which are discussed four main areas that should be improved in the Oslo Manual and the CIS for better measurement of the services innovations that this thesis is concerned with. Finally, Section 5.3 addresses reflections and future research.

## 5.1 Drivers and process characteristics of services innovation outputs

Services innovation has been defined and characterized in several publications (see Sections 2.1 and 2.3), but the services innovation process literature is still in an early phase and has scarcely been related to innovation measurement and outcomes. One of the main points in the discussion part of Paper 2 is that the design of the instrument (operationalization) can affect the reported innovation rates and that these issues have received little attention. The introduction of the thesis discussed how the Oslo Manual and CIS implementations of the manual may lack a focus on the relevance of the services innovation process compared with the innovation output. That is what the following section sheds light on by starting to highlight what drives the innovation idea and the innovation process.

### 5.1.1 Identified drivers of innovation

The findings in Papers 1 and 4 of the thesis reveal specific drivers of services innovation in tourism. These drivers seem to fit with the general literature arguing that organizational learning is positively associated with innovation (Jensen et al., 2007; Lazonick, 2011; Lorenz, Lundvall, Arundel, & Valeyre, 2007; Penrose, 1959) (see section 2.2.1 DUI-mode innovation). This literature highlights how organization of work and interaction within the organization are central elements affecting innovation, something that Papers 1 and 4 can be related to and prove empirically, while the findings additionally contribute to the identification of specific methods of organization of work.

Lorenz et al. (2007) indicate that learning and interacting within organizations and workplaces are at least as necessary for innovation performance as learning through interactions with external agents. The findings in Paper 1 can be related to both sources, external and internal. First, gathering and using information from external sources—customers, competitors and suppliers—requires interaction with external agents. The findings in Paper 1 show that this interaction increases the probability that the companies will innovate. Second, Paper 1 shows that the use of cross-functional work teams wit-



hin the organization also increases the probability of innovating, while cross-functional work teams demand interaction between the workplaces in the organization. Thus, the findings support the notion that indicators that can be related to organizational learning, or organizing of work, trigger and drive CIS-reported innovation in services (in this case more specifically services in tourism). Furthermore, the findings in Paper 4 can be related to organization of work. Paper 4 reveals how informal and formal evaluation trigger and drive the hidden innovation processes. The informal and formal evaluation (see more specific examples in Paper 4) imply that two or more employees or their department manager evaluate work practices either in formal evaluation meetings or in more informal evaluation meetings. Underlining that also concerning hidden innovation did interaction among employees, lead to learning and then innovation.

To sum up, the findings support that learning through interaction is a driver of CIS-reported innovation (results in Paper 1) as well as of hidden innovation (results in Paper 4). This finding is shown in Figure 5.1, which is the figure from Paper 3 (the innovation iceberg) but in a more refined version. The tip of the iceberg (the visible part) illustrates CIS-reported innovation, while right below the surface, between the water surface and the dotted line, there are hidden innovations (more incremental and minor than the CIS innovations, explained in Paper 4 and also later in this chapter). Even deeper, we have other improvements (these may include practice-driven innovations; see explanation in Section 2.3). Finally, the drivers are illustrated in boxes with arrows pointing to either CIS-reported or hidden innovation, the variant that they drive. Formal and informal evaluations that drive hidden innovation are placed at the bottom of the iceberg because these drivers are hidden in the CIS, because it has never included questions reflecting these drivers. Indicators (questions in the CIS) reflecting cross-functional work teams were only included in the CIS 2010 and have since then been excluded from the CIS. Thus, cross-functional work teams are also placed at the bottom of the iceberg, as hidden indicators. The driver, use of internal and external information, has for years been reflected in the CIS with questions and is still included. Thus, this driver is placed above the water surface. The methodological implications of these driver findings will be addressed in Section 5.2.4.

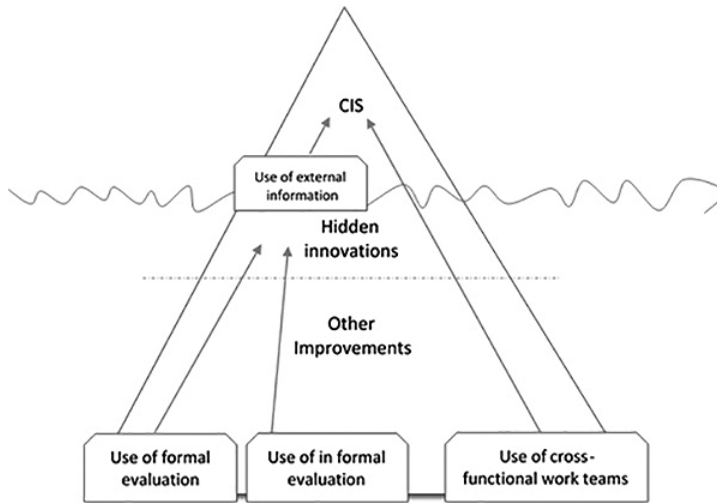


Figure 5.1: The innovation iceberg and drivers of innovation.

After having addressed the specific drivers found in Papers 1 and 4 that trigger and drive respectively CIS-reported and hidden innovation, Section 5.1.2 characterizes the process behind (1) a CIS-reported innovation output versus (2) a hidden innovation output. This gives us a better understanding of how and why some innovations remain hidden, and to which degree the CIS can be used to measure innovation in services.

### 5.1.2 Process characteristics of 1) CIS measured innovation outputs and 2) hidden innovation outputs

In the services innovation literature, services innovation is often characterized as either radical or incremental (Jon Sundbo, 1997). Paper 4 shows how CIS-reported innovation is more comprehensive (closer to radical) than the hidden innovations, which are more incremental. Moreover, incremental innovations can range from small incremental innovations to larger incremental innovations, where especially the small incremental innovations are challenging to isolate from learning (Kanter, 1983; Jon Sundbo, 1997). The floating limit between innovation and learning does, of course, make the measurement problem even more complicated. This means that there is a need for clarity within the degree or size of incremental innovations concerning operationalization and measurement. Addressing the process behind the innovation might contribute with such clarity.

Services innovation is defined and characterized by scholars as a complex process where different types and forms of innovation interfere with each other and may be difficult to identify (Fuglsang, 2008; Jon Sundbo, 2008; Jon Sundbo & Gallouj, 2000), which the findings in Papers 3 and 4 confirm as problematic. Therefore, the process itself

needs attention, when aiming to measure services innovation. It seems that a focus on types or modes of innovation confuses more than it clarifies because it conceals the understanding of the innovation itself. Section 2.3 examines two main groups of services innovation processes addressed in the services innovation literature. These are stage-wise services innovation processes and practice-based processes. Additionally, Toivonen (2010) suggested a variant of a more accelerated process, the model of rapid application. The appendix in Paper 4 indicates that most CIS-reported innovations seem to follow stage-wise processes, which are more strategically anchored at the top level of the organization (Alam & Perry, 2002; Toivonen, 2010). This makes them easily reported in the CIS given the suggestion in Section 2.3. The different types of hidden innovation identified in Paper 4 follow two types of processes, either the accelerated process of rapid application (Toivonen, 2010) or a new variant of an accelerated process identified in Paper 4, the local stage-wise process. The rapid application process that merges planning and implementation is found to be a quite incremental process (Paper 4). The local stage-wise innovation process is somehow a smaller and more compressed variant of the conventional stage-wise innovation process. It differs because it is not anchored strategically at the top level but rather is a strategic process that is executed locally at, for example, the department level. Additionally, the stages occur rapidly after each other, which progresses the innovation. The stages are still quite clear, contrary to the rapid application that merges planning and execution. The local stage-wise process is similar to the compressed product development process that Eisenhardt and Tabrizi (1995) identifies in large computer companies. In particular, the compressed characteristic of the stages, which makes the process more accelerated, is similar. Additionally, it has a lower investment level, and local evaluation at the department level triggers the innovation. The idea stage is based on practice, followed by a stage of evaluation and planning either formally or informally before the implementation of the plan (see Paper 4). Moreover, it is important to emphasize that examples of the hidden innovations identified and described in Paper 4 fit the criteria for being an innovation in the Oslo Manual. These examples of hidden innovations support the findings of NESTA (2007) that indicate a group of hidden innovations that are locally developed, smaller scaled and more incremental. Additionally, this thesis reveals more specific insights into the processes of these hidden innovations and how they unfold.

In the next section, the findings of Sections 5.1.1 and 5.1.2 will be presented visually in relation to their measurability.

### *5.1.3 Visualizing process characteristics of (1) CIS measured innovation outputs and (2) hidden services innovation outputs.*

This subsection provides some examples of how CIS-measured services innovations and hidden services innovations can be visualized. The visualization provides a clearer pictu-

re of the findings of the thesis. A few publications have used a more general visualization of services innovation, which is used as inspiration and hence is explained first.

Jon Sundbo (1997) sketches a general model of how organizational learning and innovation differ. Both phenomena are evolutionary, where organizational learning is a smooth continuous development illustrated as a straight line, while the accumulated innovation process jumps when innovation is introduced, shown as a wavy line, where each wave is an innovation.

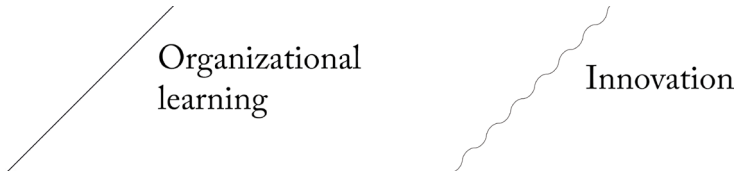


Figure 5.2: *Organizational learning and innovation (Jon Sundbo, 1997).*

Tether (2005) illustrates two distinct modes of innovation that organizations can have. The first is the “innovation staircase” mode, which is shown as a staircase where each step represents innovations that are very precise jumps that are easy to identify. The second is a “continuous change” mode of innovation illustrating how innovations evolve by continuous improvement.

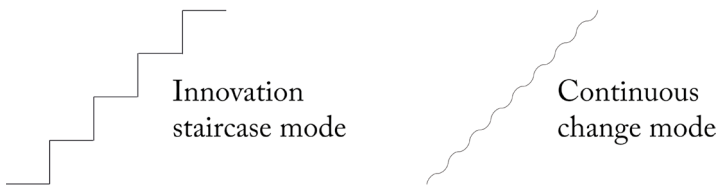


Figure 5.3: *Innovation modes (Tether 2005).*

In the following, I use these ideas of visualizing innovation as an inspiration to present my findings. Contrary to the above illustrations, I suggest how to visualize separate examples of one specific innovation and not organizational innovation modes. I borrow the straight line to illustrate the drivers that relate to work/organizational learning (see Section 5.1.1), the staircase to illustrate the stage-wise nature of an innovation (explained in Section 2.3.1) and the wavy line to illustrate the more incremental nature of a services innovation. The visualization will also indicate how measurable they are and will provide a time perspective.

The findings from the thesis papers are presented in Figures 5.4 and 5.5. The figures show examples of innovation processes that unfold over a CIS period. The blue vertical line shows the point in time when a CIS questionnaire is sent out. Figure 5.4 shows two

examples of CIS-reported innovation processes and also an example of what other smaller improvements may look like. Figure 5.5 presents two examples of hidden innovation processes. Example A in Figure 5.4 illustrates a conventional stage-wise services innovation process, a more comprehensive innovation that is easily captured in CIS surveys. Example B in Figure 5.4 shows a rapid application services innovation that is visible enough to be reported in the CIS. Example C illustrates other improvements outside the scope of what the CIS (and the Oslo Manual) aims to measure. In Figure 5.5, example D illustrates a rapid application that is hidden, and example E shows a local stage-wise innovation that is also a hidden innovation. The illustrations will be further explained below, but first I provide some additional information about the figures.

In some sense, the figures represent “iceberg thinking” in an x-axis/y-axis chart. In Figures 5.4 and 5.5, the X-axis reflects the period that a CIS survey refers back to. The Y-axis shows visibility and measurability. Visibility refers to how “visible” or known the innovations are for the people who answer the CIS questionnaire. Measurability refers to whether the innovations are, or have become, visible/known to the people who answer the questionnaire at the time they answer. The innovation examples show innovations that become more and more visible throughout the process. The blue dotted line shows the surface from the iceberg figure under which innovations are hidden from the CIS. The red dotted line shows the boundary of what constitutes an innovation according to the Oslo Manual. The y-axis reflects also the size of the innovations, where the hidden innovations are smaller in size than those easily identified by the CIS.

It is often difficult to identify the specific starting point of innovations, but as the driver findings in Section 5.1.1 indicate, innovations may have their roots in organizational learning and how work is organized. Thus, the unpredictable start of the innovation process is illustrated by a straight line, as Jon Sundbo (1997) illustrates organizational learning.

