Measuring Public Innovation in Nordic Countries

Report on the Nordic Pilot studies – Analyses of methodology and results

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Preface

This report presents findings from the Nordic pilot study which has been a central part of the joint Nordic research project 'Measuring Public Innovation in Nordic Countries: Toward a common statistical approach'. The prime objective of the project has been to generate a better understanding of how to measure innovation in public sector contexts and to test our measurement framework with respect to validity, potential comparability and usefulness. In addition to generating new knowledge and improving our understanding of how to measure innovation in the public sector, the pilot study also provides novel empirical results on public sector innovation. However, it is important to avoid over-interpretation of these results and they should not be considered suitable for benchmarking.

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For more information on the project and its deliverables, see www.mepin.eu

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Contents

1 Introduction

This report presents findings from the Nordic pilot study which has been a central part of the joint Nordic research project 'Measuring Public Innovation in Nordic Countries: Toward a common statistical approach'. The prime objective of the project has been to generate a better understanding of how to measure innovation in public sector contexts and to test our measurement framework with respect to validity, potential comparability and usefulness. The main findings from the project are therefore process oriented insights and relate to how the public sector could be approached and what mechanisms that should be taken into account when studying it. In addition to generating new knowledge and improving our understanding of how to measure innovation in the public sector, the pilot study also provides novel empirical results on public sector innovation. However, it is important to avoid overinterpretation of these results and they should not be considered suitable for benchmarking. The populations in each country are different, as country's explored different methods to address many of the challenging statistical issues for the survey, and some countries also experimented with the inclusion of special groups, such as hospitals and schools. In addition, given that this is a pilot study, a full validation procedure has not been employed. Finally, many of the concepts used in this survey are very much new to public sector organizations. Despite extensive testing, we lack a full knowledge of how these concepts are understood by various respondents. Nonetheless, the empirical findings may contribute to improve our knowledge on innovation dynamics in the public sector; it may shed new light on how this sector operates; and finally it may add to our understanding of innovation in general.

The report is structured as follows: Section two provides a brief outline of the methods used. In section three the empirical findings will be presented. The presentation of the empirical results follows the order from the Nordic common questionnaire: a) the findings related to various types of innovation and b) who these were developed by, c) the newness of these innovations, d) objectives for innovation activities in the public sector, e) information channels, f) cooperation for innovation, g) procurement, h) drivers of innovation, i) strategy and internal capabilities and finally j) barriers to innovation. Finally, some results are presented for hospitals and schools. Section four includes an assessment of both the results of the pilot studies and the methodologies used and provides some recommendations for future work. Section five contains a detailed review of the methodologies used in each of the country's studies. Tables with basic results from the pilot studies, the Nordic common questionnaire and a list of examples of innovations from the surveys can be found in the appendix.

2   Method

This section provides a brief introduction to the methods used in this study. Section four presents a more thorough discussion and reflection on methodological issues raised throughout the accomplishment of the study.

The Pilot study was conducted in all five Nordic countries Denmark, Finland, Iceland, Norway and Sweden, in the period between May and October 2010. The study was targeted at public sector institutions at both the central and non-central (i.e. regional and local) level. The central level includes government institutions such as ministries and directorates, whereas the regional and local level comprises public sector actors such as municipalities, schools and hospitals[1]. In this report the two levels are referred to as central and non-central government respectively. In most cases the questionnaire was answered by the top management of the institutions.

There are several methodical issues to be highlighted in a pilot survey like this. For instance, the reporting unit has been a central issue for the study: Who should the study be directed at? On behalf of whom should the respondent answer? Some municipalities have chosen to respond for all their sub-units, whereas others responded for their single administrative units. Such problems may have affected the answers in the study. Section four provides an account for these types of issues and problems in greater detail.

2.1   Definition of innovation

The definition of an innovation used in the survey covered four types of innovations: product, process, organisational and communication innovations. The four types of innovation have been defined in the following way in the survey:

- *A **product innovation** is the introduction of a service or good that is new or significantly improved compared to existing services or goods in your organisation. This includes significant improvements in the service or good's characteristics, in customer access or in how it is used.*
- *A **process innovation** is the implementation of a method for the production and provision of services and goods that are new or significantly improved compared to existing processes in your organisation. This may involve significant improvements in for example, equipment and/or skills. This also includes significant improvements in support functions such as IT, accounting and purchasing.*
- *An **organisational innovation** is the implementation of a new method for organising or managing work that differs significantly from existing methods in your organisation. This includes new or significant improvements to management systems or workplace organisation.*

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[1] In Iceland the situation is different as secondary schools and hospitals belong to the central level.

- *A **communication innovation** is the implementation of a new method of promoting the organisation or its services and goods, or new methods to influence the behaviour of individuals or others. These must differ significantly from existing communication methods in your organisation.*

2.2   Questionnaire

A common Nordic questionnaire was developed based on a preparatory study of user needs as well as an introductory feasibility study among potential respondents. The questionnaire was also partially based on the Community Innovation Survey (CIS) for the business sector, though adjusted to fit public sector contexts. Following the basic structure of the CIS survey, the questionnaire sought to cover the following topics dealing with innovation in public sector organizations:

- Innovations
- Innovation activities and expenditures
- The objectives of innovations
- Information channels for innovation activities
- Innovation cooperation
- External funding for innovation
- Innovative procurement practices
- Driving forces of innovation
- Innovation strategy, management and competences
- Barriers to innovation

There was some variation among the national versions of the questionnaire for selected questions (see section 5 for more details). Generally, Denmark, Iceland, Norway and Sweden followed the Nordic common questionnaire quite closely, while the questionnaire used in Finland differs more from the other countries. These national differences in how the questionnaire was made are the reason why some of the figures are not shown for all five Nordic countries. Also, the data collection was conducted in various ways in the different countries. Whereas Iceland, Norway and Sweden collected the data by using an electronic questionnaire on the internet, Denmark and Finland collected the data through a postal survey. The questionnaire was first developed in English and then translated into national languages.

2.3   Population and sample

A major challenge in conducting the pilot studies was selection of the survey frame. The starting point for all countries was the populations of enterprise (or legal) units within the general government sector. Selected units in a number of countries were excluded by manual sorting, based on an assessment of their relevance for this pilot study. In Finland, 90 units within central government were selected for the study out of 503 units. In particular, organisations such as district courts, execution authorities, various approving authorities and regional prisons were excluded from the sample. Norway also excluded selected units from their population within central government (predominantly within defense, religious services and higher education). Denmark excluded a small number of units, mainly internal approval authorities. Iceland did not undertake manual sorting, but used a judgement sample for selected sectors[2]. Universities and units within defence were typically excluded from all countries.

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[2] Note for the data collection in Iceland. For the central government, a census was taken of the largest institutions for Residential Care, Social Work and Culture & Sports. Judgement sample was applied to Education institutions, Health institutions and Technical & Environmental institutes. Finally, for other public service, a census was taken of the largest research institutes. For the municipalities, a census was taken of the five largest ones, with more than 13.000 inhabitants, while judgement sample was applied to the municipalities outside of the capital, yet excluding municipalities with less than 2000 inhabitants.

Overall samples also included additional units from selected sectors. In Finland and Norway, subunits of municipalities (for example, within areas of health, social service and education) were also surveyed. A number of countries also included selected direct service providers in their samples. Norway, Denmark, Sweden and Iceland included hospitals and Denmark and Iceland included schools in their samples. The table below provides an overview of the samples used in each country. See also section 5 below for a more detailed description of populations and samples used in the surveys.