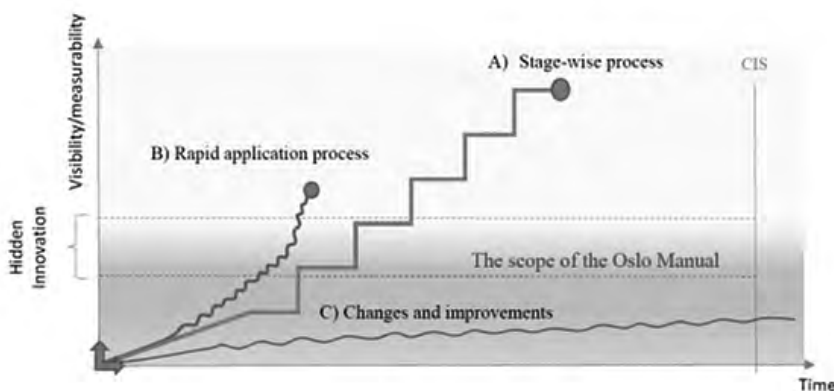


Figure 5.4: Measurable service innovations and other improvements

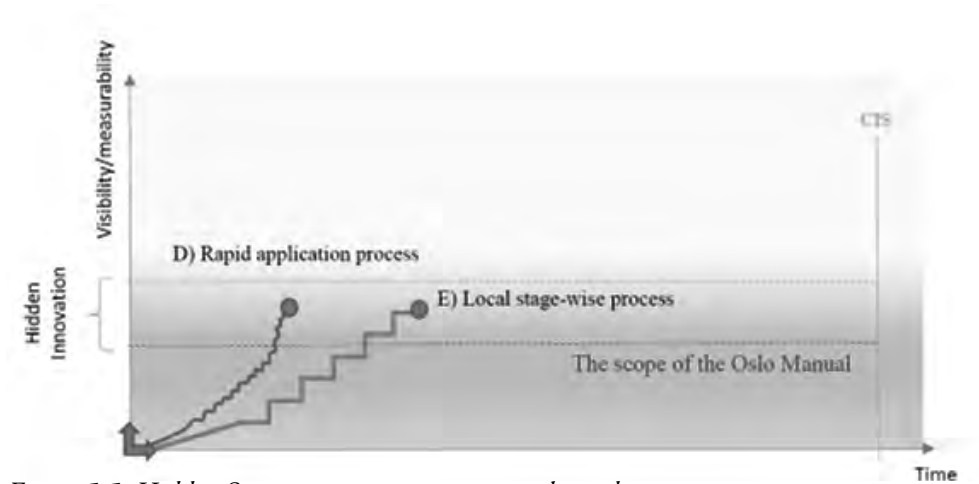


Figure 5.5: Hidden Service innovations as an accelerated process

First, we start with Figure 5.4, in which example A shows a stage-wise services innovation, which consists of more specific stages such as evaluation, planning, testing and implementation. This is illustrated as a staircase where each step represents a stage in the development process (see Figure 5.4). According to the findings in this thesis, such stage-wise services innovations are more comprehensive and easier to capture in a CIS survey (see Paper 4) and thus are illustrated as the innovation with the highest measurability. Senior management are often more involved in these innovations (and thus they are more visible to those who complete the CIS), which are illustrated with many stages over the “hidden innovation” areas (higher visibility). However, the innovation is still illustrated as rooted in organizational learning, illustrating that senior management may not necessarily be involved in the idea development. In other variants, the idea-generation stage may be visible to the senior management as well, but this is just one example of how it may look. Most of the CIS-reported innovations in Paper 4 look like example A (see appendix). Example B in Figure 5.4 shows a rapid-application services innovation. Rapid applications are not illustrated with clear steps like the stage-wise ones because the rapid applications found in Paper 4 showed that these processes tended to be characterized as a series of incremental improvements constituted by rapid acting. The merging of planning and implementation also made these processes more experimental. The wavy line shows that the change or progression in the process is not as evident as in stage-wise innovations, something that is meant to illustrate the more incremental nature of the process. The innovation is more precisely constituted by the sum of the incremental steps or changes. The acceleration is illustrated by the process getting steeper and thus fully implemented in a shorter time than the CIS-reported stage-wise innovation. This rapid application is also much closer to the hidden innovation area, because the innovation process happens more locally and thus is hidden from the senior

management answering the CIS. Hence, rapid application is illustrated as far less measurable than the first example. The findings in Paper 4 show that few of the CIS-reported innovations follow such a process, although some rapid applications are visible to senior management (especially in the final phases, when the innovation takes form) and thus may be large enough to be identified, as example B illustrates. We leave example C to the end of the discussion and turn to Figure 5.5. This figure illustrates the two variants of accelerated services innovation processes that, as the findings in Paper 4 show, tend to remain hidden in CIS surveys (see Table 3 in Paper 4). Example D is similar to the rapid application processes in Figure 5.4 but in this case a bit smaller scaled and thus hidden and harder to capture by the CIS (see visibility/measurability, the y-axis). As mentioned, the rapid application processes found tended to be more incremental (illustrated by the wavy line), where the innovations involved a series (or the sum of) many incremental steps or changes at a local level. The findings in Paper 4 indicate that a great number of hidden innovations follow such processes, and if they do not, they follow the new variant of accelerated services innovations that are revealed, that is the local stage-wise process illustrated in example E in Figure 5.5. As shown, this process has discrete steps representing discrete stages in the development process, although the stages are smaller and locally anchored. The stages are, for example, idea meetings, planning, implementation, evaluation and adjustment/improvement. While these stages are very clear, at the local (department) level they may not be that visible to the people answering a CIS (see Figure 5.5). These innovations develop quickly, and thus there is no time to involve senior management. Moreover, the persons involved in the innovation process also knew they were allowed to handle without reporting to the top level first.

In both Figures 5.4 and 5.5, all the stages or incremental steps related to the final goal—the innovation output—are illustrated by the circles (at the time the stages/steps constitute the innovation). For the rapid application, the incremental steps/changes are related to the same overall goal and constitute the services innovation. Many of the hidden innovations were definitely not hidden for the people involved in the process, something that also underlines why such innovations should be reported in a CIS survey. It is also stated in the third edition of the Oslo Manual that an innovation can be a series of smaller changes that together constitute a significant change (Bloch, 2007; OECD/Eurostat, 2005, pp. 40,47), emphasizing that these innovations should have been reported. Similar to the hidden innovations, they all became a final innovation output at some point in time. The degree of measurability depends on the top management's knowledge about the innovations (see Table 3 in Paper 4). Some of the hidden innovations are misinterpreted or forgotten by the senior management, while others are unknown. This makes the innovations harder to report (also discussed in Section 5.2.3)

Example C in Figure 5.4 shows how some improvements never become innovations

within the scope of the Oslo Manual and thus remain in the most hidden area. These improvements may also include practice-based innovations—likewise for the bricolage example (see explanation in Section 2.3 and Paper 4)—and are very difficult to capture with CIS-like instruments, which is why they are placed so deep in the shadows of what is measurable and are beyond the scope of the CIS.

The visualization of specific services innovation processes gives a more concrete, and in a way “tangible”, picture of how services innovations may look and how they unfold. With the indications of the new accelerated services innovation process (see several examples in paper 4) and many examples of rapid applications in the findings, the thesis contributes to the exploration of **accelerated services innovation**. It seems that these accelerated innovations often remain hidden in CIS surveys, making them even more important to research further. The next section evaluates CIS 2010 based on the insights into hidden innovation and addresses whether the CIS can be improved to overcome the bias of hidden innovation.

## 5.2 Measuring services innovation

The above discussion and visualization provide a clearer understanding of the degree to which the CIS 2010 can be used to measure services innovation, and which kinds of innovations it measures. As shown, the CIS measures the more comprehensive stage-wise innovations that are top-level anchored, but measures often not the accelerated innovations. However, as Paper 1 shows, it is possible to use the data that reflect these innovations successfully even though the innovation rates are low. This means that the CIS, to some degree, can be used to measure innovation, considering that one must be aware of what kind of innovation the data reveal. As the findings show, there is a bias in relation to hidden innovation, and the findings indicate that the hidden innovations are as important to the companies as the CIS reported innovation. As Paper 2 finds clear indications that the design of the instrument can be crucial for the innovation that the instrument manages to capture, the following section will address the implications for the CIS instrument based on the findings in Section 5.1. There are four areas that are critical if the CIS is to overcome the bias related to hidden innovation. Accordingly, I address the research question: *how can CIS measurement be improved?*

The first area to be discussed is related to the operationalization of the concept. Operationalization means to develop measurable indicators of the theoretical variable. This area is addressed in two sections: *5.2.1 Division into types* and *5.2.2 Innovation as a series of incremental improvements*. The third area relates to the respondents in the survey. When aiming to measure a particular concept by asking quantitative questions, you need to consider whom you ask. Does the person have the requisite knowledge for answering the questions? Or elsewhere, are there advising guidelines for gathering the information



they need to answer the questions? These issues are addressed in Section 5.2.3 *Respondents and language interpretation*. The fourth area relates to the issue of indicators reflecting drivers of innovation—specifically, drivers that can be related to organizing the work and organizational learning culture. These drivers seem to reflect distinct activities important to the innovation process. This is addressed in Section 5.2.4 *The importance of indicators related to organization of work indicators and organizational learning*. Each of the four sections is concluded by advice related to the findings; that is, advice related to overcoming measurement bias that may relate to hidden innovation in CIS research conducted in service and tourism contexts.

### 5.2.1 *Division into types*

Since 2004, the CIS questionnaires have been divided into sections measuring the four types of innovation: product (good and service) innovation, process innovation, organizational innovation and market innovation (see Section 1.3 and the section about the CIS). Each chapter has 2–4 questions/items reflecting the innovation type. Marketing and organizational innovation were included in 2004 to create a complete framework that also recognizes the importance of innovation in less R&D-intensive industries, such as services and low-technology manufacturing (OECD/Eurostat, 2005). The findings in this thesis (Papers 3 and 4) show how respondents answering a CIS questionnaire have difficulty identifying these innovation types and that this may in some cases affect their responses: it may create confusion and lead to innovations not reported or the reporting of the wrong innovation type. This complexity and intertwined nature of the services innovation process (Jon Sundbo, 2008; Tether, 2005) should not be ignored in relation to innovation measurement, and the Oslo Manual (third edition) mentions this problem (OECD/Eurostat, 2005, p. 53). Consequently, it is necessary to reconsider whether such a division into types is appropriate. There are, for example, services innovation studies suggesting other types of innovation than the four in the Oslo Manual and the CIS (Gallouj & Weinstein, 1997). Should these types be ignored then?

One suggestion for overcoming the problem, also suggested in Paper 3, would be to remove the headlines/the division into types and to use only the indicators that are designed to reflect the innovation type. This means that respondents face an entire set of indicators designed to reflect the innovations that they have introduced, without letting the respondents consider which type they belong to. This may avoid some uncertainty among the respondents.

The findings in Paper 3 also indicate that there may be a need for a review of current indicators related to service logic thinking. Paper 3 presents some examples of questions that are missing in the latest CIS. These new indicators/questions are related to service delivery characteristics. One might imagine that by incorporating multiple items refle-

cting service characteristics, it will be easier afterward to identify whether there are specific services innovation types for service industries. Likewise, there may be a presence of those innovation types in some manufacturing industries as well.

Consequently, a new version of the Oslo Manual may consider not dividing innovation into types using headlines, or at least, future CIS surveys developed for services may consider not using such a division.

### *5.2.2 Innovation as a series of incremental improvements*

Looking at the visualization of hidden innovations, the rapid application processes found in Paper 4 are constituted by a series of several incremental steps or changes, where the sum of the steps constitutes the innovation. These innovations are continuous, like a series of continuous steps (wavy line). This means that to measure these innovations, it is important to acknowledge that the accumulated change over a period might indeed be large enough to meet the criteria for being a significant improvement.

Bloch (2007, p 29) states that the third edition of the Oslo Manual now also acknowledges that innovations are not restricted to single discrete changes but may also consist of a series of incremental changes, provided that these changes together amount to a substantial improvement. This is specified in the two Sections 124 and 151 (OECD/Eurostat, 2005).

124. Second, innovation is a continuous process, and therefore difficult to measure, particularly for firms whose innovation activity is mainly characterized by small, incremental changes as opposed to single, well-defined projects to implement significant changes. Innovations are defined in the Manual as significant changes, with the intention of distinguishing significant changes from routine, minor changes. **However, it is important to recognize that an innovation can also consist of a series of minor incremental changes.**

151. Innovation activities vary greatly in their nature from firm to firm. Some firms engage in well-defined innovation projects, such as the development and introduction of a new product, whereas others primarily make continuous improvements to their products, processes and operations. Both types of firms can be innovative: an innovation can consist of the implementation of a single significant change, **or of a series of smaller incremental changes that together constitute a significant change.**

These two sections indicate that identifying innovations in service and tourism companies is acknowledged to be an important issue that is explicitly addressed in the Oslo Manual's third edition but not included in the CIS. The CIS defines innovation for respondents as the introduction of a new or significantly improved product, process,

organizational method or marketing method. The results in this thesis show that respondents in service businesses (specifically, tourism businesses) do not understand this definition to include the sum of minor incremental changes. Their interpretation does not fit with the Oslo Manual's intention of what should be measured, which leads to hidden innovation (see Table 3, hidden innovations types 2 and 4).

An inconsistency exists between the Oslo Manual and the CIS. If the aim of an innovation survey is to capture such innovations—which it is, according to the Oslo Manual—then addressing this issue more accurately in a CIS questionnaire is necessary. The term “significant improvements” is not enough. Consequently, future versions of the CIS should explain more specifically the criteria to be categorized as “significant improvements”. This could be included on the first page of the survey, where the term “innovation” is defined.

### *5.2.3 Respondents and language interpretation*

In measuring, for example, customer behaviour, you ask the customers whose behaviour is to be measured. In measuring employee satisfaction, the employees in the workplace should be surveyed. In contrast, whom do you survey if you intend to measure innovation in an organization, and what questions do you ask?

As illustrated, if you want to measure a phenomenon by using a questionnaire instrument, you need to ask the questions of respondents who have knowledge about the phenomenon, and you need to ask questions that the respondents understand.

Considering the issue of capturing more hidden innovation, we look at the two variants of hidden innovation processes presented in Figure 5.5. They are similar in that they both involve local employees in the same department. As the findings in Papers 3 and 4 indicate, the senior management of the organization are unlikely to have enough information to answer questions about these innovations, which is why they end up hidden. Paper 4 shows how hidden innovations tend to be either misinterpreted or forgotten by senior management, or are unknown. This makes the innovations harder to report. Companies rarely have routines for reporting such information to senior management (see Papers 3 and 4). To capture hidden innovations, it is necessary to ask questions that avoid misinterpretation, to ask questions that help to recall forgotten innovations and to ask to questions that include gathering of information from other levels of the organization or that involve people from other levels in the completion of the survey.