Table 1: Description of samples used in the Nordic pilot studies

Country	Level of government	Sample size	Details
Denmark	Central government	158	Census, with manual sorting
	Regional and local government	446	Census of regions and municipalities (106); Census of hospitals (61), sample of upper level secondary schools (279)
	Total	604	
Finland	Central government	90	Census with manual sorting
	Regional and local government	208	Census of largest municipalities; sample of remaining municipalities and associations of municipalities.
	Total	298	
Iceland	Central government	31	Sample
	Regional and local government	48	Sample including both municipalities and direct service providers (such as schools and hospitals)
	Total	79	
Norway	Central government	318	Census with manual sorting (except regional offices, which were sampled)
	Regional and local government	308	Sample of municipalities and hospitals, census of 20 largest municipalities
	Total	626	
Sweden	Central government	94	Sample
	Regional and local government	311	Sample of association of municipalities, municipalities and regional offices (211), sample of hospitals (100)
	Total	405	

2.4   Response rates

The response rate is between 40 and 45 % for Denmark, Finland, Norway and Sweden, whereas Iceland had a higher response rate at 78 %. Apart from Iceland these are generally low response rates which underline the need to treat the findings with care, and to see them in relation to the methodological reflections in section four.

Table 2: Overall response rate and sample by country. Percent and absolute numbers

	Denmark	*Finland*	*Iceland*	*Norway*	*Sweden*
Response rate (%)	42.0	46.3	77.6	44.7	45.2
Sample (N)	604	298	79	626	405

Given that these were pilot studies, none of results have been weighted to reflect the total population, nor have any imputation procedures been used.

2.5   Methodical summary

As this brief introduction describes, the Nordic pilot studies have been based on a harmonised approach, but there are a number of differences in their actual implementation. All surveys were based on the same common Nordic questionnaire[3], and all countries took the population of enterprise or legal units in the general government sector as the starting point for determining survey frames. However, there are also differences in the structure of government units, in choice of target population (manual sorting), sampling, and also the inclusion of direct service providers (hospitals and schools). In addition, given that this is a pilot study, a full validation procedure has not been employed.

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[3] Though with some exceptions for Finland. See section 5 below for a detailed description of differences in questionnaires.

3 Results from the pilot studies

3.1 Types of innovation

What is innovation in the public sector? What is the difference between business as usual and new practices in the public sector, and how does innovation in the public sector differ from innovation in the private sector? Innovation in the public sector may have commonalities with innovation in the private sector, but in other ways it differs from innovation in the private sector. In order to concretize and exemplify the multitude of what public sector innovations may look like this section starts out by presenting a number of concrete examples that were reported in the survey.

Product Innovation
- Robot vacuum cleaners in nursing homes for elderly people
- New ICT system for management of building projects
- Development of a software solution to register place names on top of an aerial photograph database for specialists and for the public
- One Stop Shop: All departments affiliated to the municipality customer service now has one contact point for the whole municipality for customers/citizens
- Introduction of environmentally friendly ambulances
- New ICT system for handling monitoring of vessels
- A new treatment for children, so called Multi-Systemic Therapy (MST), which is provided within the environment of the family and local community. Replaces institutionally based treatment, i.e. the separation of the child from its parents
- IPPI: A communication system for the elderly and the disabled based on GSM and television teleCARE - a system of various components to improve safety alarms
- Surgery robots
- Use of PARO seal in nursing homes (the PARO seal is a robot in the shape of a seal, able to move its eyes and make sounds)

Process Innovation
- Development of IT solution for joint login to public services which enables switching between various public services without new login for each service
- Internet-based system for allowing hunting of small wild animals
- New forms of support for the commercialization of research results
- New registration routines of crime reports received, which contributed to significantly fewer registration errors of criminal charges in the activities of investigative support
- Self-service in the personnel and payroll system
- Digitization of work processes; electronic interaction across services

- Serving a prison term at home with an electronic foot-chain. Pilot project coordinated by the Ministry of Justice
- Online procurement processes
- Introduction of national tests for basic schools
- Planning for hospitals using virtual environment

Organisational Innovation
- Altered organisational affiliation for three divisions in order to improve communication with customers
- Transfer of registration projects to an external agency
- Establishment of 'the Family House'; coordination of service provision to children and youth in the municipality

Communication Innovation
- Email free of charge to all inhabitants in a municipality
- Notification to citizens by SMS to reach citizens with information about incidents, i.e. if the water is shut down temporarily in an area of the city all registered residents of that area get an SMS about this.
- Enabling schools to watch educational films online
- A new TV channel shows the debate in the Danish Parliament, meeting of the European committee and open consultations and hearings
- "The Trial School" is addressed to all who wants to learn how a Swedish trial is run and is available at website
- Mobile phone technology in production of an exhibition
- New website with better functionality for users
- International marketing of educations

The results regarding types of innovation as illustrated in figure 1 below are fairly similar across the five countries. This is particularly the case for Finland, Norway and Sweden while shares of innovative organisations are generally higher for Denmark and Iceland.

The results show a high share of innovative organisations, both for individual types of innovations and overall. These shares are particularly high in comparison with innovative shares found in the business sector, which raises some serious questions on whether these results can be compared with those for businesses (See discussion below in section 4.2).

Figure 1: Various types of innovations by country, 2008-2009. Percent
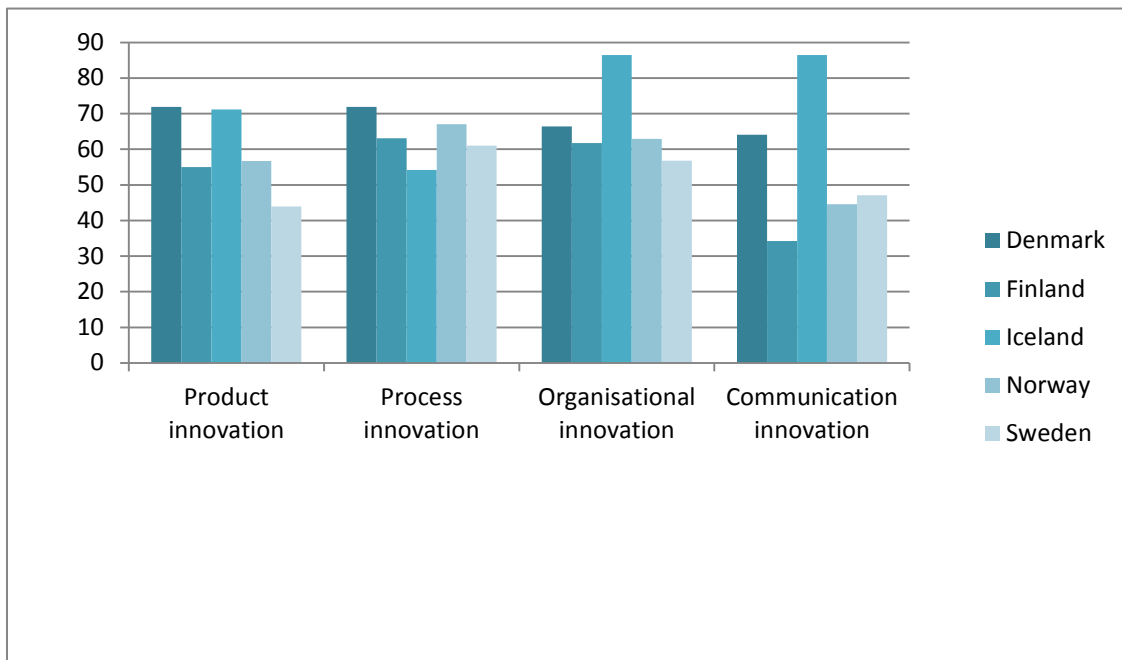
Furthermore, there are small differences between the various types of innovations. However, process innovation and organisational innovation seem to be somewhat more frequent than product innovation. The picture is more mixed regarding communication innovation, where Denmark and Iceland have high shares, while much lower shares are found in Finland, Norway and Sweden.

Figure 2 below shows shares of respondents with any type of innovation (i.e. either product, process, organisational or communication innovation) across countries and across different governmental levels. Shares of innovative organisations are quite similar in all countries (with partial exception of Iceland) and there are generally small differences in innovation activities across governmental levels. This picture still applies when including ongoing and abandoned innovation activities[4].

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[4] Typically, around 5 % of the respondents stated that they had not implemented innovations in the period, but had undertaken innovation activities which were either still ongoing or had been abandoned.

Figure 2: Any innovation (product, process, organisational or communication innovation) by country, 2008-2009. Percent
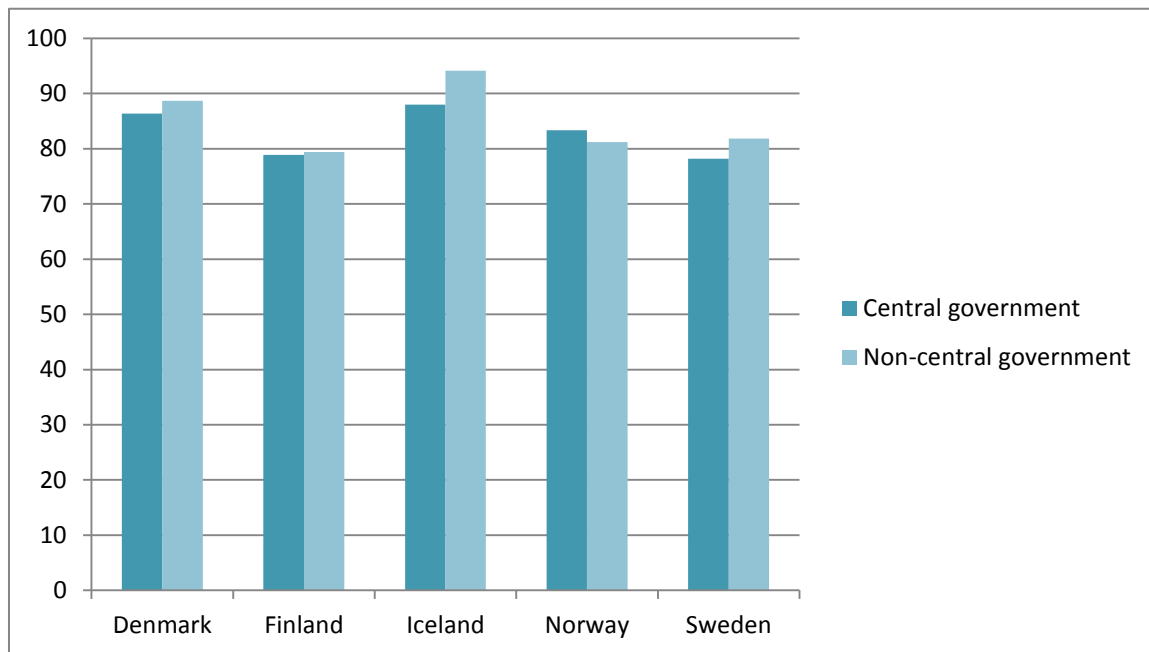
If we look at product and process innovations separately (See table 2 and 3 in the appendix), shares across governmental levels are similar for Denmark, higher for central government in Iceland, Norway and Sweden, and higher for non-central government in Finland. And, for communication innovations, shares are higher for non-central government in Denmark and Sweden and lower in Finland, Iceland and Norway (See table 2 and 3 in the appendix).

3.2 Who developed the innovations?

When looking at who the reported product innovation activities where developed by, most product innovations are developed in-house (see Figure 3). Also a sizable share stated that they had developed a product innovation in cooperation with a business or another public sector organisation. Finally, around 10 percent have stated that they have fully outsourced development of a product innovation to other public organisations or businesses. Perhaps somewhat unexpected is that the cooperation with business is as frequent as cooperation with public services in developing product innovations.

These figures thus suggest that the traditionally viewed public sector organisation that relies on passive adoption of innovations is quite rare. The results also potentially suggest that it is difficult to develop innovations for public sector organisations without at least some degree of involvement from the organisation itself.

Cooperation with businesses is an interesting variable that indicates some of the interfacing that the public sector has with the private sector. Sometimes the public sector is perceived as a static framework for dynamics in the business sector, whereas a dynamic and innovative public sector will have a great impact on both public services offered and also on the dynamism in the business sector.

Figure 3: Who developed the product innovation carried out 2008-2009? Percent organisations with product innovations.

Figure 4 below takes a closer look at cooperation patterns with businesses in product innovations across different governmental levels. Although there are some national differences regarding the reported cooperation levels, the relation between central and non-central government seems to be equal across all five countries. Central government reports to have more cooperation with businesses than non-central government. Part of the explanation for this may be that public procurement tends to be carried out centrally.

The same pattern applies for process innovations, in which cooperation with business is even higher. However, in cooperation with business in process innovation, the differences across governmental levels are not that high as for product innovation.

Figure 4: Cooperation with business in product innovation, by country and levels of government. Percent
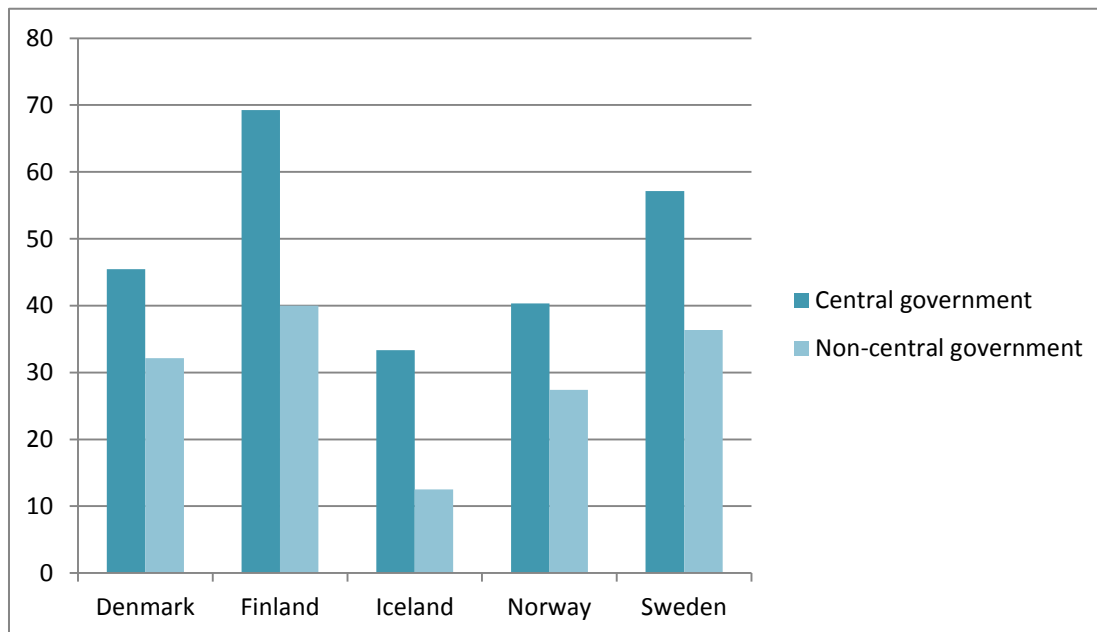
In both product and process innovations there is a higher share of collaboration with businesses in central government institutions than in non-central government institutions. There is an overall higher share of collaboration with businesses in process innovation than in product innovation. This holds for both central and non-central government institutions.

3.3 Novelty

Looking closer at the novelty of product innovations across governmental levels (see Figure 5), central government institutions have a higher share of product innovations that are novel (new compared to others) than non-central government institutions. When looking at product innovations new to the organisation the opposite pattern emerges; non-central government institutions tend to have a higher share of product innovations new to the organisation than central government institutions.

This suggests that central government institutions tend to have more novel innovations whereas non-central government institutions tend to have more incremental innovations. If correct, explanations for such a pattern may be found in the relative dependence of non-central government institutions on central government institutions.