The questions of who are the most relevant respondents and how the respondents interpret and understand the innovation questionnaire are not adequately addressed in the third edition of the Oslo Manual.

First, Section 450 solves the question of how to choose the most suitable respondents.

450. Choosing the unit's most suitable respondent is particularly important in innovation surveys, as the questions are very specialized and can be answered by only a few people in the unit, often not those who complete other statistical questionnaires. In small units, managing directors are often good respondents. In larger units, several people are often involved, but one must be responsible for co-ordinating the replies.

It seems to be taken for granted or assumed that in larger units, several people are involved in answering the questionnaire. This is not something required in the questionnaire, at least not the CIS 2010. This means that if it is forwarded to the senior management of the organization, it is reasonable to believe that a person at this level will answer the questionnaire. This means that there might be missing information (hidden innovations). The CIS questionnaire (or the SN) does not require that information is gathered from people from other sections or levels of the organization.

The next version of the Oslo Manual should consider this issue. It does not seem to be correct to *assume* that multiple people are involved in completing the survey when it is sent directly to the senior management of the company and there is no requirement to retrieve information from, for example, the departmental level.

Second, Paper 3 considers how the language and formulation of questions also need some adjustment. The Oslo Manuals third edition states in Section 455 that in the case of international innovation surveys, consideration should be given to the translation and design of the questionnaire. Even minor differences can affect the comparability of results (OECD/Eurostat, 2005), which we see in the different results of the two surveys discussed in Paper 2 and also is indicated in the findings in Paper 3. As suggested in Paper 3, the language should be simplified, and technical words should be either replaced or removed. This is explained more clearly in Paper 3 and illustrated using examples (see the paper for more specific examples). These issues might be related to misinterpretation as well.

#### *5.2.4 The importance of indicators related to organization of work indicators and organizational learning*

Indicators of drivers of innovation reflect specific activities included in the innovation process, or at least triggers to the process. Although these do not reveal final innovation outputs, statistical analysis identifying important activities in the innovation process is also important. In Paper 1, the findings show how specific drivers related to organizational learning and organization of work drive innovations. Hence, innovation surveys should include indicators reflecting those concepts and should open the possibility of

identifying different drivers or work organizations and their effects on innovation. This approach is used in this thesis and by Lorenz et al. (2007) and Lorenz and Valeyre (2006). Questions asking about the use of different internal working methods or management techniques are examples of such indicators (see Paper 1). The third edition of the Oslo Manual addresses the importance of organizational resources on pages 43 and 87, in Section 5.7.1 “Human resources” and Chapter 4 “Knowledge Management” (OECD/Eurostat, 2005). These concepts do not seem to have received much attention in CIS surveys. Only CIS 2010 addresses the use of specific working methods in Section 11 “Creativity and skills”. This section is a special section and is replaced by another special Section 11 in CIS 2012 (see Section 1.3 about the CIS questionnaire). The findings in this thesis underline the importance of these indicators and suggest that the next edition of the Oslo Manual should also focus attention on the importance of internal organization for innovation and should consider suggesting work organization indicators. Such indicators should then be implemented every time that a CIS is conducted. For example, the third edition of the Oslo Manual has given special attention to the issue of linkages. Based on the findings of this thesis, it is suggested that indicators of the work environment and working methods deserve as much attention as linkages. Compared with the section on creativity and skills in the CIS (2010), there might be more relevant indicators to include. For instance, it may be of interest to include questions reflecting formal and informal evaluation, the drivers of hidden innovation revealed in this thesis. Identification of whether companies stimulate to formal and informal evaluation of their work routines and service delivery would then indicate that the companies may stimulate hidden innovation.

### 5.3 Reflections and future research

Hidden innovation is a complex concept. You can ask: hidden to whom? The hidden innovations found in this thesis are hidden to the CIS 2010 but obviously not hidden to the people involved in the innovations. Synonymous with the term “hidden” is, for example, “not visible” or “out of sight”. Whether or not innovation is hidden depends on who completes the CIS and what these persons see and know. Another issue that may affect hiddenness is the understanding of the concept, the definition and also the questions in the CIS. Consequently, hidden innovation will also vary between early CIS versions and recent versions. These issues have consequences for comparison because data are highly prone to bias, and it is of course important to future CIS research to make this bias as insignificant as possible. When referring to hidden innovation in the future, it should always be stated to what it is hidden for? It is not adequate to state that hidden innovation is innovation not captured by conventional innovation instruments. It should be explained more specifically which specific instrument is meant. The above complex issues related to the CIS are why I argue that it is necessary to shed light on

the chosen CIS 2010 instrument from different perspectives, as is done in this thesis. As I see it, my four papers use different perspectives on the complex concept of hidden innovation and provide a more nuanced understanding of the concept in relation to CIS 2010. One paper shows the use of a CIS 2010 instrument and how the low innovation rates still can be used to conduct successful analysis, the second paper address theoretical and methodological challenges related to the CIS and indicates reasons for hidden innovations, the third paper investigates the methodological challenges, and the fourth paper seeks a better understanding of how and why innovation remains hidden. Such different approaches are, as I see it, necessary for a better understanding of hidden innovation.

Throughout the PhD process, I wanted to investigate hidden innovation both more deeply and more broadly than I reached in the three year period. I was excited and motivated, which I still am, and hopefully I will get the opportunity to build on my thesis in future research projects. Next, I will discuss possible future research including plans and ideas I had throughout the research process.

Considering the methodological implications of the thesis, the suggested improvements to the CIS have not been tested yet. It should also be noted that the findings are based on empirics for tourism services, and there may be variation in services innovation processes and outputs for other service industries. This research could be extended by conducting similar research for another service industry. Furthermore, there should be pilot studies and pre-testing of new versions of the CIS developed on the basis of my findings. It is probably also relevant to compare the findings of this thesis to the fourth version of the Oslo Manual, which (as mentioned by Nås) will soon be published. This thesis could be useful when the fourth edition of the Oslo Manual is going to be implemented in future CIS surveys. Probably the findings of the thesis can indicate critical issues that need more extensive consideration, at least for development of the CIS to be applied in tourism and service contexts. It is also interesting to consider whether it is possible to keep some sort of differentiation between the “easily reported innovation” level (the stage-wise processes that are top-level anchored) and the “hidden innovation” level (accelerated processes/local anchored). For example, it might be an option that “accelerated innovation” (the innovation normally hidden) could be reported under “*Innovation reported from department level*”. A possible differentiation would allow us to investigate whether specific industries, such as services, tend to have more accelerated innovation.

Another area to investigate relates to hidden services innovation processes. Research on accelerated innovation processes is limited. There might be more details to reveal on the accelerated innovation processes. Maybe there are more types and variants leading to hidden innovation than the local stage-wise process and the rapid application process addressed in this thesis. It may also be interesting to consider whether specific accele-

rated processes are more relevant to some service industries than others. For example, the local stage-wise process revealed in this thesis is only proven in tourism. These issues could be investigated by applying a similar methodological design (as in Papers 3 and 4) to other service contexts for comparison.

Additionally, the thesis underlines the importance of including the four identified drivers in a future CIS (see Section 6.2.4) and also other drivers related to organization of work and organizational learning. The driver indicators allow us to analyse and identify distinct company activities important throughout the innovation process. This will make it possible to analyse the drivers quantitatively in the future. In particular, the informal and formal evaluations, which have not been reflected as drivers in the CIS before, would be interesting to test statistically. It may also be relevant for future research to focus on whether the importance of specific drivers varies from service industry to service industry.

The high-tech/low-tech discussion (see Section 2.2.1) shows how the issue of hidden innovation is much broader than only the measurement of innovation in services. Knowledge of hidden innovation is relevant in other industries as well. The findings in this thesis may help us to understand hidden innovation processes in other low-tech industries. At least the method of investigating hidden innovation might be useful for low-tech industries.

Finally, I hope that my research can contribute to reliable and valid measurement of innovation in tourism and other similar service industries. Measurement that permits fair comparisons with other industries, something that any industry deserves.





## References

- Abreu, M., Grinevich, V., Kitson, M., & Savona, M. (2008). Taking services seriously: how policy can stimulate the 'hidden innovation' in the UK's services economy: National Endowment for Science, Technology and the Arts.
- Abreu, M., Grinevich, V., Kitson, M., & Savona, M. (2010). Policies to enhance the 'hidden innovation' in services: evidence and lessons from the UK. *The Service Industries Journal*, 30(1), 99-118.
- Adcock Jr, W. O., Hirschman, E. C., & Goldstucker, J. L. (1977). Bank credit card users: An updated profile. *Advances in Consumer Research*, 4(1), 236-241.
- Alam, I., & Perry, C. (2002). A customer-oriented new service development process. *Journal of services marketing*, 16(6), 515-534.
- Aldrich, J. H., & Nelson, F. D. (1984). *Linear probability, logit, and probit models* (Vol. 45): Sage.
- Allison, P. D. (2012). *Logistic regression using SAS: Theory and application*: SAS Institute.
- Alsos, G. A., Eide, D., & Madsen, E. L. (2014a). *Handbook of Research on Innovation in Tourism Industries*. Cheltenham: Edward Elgar Publishing.
- Alsos, G. A., Eide, D., & Madsen, E. L. (2014b). Introduction: innovation in tourism industries. In G. A. Alsos, D. Eide, & E. L. Madsen (Eds.), *Handbook of Research on Innovation in Tourism Industries* (pp. 1-24).
- Apanasovich, N. (2014). *The impact of business innovation on innovation performance: the case of Belarus*. PhD dissertation, Deusto University.
- Arnesen, T., Lurfald, M., & Merok, E. (2016). *Innovasjon i fragmenterte næringer [Innovation in fragmented industries]*. Vallset: Oplandske Bokforlag
- Arundel, A., & Smith, K. (2013). How firm managers understand innovation: implications for the design of innovation surveys. In F. Gault (Ed.), *Handbook of innovation indicators and measurement*. Cheltenham: Elgar.
- Aslesen, H. W., Isaksen, A., & Karlsen, J. (2012). Modes of innovation and differentiated responses to globalisation—a case study of innovation modes in the Agder region, Norway. *Journal of the Knowledge Economy*, 3(4), 389-405.
- Barras, R. (1986). Towards a theory of innovation in services. *Research Policy*, 15(4), 161-173.
- Barrett, P., Abbott, C., Sexton, M., & Ruddock, L. (2007). Hidden innovation in the construction and property sectors. *RICS Research paper series*, 7(20), 1-21.
- Bazeley, P., & Kemp, L. (2012). Mosaics, triangles, and DNA metaphors for integrated analysis in mixed methods research. *Journal of Mixed Methods Research*, 6(1), 55-72.

- Bloch, C. (2007). Assessing recent developments in innovation measurement: The third edition of the Oslo Manual. *Science and Public Policy*, 34(1), 23-34. doi:10.3152/030234207x190487
- Brevik, L. M. (2015). *How teachers teach and readers read. Developing reading comprehension in English in Norwegian upper secondary school*. (PhD), University of Oslo.
- Camisón, C., & Monfort-Mir, V. M. (2012). Measuring innovation in tourism from the Schumpeterian and the dynamic-capabilities perspectives. *Tourism Management*, 33(4), 776-789.
- Carvalho, L. (2008). *Innovation and Entrepreneurship: A model to service sector*. Ph. D. Dissertation, Évora University, Évora.
- Co-operation, O. f. E., & Development. (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data*. Paris: OECD publishing.
- Coleman, J. S., Katz, E., & Menzel, H. (1966). *Medical innovation: A diffusion study*. Indianapolis: Bobbs-Merrill
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis for field settings*. Chicago: Rand McNally.
- Coombs, R., & Miles, I. (2000). Innovation, Measurement and Services: The New Problematique. In J. S. Metcalfe & I. Miles (Eds.), *Innovation Systems in the Service Economy* (pp. 85-103). Boston: Kluwer Academic
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of applied psychology*, 78(1), 98.
- Creswell, J. W. (2007). *Designing and conducting mixed methods research*. Thousand Oaks: Sage.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage publications.
- Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social science information*, 45(4), 483-499.
- Dalen, M. (2011). *Intervju som forskningsmetode*. Oslo: Universitetsforlaget.
- De Brentani, U. (1991). Success factors in developing new business services. *European Journal of marketing*, 25(2), 33-59.
- De Jong, J. P., & Vermeulen, P. A. (2003). Organizing successful new service development: a literature review. *Management decision*, 41(9), 844-858.
- Djellal, F., Francoz, D., Gallouj, C., Gallouj, F., & Jacquin, Y. (2003). Revising the definition of research and development in the light of the specificities of services. *Science and Public Policy*, 30(6), 415-429. doi:10.3152/147154303781780227
- Djellal, F., & Gallouj, F. (2000). Innovation surveys for service industries: a review. In B. Thuriaux, E. Arnold, & C. Couchot (Eds.), *Innovation and Enterprise Creation: Statistics and Indicators, Proceedings of the conference held at Sophia Antipolis, 23 and 24 November 2000*.