Figure 5: Share of public sector organisations with novel product innovations, by country and level of government, 2008-2009. Percent
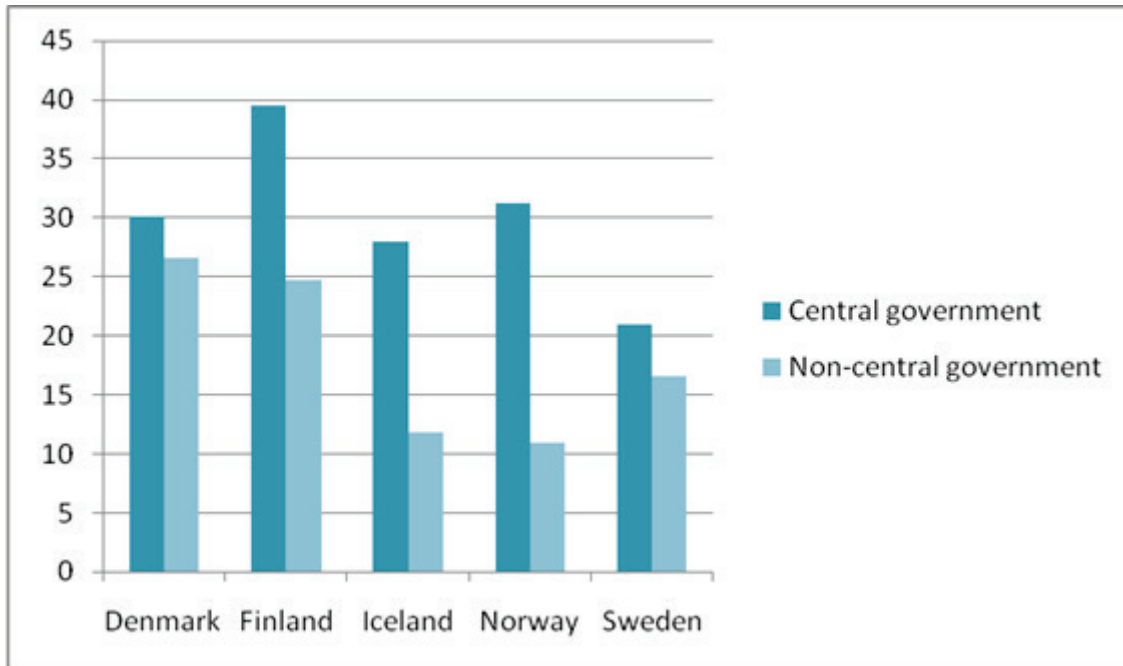
The fact that many non-central government institutions report high shares of innovations that are only new to the organisation may imply that the share of novel innovations may be potentially lower and hence more comparable to the business sector.

3.4   Objectives

One of the most important differences between the public and the private sector is differences in objectives. Businesses may have a number of secondary goals, but the main overreaching goal for all businesses is to yield a return on investments and to increase shareholder value. Objectives may be much more diffuse and multifaceted for the public sector.

Figure 6 presents the objectives that were regarded to have high importance for the organisation's innovation activities during 2008-2009. The most common objectives for innovation activities in all the Nordic countries are 'Increased efficiency', 'improved goods and services' and to 'improve user satisfaction'. Nonetheless, around half of the respondents in most countries have stated that an important objective for their innovations is to fulfil new regulations. This indicates that regulations can have a significant impact on stimulating innovation. Addressing social challenges is quite low – however this is a fairly broad objective and respondents may have had difficulties in interpreting it.

Figure 6: Objectives for innovation activities by country. Percent
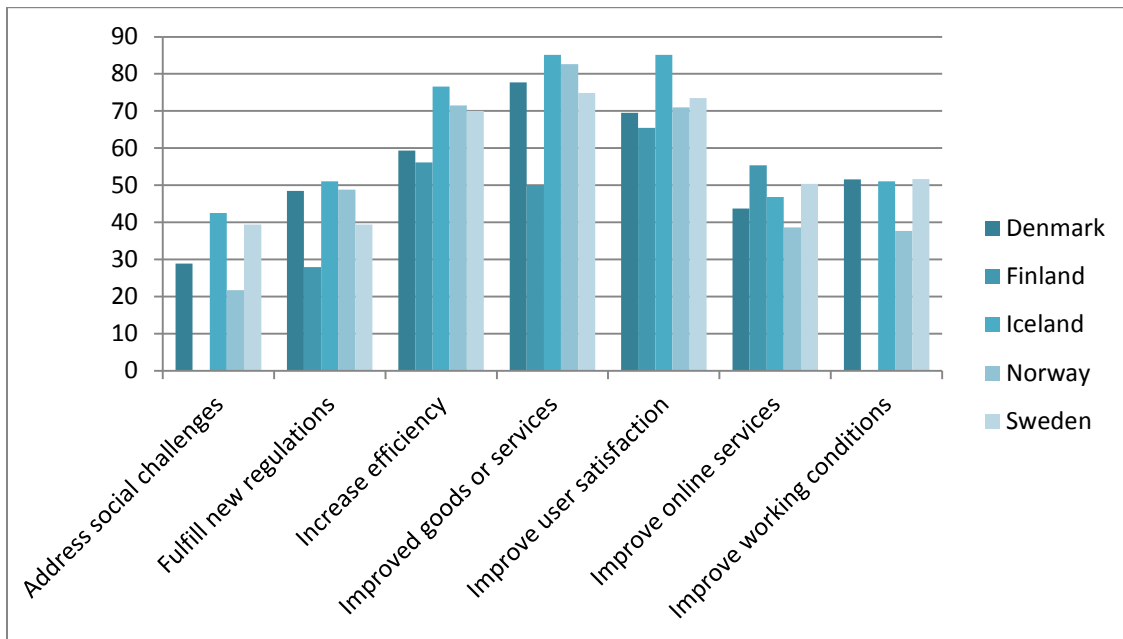
Share innovation active organisations that cite objective as highly important.

3.5   Information channels

Figure 7 illustrates the information channels that were seen to have high importance for innovation activities during 2008-2009. Among the five information channels listed (internet and online discussion forums, user satisfaction surveys, networks and conferences, hiring specialized personnel, evaluations), the highest share of respondents cited networks and conferences as very important.

Figure 7: Information channels across countries. Percent
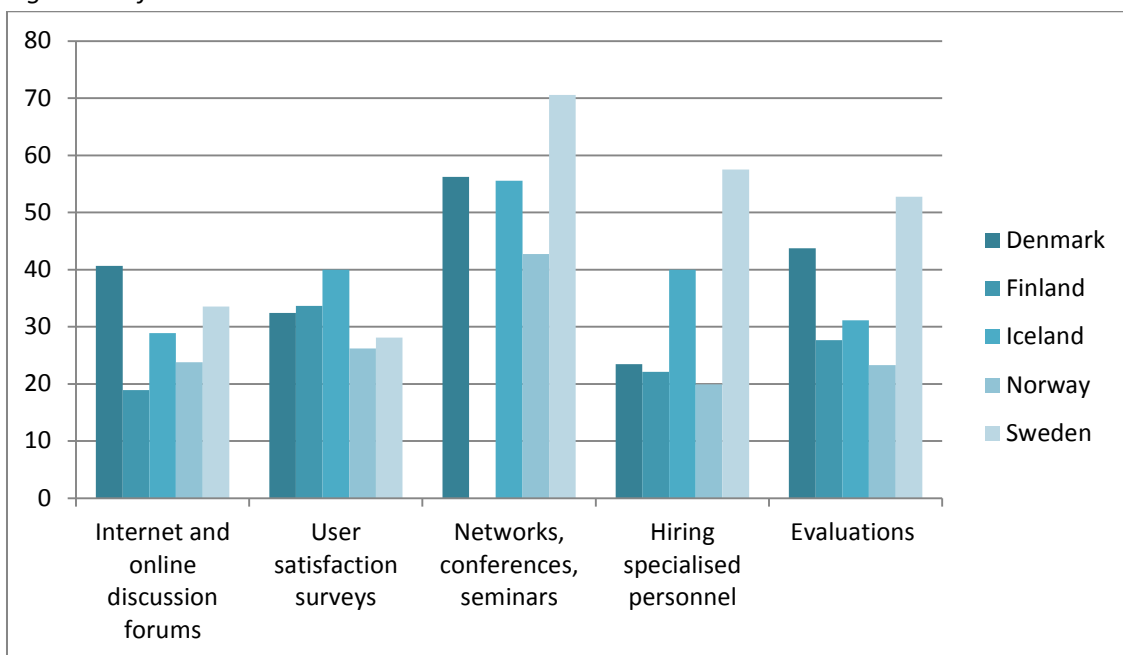
Share innovation active organisations that cite information channel as highly important.