- Drejer, I. (2004). Identifying innovation in surveys of services: a Schumpeterian perspective. *Research Policy*, 33(3), 551-562.
- Edvardsson, B., Haglund, L., & Mattsson, J. (1995). Analysis, planning, improvisation and control in the development of new services. *International Journal of Service Industry Management*, 6(2), 24-35.
- Edvardsson, B., & Olsson, J. (1996). Key concepts for new service development. *Service Industries Journal*, 16(2), 140-164.
- Eide, D., & Mossberg, L. (2013). Towards more intertwined innovation types: innovation through experience design focusing on customer interactions. In J. Sundbo & F. Sørensen (Eds.), *Handbook on the Experience Economy* (pp. 248-268). Cheltenham: Edward Elgar.
- Eisenhardt, K. M., & Tabrizi, B. N. (1995). Accelerating adaptive processes: Product innovation in the global computer industry. *Administrative Science Quarterly*, 84-110.
- Engen, M. (2016). *Frontline employees as participants in service innovation processes: innovation by weaving*. (PhD), Lillehammer University College, Lillehammer.
- Engwall, M., Magnusson, P., Marshall, C., Olin, T., & Sandberg, R. (2001). Creative Approaches to Development: Exploring Alternatives to Sequential Stage-gate Models. *Feniz Research Program & Stockholm School of Economics*.
- Fagerberg, J. (2005). *The Oxford handbook of innovation*. Oxford: Oxford University Press.
- Fitjar, R. D., & Rodríguez-Pose, A. (2013). Firm collaboration and modes of innovation in Norway. *Research Policy*, 42(1), 128-138.
- Ford, J. L., & Reed, W. A. (1969). The surgicenter. An innovation in the delivery and cost of medical care. *Arizona medicine*, 26(10), 801-804.
- Fuglsang, L. (2008). *Innovation and the creative process: towards innovation with care*. Cheltenham: Edward Elgar Publishing.
- Fuglsang, L. (2010). Bricolage and invisible innovation in public service innovation. *Journal of Innovation Economics*, 5(1), 67. doi:10.3917/jie.005.0067
- Fuglsang, L., Højland, J., Sundbo, J., & Sørensen, F. (2008). *Innovation i oplevelsesvirksomheder: Resultater fra en survey* Retrieved from [http://rudar.ruc.dk:8080/bitstream/1800/3103/2/Innovation\\_i\\_oplevelsesvirksomheder.pdf](http://rudar.ruc.dk:8080/bitstream/1800/3103/2/Innovation_i_oplevelsesvirksomheder.pdf)
- Gadrey, J., & Gallouj, F. (1998). The Provider-Customer Interface in Business and Professional Services. *Service Industries Journal*, 18(2), 1-15.
- Gallouj, F. (2002). *Innovation in the service economy: the new wealth of nations*. Cheltenham: Edward Elgar Publishing.
- Gallouj, F., & Djellal, F. (2011). *The handbook of innovation and services: a multi-disciplinary perspective*. Edward Elgar Publishing.

- Gallouj, F., & Savona, M. (2008). Innovation in services: a review of the debate and a research agenda. *Journal of Evolutionary Economics*, 19(2), 149-172. doi:10.1007/s00191-008-0126-4
- Gallouj, F., & Weinstein, O. (1997). Innovation in services. *Research Policy*, 26(4/5), 537.
- Gault, F. (2010). *Innovation strategies for a global economy: Development, implementation, measurement and management*. Ottawa: IDRC.
- Gault, F. (2013). *Handbook of innovation indicators and measurement*. Cheltenham: Elgar.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report*, 8(4), 597-606.
- González-Pernía, J. L., Parrilli, M. D., & Peña-Legazkue, I. (2015). STI–DUI learning modes, firm–university collaboration and innovation. *The Journal of Technology Transfer*, 40(3), 475-492.
- González-Pernía, J. L., Parrilli, M. D., & Peña, I. (2012). *Learning modes, types of innovation and economic performance (Orkestra Working Paper Series in Territorial Competitiveness)* (Retrieved
- Green, L., Miles, I., & Rutter, J. (2007). *Hidden innovation in the creative sectors: Interim Report for NESTA* (Retrieved from [http://moemesto.ru/alz59/file/3940541/Nesta\\_Hidden%20innovation%20in%20the%20creative%20sectors\\_2007.doc](http://moemesto.ru/alz59/file/3940541/Nesta_Hidden%20innovation%20in%20the%20creative%20sectors_2007.doc))
- Götzfried, A. (2006). *Community innovation statistics—from today's Community Innovation Survey's to better surveys tomorrow: Draft Paper*. Luxemburg: Eurostat.
- Heidenreich, M. (2009). Innovation patterns and location of European low-and medium-technology industries. *Research Policy*, 38(3), 483-494.
- Hertog, P., & Bilderbeek, R. (1999). Conceptualising service innovation and service innovation patterns. *Research Programme on Innovation in Services (SIID) for the Ministry of Economic Affairs, Dialogic, Utrecht*.
- Hirsch-Kreinsen, H. (2008). “Low-Tech” Innovations. *Industry and Innovation*, 15(1), 19-43.
- Hjalager, A.-M. (2010). A review of innovation research in tourism. *Tourism Management*, 31(1), 1-12. doi:10.1016/j.tourman.2009.08.012
- Isaksen, A., & Karlsen, J. (2012a). Combined and complex mode of innovation in regional cluster development: analysis of the light-weight material cluster in Raufoss, Norway. In M. D. Parrilli & B. T. Asheim (Eds.), *Interactive Learning for Innovation* (pp. 115-136). Basingstoke: Springer.
- Isaksen, A., & Karlsen, J. (2012b). What is regional in regional clusters? The case of the globally oriented oil and gas cluster in Agder, Norway. *Industry and Innovation*, 19(3), 249-263.

- Isaksen, A., & Nilsson, M. (2013). Combined innovation policy: Linking scientific and practical knowledge in innovation systems. *European Planning Studies*, 21(12), 1919-1936.
- Jensen, M. B., Johnson, B., Lorenz, E., & Lundvall, B. Å. (2007). Forms of knowledge and modes of innovation. *Research Policy*, 36(5), 680-693.
- Johnson, R. B., & Christensen, L. (2013). *Educational research: Quantitative, Qualitative, and mixed approaches* (5th ed.). US: Sage Publications Inc.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, 33(7), 14-26.
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112-133.
- Joppe, M. (2000). *The Research Process*. Retrieved February 25, 1998.
- Kanter, R. M. (1983). *The Change Masters: Innovations for Productivity in the American Corporation*. New York: Simon and Schuster.
- Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Beverly Hills: Sage.
- Kirner, E., Kinkel, S., & Jaeger, A. (2009). Innovation paths and the innovation performance of low-technology firms—An empirical analysis of German industry. *Research Policy*, 38(3), 447-458.
- Kvale, S., & Brinkmann, S. (2009). *Interview: introduktion til et håndværk*. København: Hans Reitzel.
- Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of Political Economy*, 74(2), 132.
- Lazonick, W. (2011). *The Innovative Enterprise and the Developmental State: Toward an Economics of "Organizational Success"*. Paper presented at the Institute for New Economic Thinking Annual Conference, Mount Washington Hotel, Bretton Woods, NH, April.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills: Sage.
- Lorenz, E., Lundvall, B.-A., Arundel, A., & Valeyre, A. (2007). How Europe's economies learn. *Industrial and Corporate Change*, 16(6), 1175-1210.
- Lorenz, E., & Valeyre, A. (2006). Organizational forms and innovative performance: a comparison of the EU-15. In E. Lorenz & B. A. Lundvall (Eds.), *How Europe's Economies Learn* (pp. 140-160). Oxford: Oxford University Press.
- Lund, T. (2005). The qualitative–quantitative distinction: Some comments. *Scandinavian journal of educational research*, 49(2), 115-132.
- Lund, T. (2012). Combining qualitative and quantitative approaches: Some arguments for mixed methods research. *Scandinavian journal of educational research*, 56(2), 155-165.

- Lundvall, B.-A. (1992a). Introduction. In B. A. Lundvall (Ed.), *National innovation system: towards a theory of innovation and interactive learning*. London: Pinter.
- Lundvall, B.-A. (1992b). National innovation system: towards a theory of innovation and interactive learning. *Pinter, London*.
- Manual, F. (2015). Guidelines for Collecting and Reporting Data on Research and Experimental Development: The Measurement of Scientific, Technological and Innovation Activities: Paris: OECD. [http://dx. doi. org/10.1787/9789264239012-en](http://dx.doi.org/10.1787/9789264239012-en).
- Marshall, M. N. (1996). Sampling for qualitative research. *Family practice*, 13(6), 522-526.
- Mattsson, J., Sundbo, J., & Fussing-Jensen, C. (2005). Innovation Systems in Tourism: The Roles of Attractors and Scene-Takers. *Industry & Innovation*, 12(3), 357-381. doi:10.1080/13662710500195967
- Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 51-89). Thousand Oaks: Sage.
- Maxwell, S. E., & Delaney, H. D. (2004). *Designing experiments and analyzing data: A model comparison perspective*. New York: Psychology Press.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, Calif: Sage.
- Moorman, C., & Miner, A. S. (1998). The convergence of planning and execution: improvisation in new product development. *The Journal of Marketing*, 1-20.
- NESTA. (2007). *Hidden Innovation: How innovation happens in six "low innovation" sectors* (Retrieved from [http://www.nesta.org.uk/sites/default/files/hidden\\_innovation.pdf](http://www.nesta.org.uk/sites/default/files/hidden_innovation.pdf))
- Nunes, S., Lopes, R., & Dias, J. (2013). *Innovation Modes and Firm's Performance: Evidence from Portugal*. Paper presented at the 53rd ERSACongress, Regional Integration: Europe, the Mediterranean and the World Economy.
- OECD. (1992). *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data-Oslo Manual*. Paris: OECD Publishing.
- OECD/Eurostat. (1997). *Proposed guidelines for collecting and interpreting technological innovation data - The Oslo Manual*. Paris: OECD.
- OECD/Eurostat. (2005). *Oslo Manual: Guidelines for collecting and interpreting innovation data*. Paris: OECD Publishing.
- Onwuegbuzie, A. J., Bustamante, R. M., & Nelson, J. A. (2010). Mixed research as a tool for developing quantitative instruments. *Journal of Mixed Methods Research*, 4(1), 56-78.

- Organisation for Economic Co-operation and Development. (1996). *Oslo Manual : Guidelines for collecting and interpreting innovation data*. Paris: OECD Publishing.
- Parrilli, M. D., & Elola, A. (2012). The strength of science and technology drivers for SME innovation. *Small Business Economics*, 39(4), 897-907.
- Pavitt, K. (1984). Sectoral patterns of technical change: towards a taxonomy and a theory. *Research Policy*, 13(6), 343-373.
- Peng, C.-Y. J., Lee, K. L., & Ingersoll, G. M. (2002). An introduction to logistic regression analysis and reporting. *The journal of educational research*, 96(1), 3-14.
- Penrose, E. (1959). *The theory of the growth of the firm*. Oxford: Blackwell.
- Riessman, F., & Hallowitz, E. (1967). The neighborhood service center: An innovation in preventive psychiatry. *American Journal of Psychiatry*, 123(11), 1408-1413.
- Rosenberg, N. (1982). *Inside the black box: technology and economics*. Cambridge: Cambridge University Press.
- Rothwell, R. (1977). The characteristics of successful innovators and technically progressive firms (with some comments on innovation research). *R&D Management*, 7(3), 191-206.
- Rønningen, M. (2009). Innovation i reiselivsnæringen. In H. Teigen, M. Mehmetoglu, & T. Haraldsen (Eds.), *Innovasjon, opplevelser og reiseliv* (pp. 11-39). Bergen: Fagbokforlaget.
- Rønningen, M., & Slåtten, T. (2012). *Innovasjon og næringsutvikling i en reiselivskontekst*. Bergen: Fagbokforl.
- Safeena, R., & Date, H. (1970). Customer perspectives on e-business value: case study on internet banking. *The Journal of Internet Banking and Commerce*, 15(1), 1-13.
- Santamaría, L., Nieto, M. J., & Barge-Gil, A. (2009). Beyond formal R&D: Taking advantage of other sources of innovation in low-and medium-technology industries. *Research Policy*, 38(3), 507-517.
- Savona, M., Abreu, M., Grinevich, V., & Kitson, M. (2008). Understanding Hidden Innovation: Services in the UK. Indicators, Empirical Evidence and Policy Implications.
- Scheuing, E. E., & Johnson, E. M. (1989). A proposed model for new service development. *Journal of services marketing*, 3(2), 25-34.
- Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, Mass.: Harvard University Press.
- Serin, G. F., & Hansen, P. A. (1997). Will low technology products disappear? *Technological Forecasting and Social Change*, 55, 179-191.
- Silverman, D. (2005). *Doing qualitative research* (2 ed.): London: Sage.

- Smith, A. (1827). *An Inquiry into the Nature and Causes of the Wealth of Nations*. Edinburgh: Nelson and Brown.
- Stenbacka, C. (2001). Qualitative research requires quality concepts of its own. *Management decision*, 39(7), 551-556.
- Sundbo, J. (1997). Management of Innovation in Service. *Service Industries Journal*, 17(3), 432-455.
- Sundbo, J. (2008). Innovation and involvement in services. In L. Fuglsang (Ed.), *Innovation and the creative process: Towards innovation with care* (pp. 25-47). Cheltenham: Edward Elgar.
- Sundbo, J., & Fuglsang, L. (2002). *Innovation as strategic reflexivity*. London: Routledge
- Sundbo, J., & Gallouj, F. (1999). Innovation in services in seven European countries: Synthesis report for the European Commission, DG, XII, TSER-SI4S, Roskilde Universitetscenters trykkeri.
- Sundbo, J., & Gallouj, F. (2000). Innovation as a loosely coupled system in services. *International Journal of Services Technology and Management*, 1(1), 15-36.
- Sundbo, J., Orfila-Sintes, F., & Sørensen, F. (2007). The innovative behaviour of tourism firms—Comparative studies of Denmark and Spain. *Research Policy*, 36(1), 88-106. doi:10.1016/j.respol.2006.08.004
- Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Thousand Oaks: Sage.
- Tether, B. S. (2005). Do Services Innovate (Differently)? Insights from the European Innobarometer Survey. *Industry & Innovation*, 12(2), 153-184. doi:10.1080/13662710500087891
- Tether, B. S., & Tajar, A. (2008). The organisational-cooperation mode of innovation and its prominence amongst European service firms. *Research Policy*, 37(4), 720-739.
- Toivonen, M. (2010). Different types of innovation processes in services and their organisational implications. In F. Gallouj & F. Djellal (Eds.), *The handbook of innovation and services: A multi-disciplinary perspective* (pp. 221-249). Cheltenham and Northampton: Edward Elgar Publishing.
- Toivonen, M., & Tuominen, T. (2009). Emergence of innovations in services. *The Service Industries Journal*, 29(7), 887-902.
- Toivonen, M., Tuominen, T., & Brax, S. (2007). Innovation process interlinked with the process of service delivery: a management challenge in KIBS. *Economies et sociétés*, 41(3), 355-384.
- Trigo, A. (2013). The nature of innovation in R&D-and non-R&D-intensive service firms: evidence from firm-level latent class analysis. *Industry and Innovation*, 20(1), 48-68.



- Tufte, P. A. (2000). En intuitiv innføring i logistisk regresjon. *Oslo: Statens institutt for forbruksforskning.*
- Van Ark, B., Broersma, L., & den Hertog, P. (2003). Services innovation, performance and policy: A review. *Synthesis Report in the Framework of the Project on Structural Information Provision on Innovation in Services (SIID) for the Ministry of Economic Affairs of the Netherlands. Groningen: University of Groningen and DIALOGIC.*
- Von Hippel, E. (1976). The dominant role of users in the scientific instrument innovation process. *Research Policy, 5*(3), 212-239.
- Von Tunzelmann, N., & Acha, V. (2005). Innovation in “low-tech” industries. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 407-432). Oxford: Oxford University Press.
- Wilhelmsen, L. (2012). A question of context: Assessing the impact of a separate innovation survey and of response rate on the measurement of innovation activity in Norway. *Statistics Norway, Documents, 51*, 2012.
- Wilhelmsen, L., & Foyn, F. (2012). *Innovasjon i norsk næringsliv 2008-2010* (Rapporter nr. 46/2012). Retrieved from <https://www.ssb.no/teknologi-og-innovasjon/artikler-og-publikasjoner/attachment/92171?ts=13c81109870>







# The Community Innovation Survey 2010 (CIS 2010)

THE HARMONISED SURVEY QUESTIONNAIRE

**The Community Innovation Survey 2010**

**FINAL VERSION July 9, 2010**

This survey collects information on your enterprise's innovations and innovation activities during the three years 2008 to 2010 inclusive.

An innovation is the introduction of a new or significantly improved product, process, organisational method, or marketing method by your enterprise. The innovation must be new to your enterprise, although it could have been originally developed by other enterprises.

Sections 5 to 8 only refer to product and process innovations.

Please complete **all** questions, unless otherwise instructed.

Person we should contact if there are any queries regarding the form:

Name: \_\_\_\_\_  
Job title: \_\_\_\_\_  
Organisation: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_  
E-mail: \_\_\_\_\_

## 1. General information about the enterprise

Name of enterprise \_\_\_\_\_ *ID*  
Address<sup>1</sup> \_\_\_\_\_ *NUTS*  
Postal code \_\_\_\_\_ Main activity<sup>2</sup> \_\_\_\_\_ *NACE*

**1.1 In 2010, was your enterprise part of an enterprise group?** (A group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group can serve different markets, as with national or regional subsidiaries, or serve different product markets. The head office is also part of an enterprise group.) *GP*

Yes  1 In which country is the head office of your group located? <sup>3</sup> \_\_\_\_\_ *HO*  
No  0

**If your enterprise is part of an enterprise group:** Please answer all further questions about your enterprise only for the enterprise for which you are responsible in [your country]. Exclude all subsidiaries or parent enterprises.

**1.2 In which geographic markets did your enterprise sell goods and/or services during the three years 2008 to 2010?**

	Yes	No	
	1	0	
A. Local / regional within [your country]	<input type="checkbox"/>	<input type="checkbox"/>	<i>MARLOC</i>
B. National (other regions of [your country])	<input type="checkbox"/>	<input type="checkbox"/>	<i>MARNAT</i>
C. Other European Union (EU), EFTA, or EU candidate countries*	<input type="checkbox"/>	<input type="checkbox"/>	<i>MAREUR</i>
D. All other countries	<input type="checkbox"/>	<input type="checkbox"/>	<i>MAROTH</i>

**Which of these geographic areas was your largest market in terms of turnover during the three years 2008 to 2010?** (Give corresponding letter) \_\_\_\_\_ *LARMAR*

\*: Include the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Switzerland, Turkey, Spain, Sweden and the United Kingdom.

<sup>1</sup> NUTS 2 code

<sup>2</sup> NACE 4 digit code

<sup>3</sup>Country code according to ISO standard

## 2. Product (good or service) innovation

A product innovation is the market introduction of a **new** or **significantly** improved **good or service** with respect to its capabilities, user friendliness, components or sub-systems.

- Product innovations (new or improved) must be new to your enterprise, but they do not need to be new to your market.
- Product innovations could have been originally developed by your enterprise or by other enterprises.

A **good** is usually a tangible object such as a smart phone, furniture, or packaged software, but downloadable software, music and film are also goods. A **service** is usually intangible, such as retailing, insurance, educational courses, air travel, consulting, etc.

### 2.1 During the three years 2008 to 2010, did your enterprise introduce:

	Yes 1	No 0	
New or significantly improved goods ( <i>exclude the simple resale of new goods and changes of a solely aesthetic nature</i> )	<input type="checkbox"/>	<input type="checkbox"/>	INPDGD
New or significantly improved services	<input type="checkbox"/>	<input type="checkbox"/>	INPDSV

**If no to all options, go to section 3, otherwise:**

### 2.2 Who developed these product innovations?

	<i>Tick all that apply</i>		
	Goods innovations <i>INPDTG</i>	Service innovations <i>INPDTS</i>	
Your enterprise by itself	<input type="checkbox"/>	<input type="checkbox"/>	<i>1</i>
Your enterprise together with other enterprises or institutions*	<input type="checkbox"/>	<input type="checkbox"/>	<i>2</i>
Your enterprise by adapting or modifying goods or services originally developed by other enterprises or institutions*	<input type="checkbox"/>	<input type="checkbox"/>	<i>3</i>
Other enterprises or institutions*	<input type="checkbox"/>	<input type="checkbox"/>	<i>4</i>

\*: Include independent enterprises plus other parts of your enterprise group (subsidiaries, sister enterprises, head office, etc). Institutions include universities, research institutes, non-profits, etc.

### 2.3 Were any of your product innovations (goods or services) during the three years 2008 to 2010:

	Yes 1	No 0	
<b>New to your market?</b> Your enterprise introduced a new or significantly improved product onto your market before your competitors (it may have already been available in other markets)	<input type="checkbox"/>	<input type="checkbox"/>	NEWMKT
<b>Only new to your firm?</b> Your enterprise introduced a new or significantly improved product that was already available from your competitors in your market	<input type="checkbox"/>	<input type="checkbox"/>	NEWFRM

**Using the definitions above, please give the percentage of your total turnover<sup>4</sup> in 2010 from:**

New or significantly improved products introduced during the three years 2008 to 2010 that were **new to your market** TURNMAR  

--	--	--

 %

New or significantly improved products introduced during the three years 2008 to 2010 that were **only new to your firm** TURNIN  

--	--	--

 %

Products that were **unchanged or only marginally modified** during the three years 2008 to 2010 (include the resale of new products purchased from other enterprises) TURNUNG  

--	--	--

 %

**Total turnover in 2010** 

1	0	0
---	---	---

 %

**2.4 Were any of your product innovations during the three years 2008 to 2010:**

	Yes	No	Don't know	
	<i>1</i>	<i>0</i>	<i>2</i>	
A first in [your country]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>INPDFC</i>
A first in Europe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>INPDFE</i>
A world first	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>INPDFW</i>

<sup>4</sup> For Credit institutions: Interests receivable and similar income, for insurance services: Gross premiums written



### 3. Process innovation

A process innovation is the implementation of a **new** or **significantly** improved production process, distribution method, or supporting activity.

- Process innovations must be new to your enterprise, but they do not need to be new to your market.
- The innovation could have been originally developed by your enterprise or by other enterprises.
- Exclude purely organisational innovations – these are covered in section 9.

#### 3.1 During the three years 2008 to 2010, did your enterprise introduce:

	Yes 1	No 0	
New or significantly improved methods of manufacturing or producing goods or services	<input type="checkbox"/>	<input type="checkbox"/>	INSPD
New or significantly improved logistics, delivery or distribution methods for your inputs, goods or services	<input type="checkbox"/>	<input type="checkbox"/>	INPSLG
New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing	<input type="checkbox"/>	<input type="checkbox"/>	INPSSU

**If no to all options, go to section 4, otherwise:**

#### 3.2 Who developed these process innovations?

INPSDV

*Tick all that apply*

Your enterprise by itself	<input type="checkbox"/> 1
Your enterprise together with other enterprises or institutions*	<input type="checkbox"/> 2
Your enterprise by adapting or modifying processes originally developed by other enterprises or institutions*	<input type="checkbox"/> 3
Other enterprises or institutions*	<input type="checkbox"/> 4

\*: Include independent enterprises plus other parts of your enterprise group (subsidiaries, sister enterprises, head office, etc). Institutions include universities, research institutes, non-profits, etc.

#### 3.3 Were any of your process innovations introduced during the three years 2008 to 2010 new to your market?

	INPSNM
Yes	<input type="checkbox"/> 1
No	<input type="checkbox"/> 0
Do not know	<input type="checkbox"/> 2

### 4. Ongoing or abandoned innovation activities for process and product innovations

Innovation activities include the acquisition of machinery, equipment, software, and licenses; engineering and development work, design, training, marketing and R&D when they are *specifically* undertaken to develop and/or implement a product or process innovation. Also include basic R&D as an innovation activity even when not related to a product and/or process innovation.

#### 4.1 During the three years 2008 to 2010, did your enterprise have any innovation activities that did not result in a product or process innovation because the activities were:

	Yes 1	No 0	
Abandoned or suspended before completion	<input type="checkbox"/>	<input type="checkbox"/>	INABA
Still ongoing at the end of the 2010	<input type="checkbox"/>	<input type="checkbox"/>	INONG

**If your enterprise had no product or process innovations or innovation activity during the three years 2008 to 2010 (no to all options in questions 2.1, 3.1, and 4.1), go to section 8.**

**Otherwise, go to section 5**

## 5. Innovation activities and expenditures for process and product innovations

### 5.1 During the three years 2008 to 2010, did your enterprise engage in the following innovation activities:

		Yes 1	No 0	
<b>In-house R&amp;D</b>	Creative work undertaken within your enterprise to increase the stock of knowledge for developing new and improved products and processes (include software development in-house that meets this requirement)	<input type="checkbox"/>	<input type="checkbox"/>	RRDIN
	If yes, did your enterprise perform R&D during the three years 2008 to 2010: Continuously (your enterprise has permanent R&D staff in-house) <input type="checkbox"/> 1 Occasionally (as needed only) <input type="checkbox"/> 2			RDENG
<b>External R&amp;D</b>	Same activities as above, but performed by other enterprises (including other enterprises or subsidiaries within your group) or by public or private research organisations and purchased by your enterprise	<input type="checkbox"/>	<input type="checkbox"/>	RRDEX
<b>Acquisition of machinery, equipment and software</b>	Acquisition of advanced machinery, equipment (including computer hardware) or software to produce new or significantly improved products and processes	<input type="checkbox"/>	<input type="checkbox"/>	RMAC
<b>Acquisition of external knowledge</b>	Purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other enterprises or organisations for the development of new or significantly improved products and processes	<input type="checkbox"/>	<input type="checkbox"/>	ROEK
<b>Training for innovative activities</b>	Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes	<input type="checkbox"/>	<input type="checkbox"/>	RTR
<b>Market introduction of innovations</b>	Activities for the market introduction of your new or significantly improved goods or services, including market research and launch advertising	<input type="checkbox"/>	<input type="checkbox"/>	RMAR
<b>Design</b>	Activities to design, improve or change the shape or appearance of new or significantly improved goods or services	<input type="checkbox"/>	<input type="checkbox"/>	RDSG
<b>Other</b>	Other activities to implement new or significantly improved products and processes such as feasibility studies, testing, routine software development, tooling up, industrial engineering, etc.	<input type="checkbox"/>	<input type="checkbox"/>	RPRE

### 5.2 Please estimate the amount of expenditure for each of the following four innovation activities in **2010** only. (Include personnel and related costs)<sup>5</sup>

*If your enterprise had no expenditures in 2010, please fill in '0'*

<b>In-house R&amp;D</b> (Include capital expenditures on buildings and equipment specifically for R&D)	<input type="text"/>	RRDINX
<b>Purchase of external R&amp;D</b>	<input type="text"/>	RRDEXX
<b>Acquisition of machinery, equipment, and software</b> (Exclude expenditures on equipment for R&D)	<input type="text"/>	RMACX
<b>Acquisition of external knowledge</b>	<input type="text"/>	ROEKX
<b>Total of these four innovation expenditure categories</b>	<input type="text"/>	RTOT

<sup>5</sup> Give expenditure data in 000's of national currency units to eight digits.

**5.3 During the three years 2008 to 2010, did your enterprise receive any public financial support for innovation activities from the following levels of government?** Include financial support via tax credits or deductions, grants, subsidised loans, and loan guarantees. Exclude research and other innovation activities conducted entirely for the public sector under contract.

	Yes 1	No 0	
Local or regional authorities	<input type="checkbox"/>	<input type="checkbox"/>	<i>FUNLOC</i>
Central government (including central government agencies or ministries)	<input type="checkbox"/>	<input type="checkbox"/>	<i>FUNGMT</i>
The European Union (EU)	<input type="checkbox"/>	<input type="checkbox"/>	<i>FUNEU</i>
If yes, did your enterprise participate in the EU 7 <sup>th</sup> Framework Programme for Research and Technical Development?	<input type="checkbox"/>	<input type="checkbox"/>	<i>FUNRTD</i>

## 6. Sources of information and co-operation for product and process innovation

**6.1 During the three years 2008 to 2010, how important to your enterprise's innovation activities were each of the following information sources?** Please identify information sources that provided information for new innovation projects or contributed to the completion of existing innovation projects.