However, a sizable share also views user surveys and evaluations as important channels to gather information on their innovation activities. Around 20% in Norway, Denmark and Finland found hiring specialized personnel as an important channel, while the shares were much higher in Iceland and Sweden. As with other indicators, it is difficult to discern whether large differences reflect actual differences, or instead different interpretations of the questions. However, this question is arguably very straightforward and it is perhaps not unrealistic to have large country differences in the use of evaluations or in the ability to hire qualified personnel within specific areas.

3.6   Innovation cooperation

Figure 8 below presents different cooperation partners of high importance to innovation activities in public organisations. Although there are no clear tendencies regarding cooperation with the business sector or the public sector, three out of four countries put more emphasis on cooperation with the business sector than with the public sector.

Figure 8: Cooperation partners of high importance to innovation activities. All governmental levels, 2008-2009
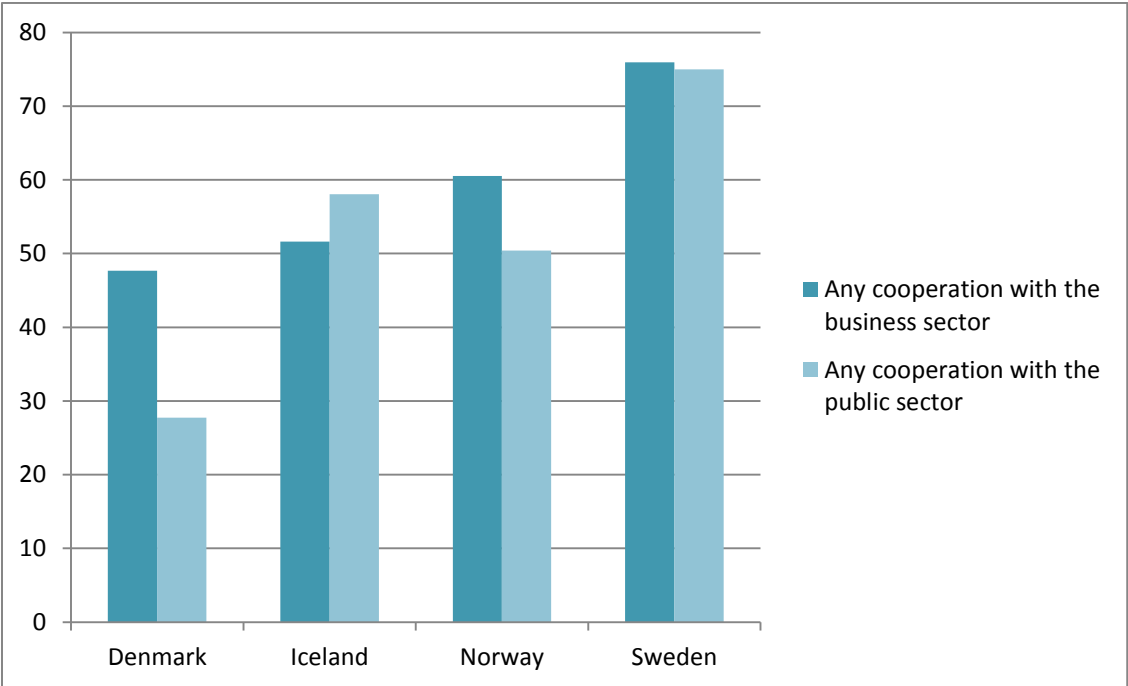
When divided on different governmental levels (see table 8 and 9 in the appendix), there is a quite clear pattern that central government institutions report to have a higher share of cooperation with the business sector than non-central government institutions. The picture remains the same concerning cooperation with the public sector, but in this case the difference between central and non-central governmental institutions is smaller.

Figure 9 above presents innovation cooperation across governmental levels. The cooperation level in public sector innovation activities is generally very high. There are no significant differences in terms of innovation cooperation across central and non-central governmental levels. However, central government organisations in four out of five countries report having somewhat more innovation cooperation than non-central government organisations. Central government institutions also report having more frequent international cooperation than non-central government institutions (see table 8 and 9 in the appendix). This is the case both for cooperation with enterprises and with public organisations abroad.

Figure 9: Innovation cooperation by governmental level, 2008-2009. Percent
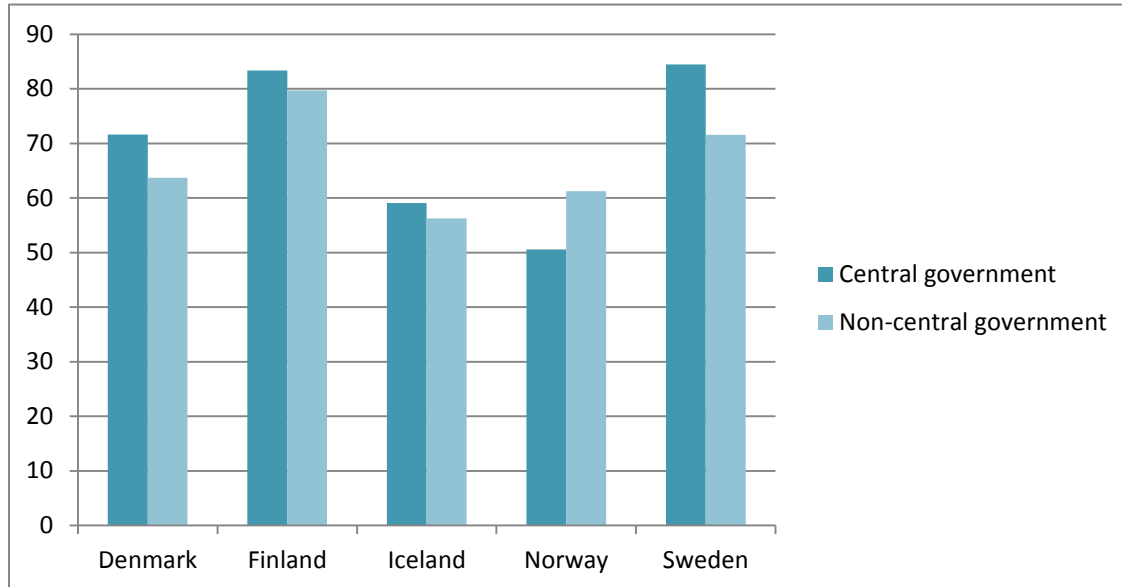
Figure 10 illustrates international collaboration partners in innovation activities. There is a tendency in all countries that there is a higher share of collaboration with public organisations abroad than with enterprises abroad.