		<b>Degree of importance</b>				
		<i>Tick 'not used' if no information was obtained from a source.</i>				
	<b>Information source</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Not used</b>	
		3	2	1	0	
<b>Internal</b>	Within your enterprise or enterprise group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SENTG</i>
<b>Market sources</b>	Suppliers of equipment, materials, components, or software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SSUP</i>
	Clients or customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SCLI</i>
	Competitors or other enterprises in your sector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SCOM</i>
	Consultants, commercial labs, or private R&D institutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SINS</i>
<b>Institutional sources</b>	Universities or other higher education institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SUNI</i>
	Government or public research institutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SGMT</i>
<b>Other sources</b>	Conferences, trade fairs, exhibitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SCON</i>
	Scientific journals and trade/technical publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SJOU</i>
	Professional and industry associations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>SPRO</i>

**6.2 During the three years 2008 to 2010, did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?** Innovation co-operation is active participation with other enterprises or non-commercial institutions on innovation activities. Both partners do not need to commercially benefit. Exclude pure contracting out of work with no active co-operation.

Yes   
 No  (Please go to question 7.1) CO

**6.3 Please indicate the type of innovation co-operation partner by location**

*(Tick all that apply)*

Type of co-operation partner	[Your country]	Other Europe*	United States	China or India	All other countries
A. Other enterprises within your enterprise group	<input type="checkbox"/> Co11	<input type="checkbox"/> Co12	<input type="checkbox"/> Co13	<input type="checkbox"/> Co14	<input type="checkbox"/> Co15
B. Suppliers of equipment, materials, components, or software	<input type="checkbox"/> Co21	<input type="checkbox"/> Co22	<input type="checkbox"/> Co23	<input type="checkbox"/> Co24	<input type="checkbox"/> Co25
C. Clients or customers	<input type="checkbox"/> Co31	<input type="checkbox"/> Co32	<input type="checkbox"/> Co33	<input type="checkbox"/> Co34	<input type="checkbox"/> Co35
D. Competitors or other enterprises in your sector	<input type="checkbox"/> Co41	<input type="checkbox"/> Co42	<input type="checkbox"/> Co43	<input type="checkbox"/> Co44	<input type="checkbox"/> Co45
E. Consultants, commercial labs, or private R&D institutes	<input type="checkbox"/> Co51	<input type="checkbox"/> Co52	<input type="checkbox"/> Co53	<input type="checkbox"/> Co54	<input type="checkbox"/> Co55
F. Universities or other higher education institutions	<input type="checkbox"/> Co61	<input type="checkbox"/> Co62	<input type="checkbox"/> Co63	<input type="checkbox"/> Co64	<input type="checkbox"/> Co65
G. Government or public research institutes	<input type="checkbox"/> Co71	<input type="checkbox"/> Co72	<input type="checkbox"/> Co73	<input type="checkbox"/> Co74	<input type="checkbox"/> Co75

\*: Include the following European Union (EU) countries, EFTA, or EU candidate countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Switzerland, Turkey, Spain, Sweden and the United Kingdom.

**6.4 Which type of co-operation partner did you find the most valuable for your enterprise's innovation activities? (Give corresponding letter) \_\_\_\_\_** PMOS

**7. Objectives for your product and process innovations during 2008 to 2010**

**7.1 How important were each of the following objectives for your activities to develop product or process innovations during the three years 2008 to 2010?**

*If your enterprise had several projects for product and process innovations, make an overall evaluation*

	High 3	Medium 2	Low 1	Not relevant 0	
Increase range of goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ORANGE
Replace outdated products or processes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OREPL
Enter new markets or increase market share	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ONMOMS
Improve quality of goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OQUA
Improve <i>flexibility</i> for producing goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OFLEX
Increase <i>capacity</i> for producing goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OCAP
Reduce labour costs per unit output	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OLBR
Reduce material and energy costs per unit output	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ORME
Reduce environmental impacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OREI
Improve health or safety of your employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OHESY

## 8. Factors hampering product and process innovation activities

8.1 During the three years 2008 to 2010, how important were the following factors in preventing your enterprise from innovating or in hampering your innovation activities?

		Degree of importance				
		High	Medium	Low	Factor not experienced	
		3	2	1	0	
<b>Cost factors</b>	Lack of funds within your enterprise or group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HFENT</i>
	Lack of finance from sources outside your enterprise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HFOUT</i>
	Innovation costs too high	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HCOS</i>
<b>Knowledge factors</b>	Lack of qualified personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HPER</i>
	Lack of information on technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HTEC</i>
	Lack of information on markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HINF</i>
	Difficulty in finding cooperation partners for innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HPAR</i>
<b>Market factors</b>	Market dominated by established enterprises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HDOM</i>
	Uncertain demand for innovative goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HDEM</i>
<b>Reasons not to innovate</b>	No need due to prior innovations by your enterprise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HPRIOR</i>
	No need because of no demand for innovations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>HMAR</i>

## 9. Organisational innovation

An organisational innovation is a new organisational method in your enterprise's business practices (including knowledge management), workplace organisation or external relations that has not been previously used by your enterprise.

- It must be the result of strategic decisions taken by management.
- Exclude mergers or acquisitions, even if for the first time.

9.1 During the three years 2008 to 2010, did your enterprise introduce:

	Yes	No	
	1	0	
New <b>business practices</b> for organising procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<i>ORGBUP</i>
New methods of <b>organising work responsibilities and decision making</b> (i.e. first use of a new system of employee responsibilities, team work, decentralisation, integration or de-integration of departments, education/training systems, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<i>ORGWKP</i>
New methods of <b>organising external relations</b> with other firms or public institutions (i.e. first use of alliances, partnerships, outsourcing or sub-contracting, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<i>ORGEXR</i>

**If no to all options, go to section 10.**

**Otherwise, go to question 9.2**

## 9.2 How important were each of the following objectives for your enterprise's organisational innovations introduced during the three years 2008 to 2010 inclusive?

*If your enterprise introduced several organisational innovations, make an overall evaluation*

	High	Medium	Low	Not relevant	
	3	2	1	0	
Reduce time to respond to customer or supplier needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ORORED
Improve ability to develop new products or processes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OROABL
Improve quality of your goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OROQUA
Reduce costs per unit output	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ORORCO
Improve communication or information sharing within your enterprise or with other enterprises or institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OROCIN

## 10. Marketing innovation

A marketing innovation is the implementation of a new marketing concept or strategy that differs significantly from your enterprise's existing marketing methods and which has not been used before.

- It requires significant changes in product design or packaging, product placement, product promotion or pricing.
- Exclude seasonal, regular and other routine changes in marketing methods.

### 10.1 During the three years 2008 to 2010, did your enterprise introduce:

	Yes	No	
	1	0	
Significant changes to the aesthetic <b>design</b> or <b>packaging</b> of a good or service ( <i>exclude changes that alter the product's functional or user characteristics – these are product innovations</i> )	<input type="checkbox"/>	<input type="checkbox"/>	MKTDGP
New media or techniques for <b>product promotion</b> ( <i>i.e. the first time use of a new advertising media, a new brand image, introduction of loyalty cards, etc</i> )	<input type="checkbox"/>	<input type="checkbox"/>	MKTPDP
New methods for <b>product placement</b> or sales channels ( <i>i.e. first time use of franchising or distribution licenses, direct selling, exclusive retailing, new concepts for product presentation, etc</i> )	<input type="checkbox"/>	<input type="checkbox"/>	MKTPDL
New methods of <b>pricing</b> goods or services ( <i>i.e. first time use of variable pricing by demand, discount systems, etc</i> )	<input type="checkbox"/>	<input type="checkbox"/>	MKTPRI

**If no to all options, go to section 11.**

**Otherwise, go to question 10.2**

## 10.2 How important were each of the following objectives for your enterprise's marketing innovations introduced during the three years 2008 to 2010 inclusive?

*If your enterprise introduced several marketing innovations, make an overall evaluation*

	High	Medium	Low	Not relevant	
	3	2	1	0	
Increase or maintain market share	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OMKTS
Introduce products to new customer groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OMKTGC
Introduce products to new geographic markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OMKTGM

## 11. Creativity and skills

### 11.1 During the three years 2008 to 2010, did your enterprise employ individuals in-house with the following skills, or obtain these skills from external sources?

Tick both 'Employed in-house' and 'Obtained from external sources' if relevant.

	Employed in-house	Obtained from external sources*	Skills not used / not relevant	
	1	2	0	
Graphic arts / layout / advertising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SGALA
Design of objects or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SDOS
Multimedia (combining audio, graphics, text, still pictures, animation, video etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SMED
Web design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SWDS
Software development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SSWD
Market research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SMKR
Engineering / applied sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SENAP
Mathematics / statistics / database management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SMSDM

\*: Include freelancers, consultants, other independent enterprises, other parts of your enterprise group, etc.

### 11.2 During the three years 2008 to 2010, did your enterprise use any of the following methods to stimulate new ideas or creativity among your staff? If yes, was the method successful in producing new ideas or increasing creativity?

	Method used and:			Method not used	
	Successful	Not Successful	Don't know if successful		
	1	2	3		
Brainstorming sessions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MBRST
Multidisciplinary or cross-functional work teams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MMDCF
Job rotation of staff to different departments or other parts of your enterprise group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MJBRT
Financial incentives for employees to develop new ideas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MFIN
Non-financial incentives for employees to develop new ideas, such as free time, public recognition, more interesting work, etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MNFIN
Training employees on how to develop new ideas or creativity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MTREM

## 12. Basic economic information on your enterprise

**12.1 What was your enterprise's total turnover for 2008 and 2010?**<sup>6</sup> Turnover is defined as the market sales of goods and services (Include all taxes except VAT<sup>7</sup>).

2008	2010
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TURN08	TURN10

**12.2 What was your enterprise's average number of employees in 2008 and 2010?**<sup>8</sup>

2008	2010
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
EMP08	EMP10

**12.3 Approximately what percent of your enterprise's employees in 2010 had a university degree?**<sup>9</sup>

- EMPUD*
- |             |                          |   |
|-------------|--------------------------|---|
| 0%          | <input type="checkbox"/> | 0 |
| 1% to 4%    | <input type="checkbox"/> | 1 |
| 5% to 9%    | <input type="checkbox"/> | 2 |
| 10% to 24%  | <input type="checkbox"/> | 3 |
| 25% to 49%  | <input type="checkbox"/> | 4 |
| 50% to 74%  | <input type="checkbox"/> | 5 |
| 75% to 100% | <input type="checkbox"/> | 6 |

<sup>6</sup> Give turnover in '000 of national currency units. Leave space for up to nine digits.

<sup>7</sup> For Credit institutions: Interests receivable and similar income; for Insurance services give gross premiums written

<sup>8</sup> If administrative data are used and the annual average is not available, give results for the end of each year. Leave space for up to six digits for question 12.2.

<sup>9</sup> National translation: This includes ISCED 5a and 6. If administrative data are used, use the same time period as for question 12.2.



## Innovasjon



De neste spørsmålene dreier seg om innovasjon. Innovasjon er basert på resultater av enten ny teknologisk utvikling, nye kombinasjoner av eksisterende teknologi eller utnyttelse av annen kunnskap ervervet av foretaket. Dette omfatter FoU, men også annen aktivitet. Både foretak med og uten FoU skal svare på denne delen av undersøkelsen.



### Produktinnovasjon

Produktinnovasjon er en vare eller tjeneste som enten er ny eller vesentlig forbedret med hensyn på dets egenskaper, tekniske spesifikasjoner, innebygd software eller andre immaterielle komponenter eller brukervennlighet. Innovasjonen skal være ny for foretaket; den må ikke nødvendigvis være ny for markedet. Det er ikke avgjørende om innovasjonen er utviklet av ditt foretak eller av andre foretak. Endringer av bare estetisk natur, som design, skal ikke inkluderes her, men under markedsinnovasjon. Rent salg av innovasjoner fullt og helt utviklet og produsert av andre foretak omfattes ikke.

**12 Har foretaket i perioden 2008-2010 introdusert produkter (varer eller tjenester) på markedet som er nye eller vesentlig forbedrede?**

- Ja, varer  
 Ja, tjenester  
 Nei → **Gå til 16**



**13 Hvem utviklet disse produktene?** Kryss av for de alternativene som passer

	Nye varer	Nye tjenester
I hovedsak eget foretak	<input type="checkbox"/>	<input type="checkbox"/>
Eget foretak i samarbeid med foretak i eget konsern	<input type="checkbox"/>	<input type="checkbox"/>
Eget foretak i samarbeid med andre foretak eller institusjoner (forskningsinstitutter, universiteter/høyskoler)	<input type="checkbox"/>	<input type="checkbox"/>
Eget foretak ved å kopiere eller modifisere varer eller tjenester opprinnelig utviklet av andre foretak eller institusjoner	<input type="checkbox"/>	<input type="checkbox"/>
I hovedsak andre foretak eller institusjoner	<input type="checkbox"/>	<input type="checkbox"/>

**14 Var noen av disse produktinnovasjonene nye for foretakets marked eller bare nye for foretaket?**

	Ja	Nei	Hvis ja: →	Nye for det norske markedet	Nye for det europeiske markedet	Nye for verdensmarkedet
Nye for foretakets marked	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bare nye for foretaket	<input type="checkbox"/>	<input type="checkbox"/>				

**15 Fordel etter beste skjønn foretakets omsetning<sup>1</sup> i 2010 på:**

Nye eller vesentlig forbedrede produkter (varer eller tjenester) introdusert i perioden 2008-2010 som var <b>nye for foretakets marked</b>	<input type="text"/>	%
Nye eller vesentlig forbedrede produkter (varer eller tjenester) introdusert i perioden 2008-2010 som var <b>nye bare for foretaket</b>	<input type="text"/>	%
Produkter (varer eller tjenester) som var <b>uforandrede eller lite endret</b> i perioden 2008-2010. Varer og tjenester fullt og helt utviklet og produsert av andre skal inkluderes her	<input type="text"/>	%
<b>Total omsetning i 2010</b>	<b>1,0,0</b>	<b>%</b>

<sup>1</sup> For kredittinstitusjoner: Renteinntekter og tilsvarende inntekter; for forsikringsselskaper: Brutto premieinntekter



## Prosessinnovasjon

Prosessinnovasjon omfatter nye eller vesentlig forbedrede produksjonsteknologi/-metoder og nye eller vesentlige forbedrede metoder for levering av varer og tjenester. Innovasjonen skal være ny for foretaket; foretaket må ikke nødvendigvis være den første til å introdusere denne prosessen. Det er ikke avgjørende om innovasjonen er utviklet av ditt foretak eller av andre foretak. Rene organisasjonsmessige endringer skal ikke inkluderes her.