Figure 10: International collaboration partners. All governmental levels, 2008-2009
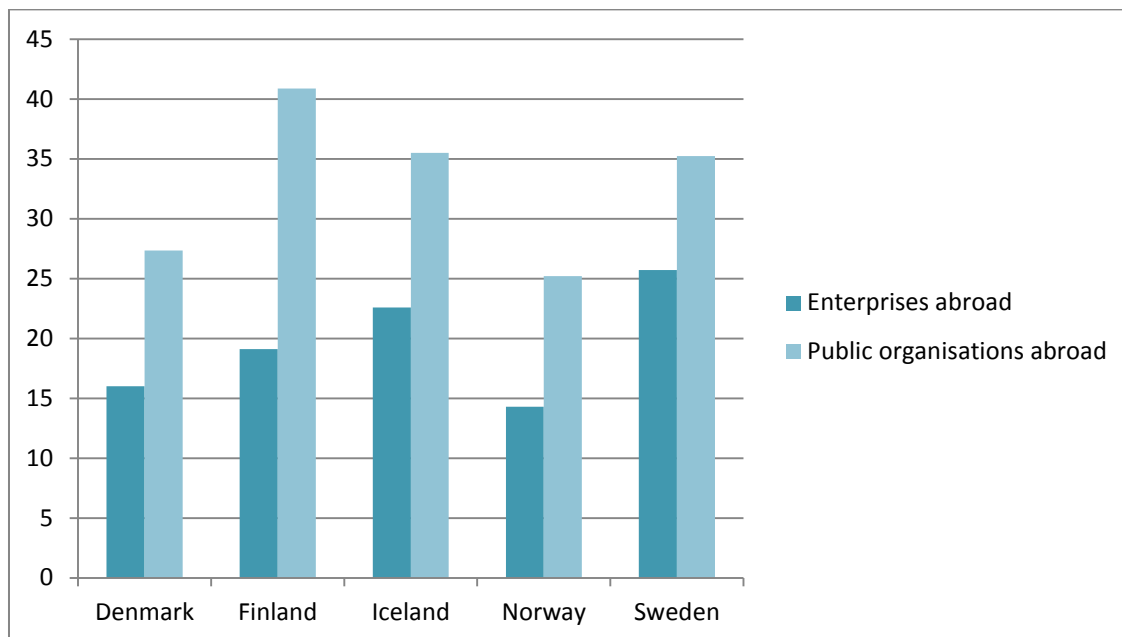
3.7   Procurement

Public procurement practices can be used as important tools to provide innovation both in the public and the private sector. Between 40 and 50% of the respondents state that they have used procurement to promote innovation. 'Acquisition of components' or 'software from ICT-suppliers' followed by 'contracting of consultancy services' were cited as the most important ways to promote innovation among suppliers. Apart from this, central government institutions tend to have a higher share of respondents using procurement to promote innovation than non-central government institutions. Of the five Nordic countries, Norway stands out by having the lowest level of procurement

to promote innovation. This may have to do with the formulation or understanding of the questions raised in the questionnaire.

Figure 11: Use of procurement in promoting innovation
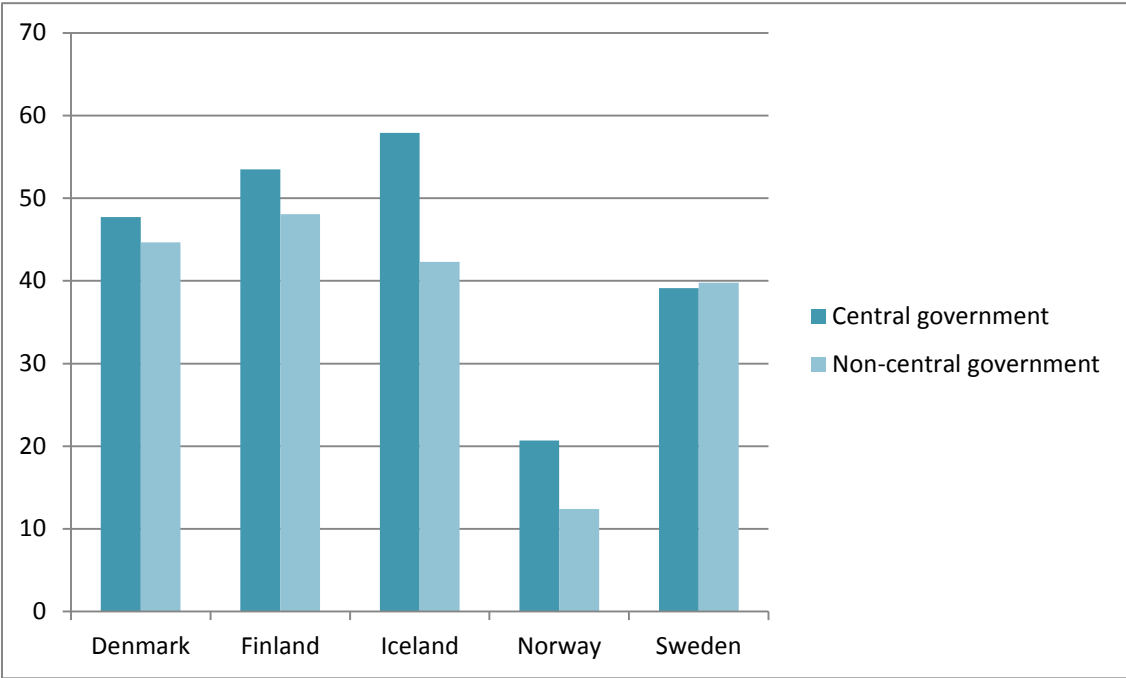
3.8   Drivers of innovation

Innovation may have various types of drivers internal or external to the organisation. From the literature on innovation systems in the business sector (Lundvall 1992; Nelson 1993; Cooke 1992; Edquist 2005) we know that different types of actors (e.g. collaboration partners, competitors, sub-contractors, knowledge institutions), institutional contexts, activities and functions may influence the ability or propensity of an organisation to innovate. Figure 12 below presents an overall picture on innovation drivers in the public sector, referring to drivers that are seen to have high importance to innovation activities in the public sector.

Figure 12: Groups of innovation drivers of high importance by country. Percent
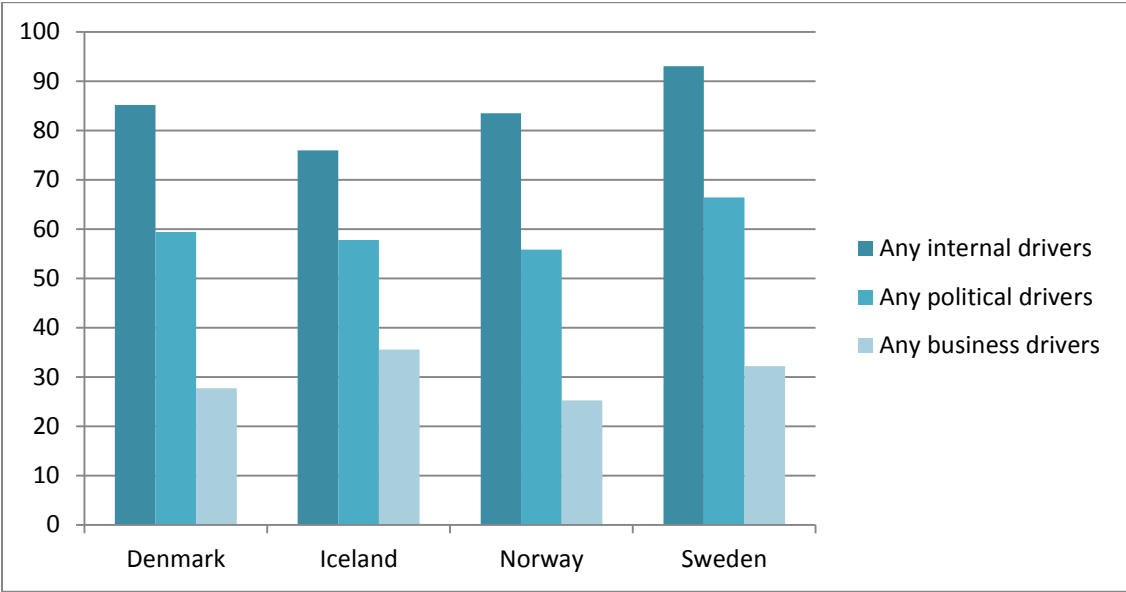
Internal drivers such as management or staff are reported to be the most important drivers of innovation in the public sector. Apart from this, political drivers in general are regarded more important than business drivers. At the level of individual variables 'budget changes' as well as considerations to citizens are other driving forces that are given the greatest emphasis by respondents (see Figure 13).

Figure 13: Drivers of innovation of high importance by country. Percent
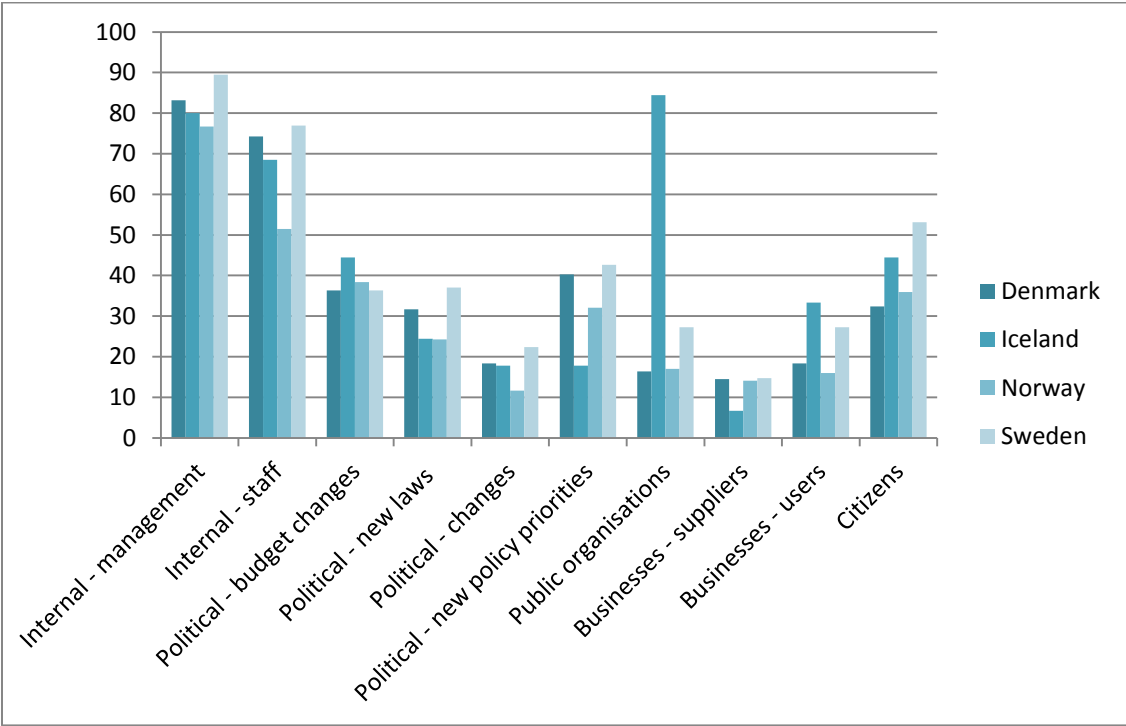
3.9   Strategy and internal capabilities

To get a better understanding of how innovation is incorporated into public organisations, respondents were asked a series of question about how innovation is organised in their organisations. The results are shown in Figure 14.

In Denmark, Norway and Sweden between one third and one fourth state that their organisation has specific goals for their innovation activities and that it has developed an innovation strategy that is included in their overall strategy. Nearly half of all respondents say that their innovation activities are mainly organised as projects and that top management gives priority to new ideas and is active in implementation of innovation. In Denmark and Sweden, one in four states that their organisations have a development department. About one in five states that staff is given incentives to identify new ideas for innovations, which can be contrasted with the finding that staff is regarded highly central as drivers of innovation (Figure 13).

Figure 14: Strategy and internal capabilities by country, 2008-2009. Percent that highly agrees with the following statements. All government levels.
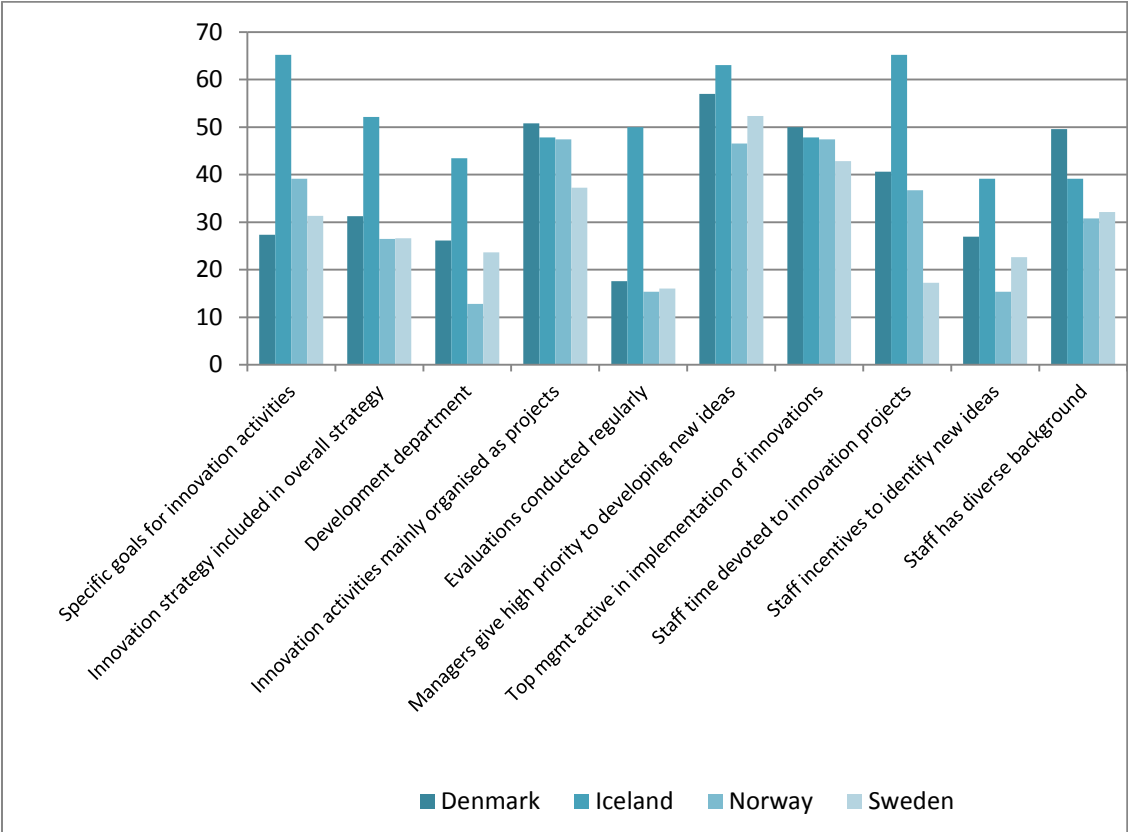
3.10   Barriers to innovation

Depending on how the public sector is delineated and defined, as well as on the increasing privatization of the public sector, there can be many different sources and barriers to innovation in the public sector. Mirroring the terminology from private sector innovation studies one may distinguish between top-down innovation and bottom-up innovation (Windrum 2008). Some innovations may be national or generic top-down efforts initiated by generalists in the form of politicians or managers and then implemented at the local level in the respective service providing organisations. Other types of innovations may be bottom-up initiatives from a range of different and often specialized civil servants. Due to many public organisations being large, and due to the bureaucratic and formal organisational principles and cultures often following these, one could be inclined to believe that bottom-up initiatives are disfavoured in the public sector.

Various contexts may have different factors that serve to slow down or limit the full innovative potential. From the community innovation survey (CIS) we know that often those actors that identify the most barriers to innovation also tend to be the most innovative as the ones that are innovative also often tend to be experienced and aware of different types of barriers to innovation. When looking at barriers to innovation in the public sector there are large differences between the Nordic countries and also between the different variables.