### 16 Introduserte foretaket i perioden 2008-2010 noe av det følgende ....

- Ja, nye eller vesentlige forbedrede metoder for produksjon eller framstilling av varer eller tjenester
- Ja, nye eller vesentlige forbedrede metoder for lagring, levering eller distribusjon av varer eller tjenester
- Ja, nye eller vesentlige forbedrede støttefunksjoner, som systemer for vedlikehold, innkjøp, regnskap eller IT
- Nei → **Gå til 19**

### 17 Hvem utviklet disse prosessene? Kryss av for de alternativene som passer

- I hovedsak eget foretak
- Eget foretak i samarbeid med foretak i eget konsern
- Eget foretak i samarbeid med andre foretak eller institusjoner (forskningsinstitutter, universiteter/høyskoler)
- Eget foretak ved å kopiere eller modifisere prosesser opprinnelig utviklet av andre foretak eller institusjoner
- I hovedsak andre foretak eller institusjoner



### 18 Var noen av prosessinnovasjonene introdusert i perioden 2008-2010 nye for foretakets marked?

- Ja
- Nei
- Vet ikke

### 19 Hadde foretaket i perioden 2008-2010 innovasjonsaktivitet som ikke har resultert i en produkt- eller prosess-innovasjon fordi:

- |   | Ja                       | Nei                      |
|---|--------------------------|--------------------------|
| Aktiviteten ble avbrutt eller utsatt før ferdigstilling | <input type="checkbox"/> | <input type="checkbox"/> |
| Aktiviteten var pågående ved utgangen av 2010           | <input type="checkbox"/> | <input type="checkbox"/> |



**20** Innovasjonsaktiviteter utført i 2008-2010. Kryss av hvilke innovasjonsaktiviteter foretaket utførte i perioden 2008-2010.



	Ja	Nei
<b>Eget forsknings- og utviklingsarbeid (innen foretaket)</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Kjøp av FoU-tjenester fra andre</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Kjøp av maskiner, utstyr og programvare (utenom FoU)</b> Rettet spesielt mot utvikling av nye produkter og/eller prosesser.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Kjøp av annen ekstern kunnskap (utenom FoU)</b> Kjøp av rettigheter til bruk av patenter, ikke-patenterte oppfinnelser, lisenser, know-how, varemerker eller annen kunnskap eller tjenester for utvikling av nye produkter og/eller prosesser.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Kompetanseoppbygging (utenom FoU)</b> Opplæring av personale i direkte tilknytning til utvikling og/eller introduksjon av nye eller forbedrede produkter eller prosesser, både bruk av eksterne tjenester og intern utdanning.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Markedsintroduksjon av innovasjoner</b> Innbefatter intern og ekstern aktivitet i forbindelse med lansering av et nytt eller forbedret produkt. Dette kan omfatte forundersøkelser i markedet, markedstester og lanseringsreklame. Oppbygging av distribusjonsnett for markedsføring av innovasjoner skal derimot ikke inngå.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Design</b> Aktiviteter knyttet til design, forbedring eller endring av form eller utseende av nye eller vesentlige forbedrede varer eller tjenester.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Annet</b> Andre aktiviteter for å introdusere nye produkter eller prosesser slik som uttesting, rutinemessig programmering, oppstart, engineering mv.	<input type="checkbox"/>	<input type="checkbox"/>



**21** Gi etter beste skjønn et anslag for kostnadene i 2010 til følgende innovasjonsaktiviteter foretaket utførte. Inkl. lønns- og egne driftskostnader, kjøp av tjenester og investeringskostnader (ikke avskrivninger).

Kostnadene i 2010  
Hele 1000 kroner

<b>Eget forsknings- og utviklingsarbeid (innen foretaket)</b>	Oppgitt i spørsmål 4	
<b>Kjøp av FoU-tjenester fra andre</b>	Oppgitt i spørsmål 11	
<b>Kjøp av maskiner, utstyr og programvare (utenom FoU)</b> Rettet spesielt mot utvikling av nye produkter og/eller prosesser.	<input type="text"/>	000
<b>Kjøp av annen ekstern kunnskap (utenom FoU)</b> Kjøp av rettigheter til bruk av patenter, ikke-patenterte oppfinnelser, lisenser, know-how, varemerker eller annen kunnskap eller tjenester for utvikling av nye produkter og/eller prosesser.	<input type="text"/>	000
<b>Andre kostnader knyttet til introduksjon av nye produkter eller prosesser.</b> Kompetanseoppbygging, markedsintroduksjoner av innovasjoner, design og andre aktiviteter.	<input type="text"/>	000



**22 Formål med innovasjon.** Hvor viktig var de følgende formålene for foretaket for utvikling av nye produkter (varer eller tjenester) eller prosesser i perioden 2008-2010? ⌵

	Svært viktig	Nokså viktig	Lite viktig	Ikke relevant
⌵ Utvide spekter av varer eller tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Erstatte utdaterte produkter eller prosesser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gå inn i nye markeder eller øke markedsandel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forbedre kvalitet i varer eller tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forbedre fleksibilitet for produksjon av varer eller tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Øke kapasitet for produksjon av varer eller tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redusere arbeidskostnader per produsert enhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redusere material- og energikostnader per produsert enhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redusere miljømessige effekter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forbedre helse eller sikkerhet for ansatte	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**23 Forskjellige former for informasjon er nødvendig for utvikling og introduksjon av nye produkter og prosesser.** Vi er interessert i å vite mer om hvor denne informasjonen kommer fra. Oppgi betydningen av følgende informasjonskilder til foretakets innovasjonsaktiviteter i perioden 2008-2010, enten for nye innovasjonsprosjekter eller fullføring av eksisterende innovasjonsprosjekter.

⌵

		Stor betydning	Middels betydning	Liten betydning	Ikke brukt
<b>Interne kilder</b>	Innen foretaket eller konsernet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Markedskilder</b>	Leverandører av utstyr, materiell, komponenter eller dataprogram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Klienter, kunder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Konkurrenter eller andre foretak i din bransje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Konsulenter, konsulentforetak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Kommersielle laboratorier /FoU-foretak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Institusjonelle kilder</b>	Universiteter eller høyskoler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Offentlige eller private forskningsinstitutter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Andre kilder</b>	Faglige konferanser, møter, messer og utstillinger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Faglige tidsskrifter eller publikasjoner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Bransjeorganisasjoner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Samarbeid om innovasjon og FoU i 2008-2010.

Med samarbeid menes aktiv deltaking i felles FoU og andre innovasjonsaktiviteter med andre organisasjoner (enten andre foretak eller ikke-kommersielle institusjoner). Dette betyr ikke nødvendigvis at begge parter oppnår umiddelbar økonomisk gevinst fra samarbeidet. Rent kontraktarbeid uten aktivt samarbeid fra begge parter omfattes ikke.

**24 Hadde foretaket innovasjonssamarbeid, inkl. FoU, med andre foretak eller institusjoner i perioden 2008-2010?**

Ja

Nei → **Gå til 26**

⌵

⌵



**25 Kryss av for type samarbeidspartner og hvor denne er geografisk lokalisert.** Flere svaralternativer er mulig. Kryss også av for den viktigste samarbeidspartneren (siste kolonne).

	Lokalt/ regionalt i Norge	Norge for øvrig	Norden	Europa for øvrig <sup>1</sup>	USA	Kina eller India	Andre land	Viktigste partner Bare ett kryss
Andre foretak i samme konsern	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leverandører av utstyr, materiell, komponenter eller dataprogram	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Klienter, kunder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Konkurrenter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Konsulenter, konsulentforetak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kommersielle laboratorier/FoU-foretak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Universiteter eller høyskoler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Offentlige eller private forskningsinstitutter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<sup>1</sup> Følgende EU- /kandidatland: Belgia, Bulgaria, Estland, Frankrike, Hellas, Irland, Italia, Kroatia, Kypros, Latvia, Liechtenstein, Litauen, Luxembourg, Makedonia, Malta, Nederland, Polen, Portugal, Romania, Slovakia, Slovenia, Spania, Storbritannia, Sveits, Tsjekkia, Tyrkia, Tyskland, Ungarn og Østerrike.

**26 Hemmende faktorer for innovasjon. Hvor avgjørende var følgende faktorer for ikke å drive innovasjonsaktivitet eller hindrende for pågående innovasjonsaktivitet i perioden 2008-2010?** Oppgi graden av viktighet for de relevante faktorene.

		Svært viktig	Nokså viktig	Lite viktig	Faktor ikke opplevd
<b>Kostnadsforhold</b>	For høye innovasjonskostnader	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Mangel på finansiering innen foretaket eller konsernet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Mangel på passende finansiering fra kilder utenfor foretaket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Kunnskapsforhold</b>	Problemer med å holde på eller rekruttere kvalifisert personell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Mangel på teknologisk informasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Mangel på markedsinformasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Vanskelig å finne samarbeidspartner for innovasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Markedsforhold</b>	Markedet dominert av etablerte foretak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Usikker etterspørsel etter nye varer og tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Grunner til ikke å innovere</b>	Ikke behov på grunn av tidligere innovasjoner i foretaket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Ikke behov på grunn av manglende etterspørsel i markedet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**27 Gjorde foretaket, eller konsernet som foretaket tilhører, i perioden 2008-2010 bruk av følgende metoder for å beskytte oppfinnelser eller innovasjoner utviklet av foretaket?**

	Ja	Nei
Søke om patent	<input type="checkbox"/>	<input type="checkbox"/>
Mønsterbeskyttelse	<input type="checkbox"/>	<input type="checkbox"/>
Varemerke	<input type="checkbox"/>	<input type="checkbox"/>
Opphavsrett (copyright)	<input type="checkbox"/>	<input type="checkbox"/>
Hemmeligholdelse	<input type="checkbox"/>	<input type="checkbox"/>
Kompleks utforming/design	<input type="checkbox"/>	<input type="checkbox"/>
Tidsforsprang på konkurrentene	<input type="checkbox"/>	<input type="checkbox"/>

### Organisasjonsinnovasjon

En organisasjonsinnovasjon er gjennomføring av nye organisatoriske metoder i foretaket (inkl. kunnskapssystemer), organisering av arbeidsrutiner/-prosesser eller bruk av nye eksterne relasjoner for foretaket. Endringene må være et resultat av strategiske beslutninger i foretaket. Sammenslåing med andre eller oppkjøp av andre foretak omfattes ikke.

#### 28 Introduserte foretaket noen av følgende organisasjonsmessige endringer i perioden 2008-2010?

	Ja	Nei
Ny <b>forretningspraksis</b> for organisering av arbeid eller prosedyrer (f.eks. styring av forsyningskjeder, prosessomlegging/-optimalisering (BPR/lean production), kvalitetsstyring, opplæringssystemer)	<input type="checkbox"/>	<input type="checkbox"/>
Nye metoder for <b>organisering av arbeidsansvar og beslutninger</b> innen foretaket (første gangs bruk av nye systemer for delegering av ansvar og beslutninger til ansatte, team arbeid, desentralisering, integrering eller oppsplitting av avdelinger, opplæringssystemer mv.)	<input type="checkbox"/>	<input type="checkbox"/>
Nye metoder for organisering av <b>eksterne relasjoner</b> til andre foretak eller offentlige institusjoner som bruk av allianser, partnerskap, utskilling av aktiviteter, utsetting (outsourcing), underkontrahering (sub-contracting) for første gang.	<input type="checkbox"/>	<input type="checkbox"/>

Hvis foretaket ikke introduserte organisatoriske endringer (nei på alle): → Gå til **30**

#### 29 Hvor viktig var følgende formål for foretakets organisatoriske endringer gjennomført i perioden 2008-2010?

Hvis foretaket har gjennomført flere organisatoriske endringer, svar ut fra en totalvurdering.

	Høy viktighet	Middels viktighet	Lav viktighet	Ikke relevant
Redusere responstid på behov fra kunder eller leverandører	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forbedre evne til å utvikle nye produkter eller prosesser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forbedre kvalitet i foretakets varer eller tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redusere kostnader per produsert enhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forbedre kommunikasjon eller informasjonsutveksling innen foretaket eller med andre foretak eller institusjoner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Markedsinnovasjon (marketing)

En markedsinnovasjon er gjennomføring av et nytt markedsføringskonsept eller ny -strategi som atskiller seg vesentlig fra foretakets nåværende metoder og som ikke har vært brukt av foretaket tidligere. Dette krever vesentlige endringer i produktets design eller innpakning, produkt plassering, promotering eller prissetting. Unntatt er rutine- eller sesongmessige endringer i markedsføringsmetoder.

#### 30 Introduserte foretaket i løpet av 2008-2010 markedsinnovasjoner i form av ...

	Ja	Nei
...Vesentlige endringer i <b>design</b> (utseende, utforming) eller <b>innpakning</b> av en vare eller tjeneste (unntatt endringer som er knyttet til produktets funksjonalitet eller bruksegenskaper)	<input type="checkbox"/>	<input type="checkbox"/>
...Nye media eller nye måter for <b>promotering</b> av produktet (f.eks. annonsering i nytt media for første gang, nytt varemerke, introduksjon av kunde-/lojalitetskort)	<input type="checkbox"/>	<input type="checkbox"/>
...Nye måter for <b>produkt plassering</b> eller nye <b>salgskanaler</b> (f.eks. første gangs bruk av franchising eller distribusjonslisenser, direkte salg, eksklusivt kundesalg, nytt konsept for produktpresentasjon)	<input type="checkbox"/>	<input type="checkbox"/>
...Nye metoder for <b>prising</b> av varer eller tjenester (bruk av rabattsystemer for første gang, etterspørselsbestemt prissetting)	<input type="checkbox"/>	<input type="checkbox"/>

Hvis foretaket ikke introduserte markedsinnovasjoner (nei på alle): → Gå til **32**

#### 31 Hvor viktig var de følgende formål for foretakets markedsinnovasjoner gjennomført i perioden 2008-2010? Hvis foretaket har gjennomført flere markedsinnovasjoner, svar ut fra en totalvurdering.

	Høy viktighet	Middels viktighet	Lav viktighet	Ikke relevant
Øke eller opprettholde markedsandel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Introdusere produkter til nye kundegrupper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Introdusere produkter til nye geografiske markeder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Kreativitet og kompetanse



**32** Hadde foretaket ansatte personer med følgende kompetanse, eller kjøpte foretaket slik kompetanse eksternt<sup>1</sup> i perioden 2008 – 2010?



	Ansatt i foretaket	Innkjøpt eksternt	Kompetanse ikke brukt/ ikke relevant
Grafisk design/formgivning (layout)/markedsføring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design av varer og tjenester	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Multimedia (kombinere lyd, grafikk, tekst, bilder, animasjon, video etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Webdesign/ Webutvikling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Programvareutvikling (IT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Markedsundersøkelser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ingeniører/anvendt forskning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Matematikk/statistikk/databehandling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<sup>1</sup> Inkluderer frilansere, konsulenter, personale innleid fra andre foretak, personale midlertidig hentet inn fra andre foretak i eget konsern, etc.

**33** Brukte foretaket noen av følgende metoder for å stimulere til nye ideer eller kreativitet blant ansatte i perioden 2008-2010? Hvis metoden brukt, var metoden vellykket eller ikke vellykket?



	Vellykket	Ikke vellykket	Vet ikke	Metoden ikke brukt
Idédugnader (brainstorming)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tverrfaglige eller bredt sammensatte arbeidsgrupper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stillingsrotasjon av ansatte til forskjellige avdelinger i foretaket eller andre foretak i konsernet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Økonomiske insentiver for de ansatte til å utvikle nye ideer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ikke-økonomiske insentiver for de ansatte til å utvikle nye ideer (mer fri eller fleksibel tidsbruk, offentlig anerkjennelse, mer interessante arbeidsoppgaver etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utdanning/opplæring for de ansatte særskilt rettet mot å utvikle kreativitet/ nye ideer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**34** Foretakets marked. I hvilke geografiske markeder selger foretaket sine produkter eller tjenester? Sett kryss for hvert marked. Hvilket er det viktigste markedet? Sett ett kryss i siste kolonne.

	Hvilke markeder. Flere kryss mulig.	Viktigste marked. Bare ett kryss
Lokalt/regionalt i Norge	<input type="checkbox"/>	<input type="checkbox"/>
Norge for øvrig	<input type="checkbox"/>	<input type="checkbox"/>
Andre EU-/EFTA – land <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>
Andre land	<input type="checkbox"/>	<input type="checkbox"/>

<sup>1</sup> Belgia, Bulgaria, Danmark, Estland, Finland, Frankrike, Hellas, Irland, Island, Italia, Kroatia, Kypros, Latvia, Liechtenstein, Litauen, Luxembourg, Makedonia, Malta, Nederland, Polen, Portugal, Romania, Slovakia, Slovenia, Spania, Storbritannia, Sveits, Sverige, Tsjekkia, Tyrkia, Tyskland, Ungarn og Østerrike.







## Appendix 3

Undersøkelse av 1) forståelsen av CIS-spørsmål og 2) hva som rapporteres og eventuelt ikke rapporteres.

Overordnede RQ:

1. Hvilke innovasjoner rapporteres i en CIS-survey? Hvorvidt kjenner toppledelse/daglig leder til innovasjonene som er iverksatt innen organisasjonen, inkludert avdelingsnivå/lavere nivå? Forekommer det innovasjoner som ikke rapporteres? (Inkrementelle, bricolage, employeeediven, evt. nye typer) og hvordan utøves disse?
2. Hvordan arbeider bedriften for å utvikle og iverksette innovasjoner? (Initiering, drivere?)
3. Forståes spørreskjemaet av respondent? Er forklaringene til innovasjonsbegrepet begripelig? (Taxonomien)

### Trin 1:

Avtale om intervjudeltakelse:

Respondentene kontaktes på telefon/mail med spørsmål om de har mulighet/interesse for å delta i undersøkelsen. De informeres kort om at undersøkelsen handler om innovasjon og hvordan det jobbes med innovasjon i bedriften. Etter at kontakt er opprettet/respondent har akseptert invitasjonen, avtales det intervjutidspunkt og sted for intervju.

### Trin 2: (møte/intervju).

Respondentene bes først om å ta seg god tid (i fred og ro) til å svare på CIS-spørsmålene om de fire innovasjonstyper etter å ha lest introduksjonssiden til undersøkelsen.

### (Selve intervjuet.) Intervjuguide.<sup>1</sup>

Intro:

- Er spørreskjemaet forståelig?
- Hvordan oppleves spørreskjemaet å svare på?
- Kjente du til innovasjonsbegrepet før dette intervjuet. Følte du at du hadde en god forståelse for hva innovasjon er?

---

1 Hvert intervju tilpasses nivået som intervjues henholdsvis topp-leder eller avdelingsleder

## CIS – Produktinnovasjon

- Hvis du har svart ja på at slike innovasjoner er iverksatt, Hvilke innovasjoner har du tenkt på da du svarte ja?
- Hvor og hvordan er disse innovasjonene utviklet? (Hvis problemer med å svare, supplere med: er noen av disse produktene utviklet i din avdeling og ikke på overordnet/sentralt nivå i bedriften? Eller er noen utviklet på overordnet/sentralt nivå? Eller i samarbeid mellom sentralt nivå og avdelings-/seksjonsnivå?)
- (Kun avdelingsledere: Har daglig leder/topp ledelse kjennskap til alle utviklede produkter/tjenester?)
- Er det skjet forbedringer av produkter/tjenester som ikke er rapportert i skjemaet? Hvorfor?
- Hvordan har dere jobbet for å utvikle henholdsvis nye produkter for markedet og nye produkter for bedriften? (Ledelse til avdeling, avdeling til ledelse?)
- Hvor finnes/hentes Ideer/informasjon?
- Har avdelingen jobbet med tjenesteforbedringer som ikke er rapportert i skjemaet? (Hvor går grensen)

(taxonomi spørsmål)

- Forstår du introduksjonen til innovasjon (forklaring av hva innovasjon er)? Samsvarer den med din oppfattelse av innovasjon?
- Forstår du introduksjonen og forklaringene til produktinnovasjon?
- Hvis noe er uklart eller det minste vanskelig å forstå, forklar hvordan? Og hvorfor?
- Har du klart for deg hva forskjellen på en vare og tjeneste er?
- Testing av alternativs spørreskjema (Rønningen, 2009)<sup>2</sup>

## CIS – Prosessinnovasjon

- Hvis du har svart ja på at slike innovasjoner er iverksatt, Hvilke innovasjoner har du tenkt på da du svarte ja?
- Hvor og hvordan er disse innovasjonene utviklet? (Hvis problemer med å svare, supplere med: er noen av disse produktene utviklet i din avdeling og ikke på overordnet/sentralt nivå i bedriften? Eller er noen utviklet på

---

<sup>2</sup> Rønningen (2009) er en justert CIS-versjon hvor definisjoner og spørsmål er formulert med et enklere språk. Bruken av tekniske begrep og forkortelser er redusert.

overordnet/sentralt nivå? Eller i samarbeid mellom sentralt nivå og avdelings-/seksjonsnivå?

- Er prosessinnovasjoner utfordrende å identifisere?
- Er prosessinnovasjoner utfordrende å skille fra produktinnovasjon?
- (Kun avdelingsledere: Har daglig leder/topp ledelsen kjennskap til alle utviklede prosessinnovasjoner?)
- Har det foregått noen prosessinnovasjoner som ikke er rapportert? Hvor oppfattes grensen å være til hva som er innovasjon?
- Jobber dere kontinuerlig med å følge med på tilgjengelig prosessutviklinger i og utenfor bedriften?
- Hvor finnes/hentes Ideer/informasjon?

(taxonomi spørsmål)

- Er introduksjonen og spørsmålene til prosessinnovasjon lett forståelig?
- Hvis du synes den skulle være presentert annerledes, hvordan da?
- Kjenner du igjen de 3 kategoriene som det deles inn i? Forstår du dem?
- Er inndelingen i de tre kategorier naturlig? (savnes noe)
- Testing av alternativt spørreskjema (Rønningen, 2009)

### CIS - Organisasjonsinnovasjon

- Hvis du har svart ja på at slike innovasjoner er iverksatt, Hvilke innovasjoner har du tenkt på da du svarte ja?
- Hvor og hvordan er disse innovasjonene utviklet? (Hvis problemer med å svare, supplere med: er noen av disse produktene utviklet i din avdeling og ikke på overordnet/sentralt nivå i bedriften? Eller er noen utviklet på overordnet/sentralt nivå? Eller i samarbeid mellom sentralt nivå og avdelings-/seksjonsnivå?)
- (Kun avdelingsledere: Har daglig leder/topp ledelsen kjennskap til alle utviklede prosessinnovasjoner?)
- Har det foregått organisatoriske endringer som du ikke har krysset av for? (Hvor går grensen?)
- Hvilke formål er rapportert som viktige for organisatoriske endringer?

(taxonomi spørsmål)

- Er det forståelig hva organisatorisk innovasjon er?
- Hvis det er uklarerheter ved spørsmålet, forklar hvordan og hvorfor?

Testing av alternativt spørreskjema (Rønningen, 2009)

### CIS - Markedsinnovasjon

- Hvis du har svart ja på at slike innovasjoner er iverksatt, Hvilke innovasjoner har du tenkt på da du svarte ja?
- Hvor og hvordan er disse innovasjonene utviklet? (Hvis problemer med å svare, supplere med: er noen av disse produktene utviklet i din avdeling og ikke på overordnet/sentralt nivå i bedriften? Eller er noen utviklet på overordnet/sentralt nivå? Eller i samarbeid mellom sentralt nivå og avdelings-/seksjonsnivå?)
- Hvordan jobber dere med markedsinnovasjon?
- Har det blitt introdusert noen markedsinnovasjoner på avdelingsnivå, evt. I samarbeid med markedsavdelingen etter dine vurderinger? Eller hvordan starter/oppstår og utvikles markedsinnovasjoner?

(taxonomi spørsmål)

- Er det forståelig hva markedsinnovasjon er?
- Hvis noe er det minste uklart, forklar hvordan og hvorfor?

Testing av alternativt spørreskjema (Rønningen, 2009)

### Generelle spørsmål:

- Er spørreskjemaet forståelig?
- Syns du produkt, prosess, organisasjons og markedsinnovasjon er en naturlig inndeling av innovasjonsaktivitet? Går det bra å skille mellom disse når en besvarer spørsmålene?
- Fikk du gitt uttrykk for/rapportert/plassert betydelige forbedringer i din avdeling? Eller mener du det er utviklet innovasjon/utvikling/forbedringer i din bedrift som ikke fanges opp av spørsmålene/faller inn under noen av innovasjonstypene? (Forklar og utdyp)
- Hva slags innovasjonsaktivitet er viktigst for dere som reiselivsbedrift?
- Hvordan jobber dere med innovasjonsprosesser?



Doctoral dissertation submitted for the degree of Philosophiae Doctor (PhD) to the PhD programme Innovation in Services in the Public and Private Sectors at Inland Norway University of Applied Sciences

## **Exploring the CIS and hidden innovation in a service context**

The overall goal of this thesis is to investigate the use of the Community Innovation Survey (CIS) in a service context.

The thesis argues that understanding the processes behind services innovations provides better insights into the measurement of innovation and hidden innovation; for example, how innovations start and develop, and who is involved. Such knowledge may reveal how and why some innovations remain hidden. It is argued that the process of a services innovation is so crucial to the innovation outcome that it should be acknowledged in innovation measurement. This thesis addresses how the CIS tends to focus excessively on innovation output, and it is unclear whether the process that leads to services innovation is acknowledged. Consequently, this thesis investigates CIS measurement of innovation and hidden innovation by relating process perspectives on services innovation to the measurement of the services innovation output.

The findings of the thesis reveal several examples of hidden innovation and suggest four different types of hidden innovation.

The thesis suggests that the CIS can be used to measure innovation in tourism and services. The CIS instrument should not be dismissed but rather improved. One way of improving the instrument for innovation measurement in tourism or similar services would be to follow the suggested recommendations in this thesis.



Anne Jørgensen Nordli  
was born in 1978.  
Nordli holds a position at Inland School  
of Business and Social Sciences at Inland  
Norway University of Applied Sciences.