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Figure 15 above illustrates barriers to innovation of high importance. Political barriers (lack of flexibility in laws, lack of incentives or lack of funding) and internal barriers (inadequate time or lack of incentives) are stated as the two most important categories of barriers, whereas organisational barriers (risk of failure or lack of cooperation) and external barriers (rules hinder collaboration, lack of innovative suppliers or resistant users) are regarded as being of less importance as barriers to innovation.

Figure 16: Barriers to innovation by country, 2008-2009. Percent that cites barriers as highly important
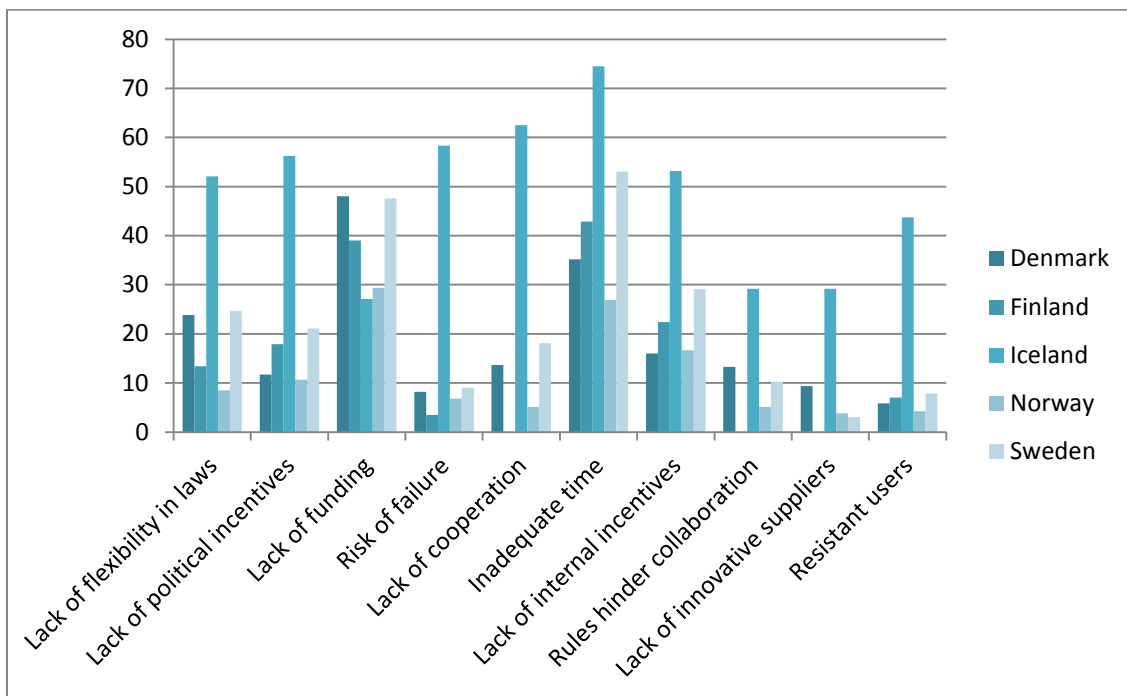
Going into somewhat more detail on individual barriers, figure 16 below shows how the variables 'lack of funding', 'inadequate time' and 'lack of internal incentives' are emphasized as the three most important barriers to innovation. Surprisingly, risk of failure is ranked very low as a barrier to innovation. This contradicts findings in earlier studies in which risk aversion has been pointed out as a key barrier to innovation in the public sector (Koch et al. 2006; Koch and Hauknes 2005). Also worth noting is that Iceland has far higher percentage rates than the other Nordic countries.

3.11 Hospitals and schools

In Norway, Sweden, Iceland and Denmark, the pilot study included samples of direct providers of public services, such as organisations in health and education. All four countries included hospitals in their survey, (or groups of hospitals, depending on how they are organized) while Denmark and Iceland also included upper-level secondary schools. The questionnaire used for these groups was the same as for all other public sector organizations. The numbers of observations for these groups are very small, which adds considerably to the lack of precision and to the exploratory nature of these figures.

Figure 17 presents the overall innovation levels in public health organisations at non-central governmental level in Denmark, Norway and Sweden[5]. The health organisations report to have higher shares of process and organisational innovation than product and communication innovation. There is no clear pattern across the three countries for health organisations. Whereas Denmark tends to have high relative shares in product, process and communication innovation, Norway has high relative shares in process and organisational innovation. Sweden has a high relative share in organisational innovation.

Figure 17: Various types of innovations in health organisations by country, 2008-2009. Percent
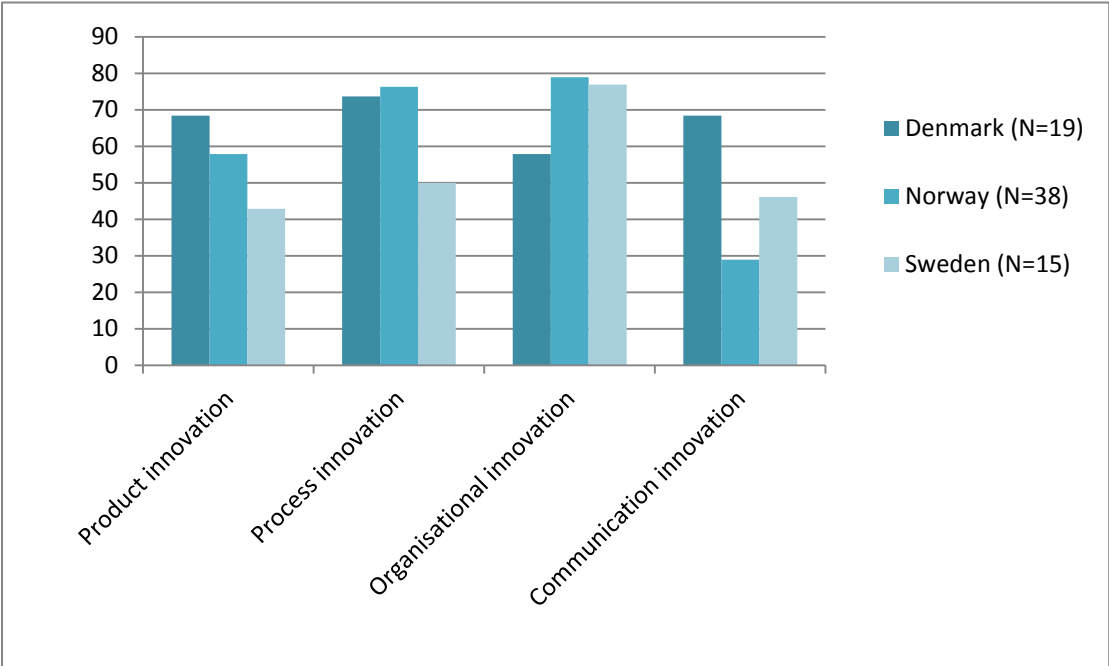
For all the three countries health organisations report a somewhat higher share of using procurement to promote innovation than for all sectors of non-central government organisations. Health organisations also report to have higher shares that cite barriers to innovation than for all sectors of non-central government organisations. In all three countries health organisations report to have higher

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[5] Due to a low number of observations, results for hospitals in Iceland are not included in these comparisons. Finland did not include hospitals in their sample.

political and external barriers to innovation than for all sectors of non-central government organisations. Organisational barriers are reported to be higher for health organisations than for others in Norway, whereas they are lower in Sweden and Denmark. Finally, health organisations report a somewhat lower share of cooperation than all sectors among non-central government organisations in Denmark and Norway, whereas in Sweden the opposite is the case.

There is a mixed picture regarding the innovation levels in health organisations compared with corresponding figures for educational organisations and across all sectors. Figure 18 illustrates that in Denmark hospitals and other non-central health organisations tend to have somewhat higher innovation rates than schools and other direct service providers in the educational system. Educational organisations tend to have lower innovation shares than across all sectors. Apart from this the innovation levels in these sectors are fairly similar.

Figure 18: Various types of innovations in health, education and across all sectors in non-governmental institutions, Denmark 2008-2009. Percent
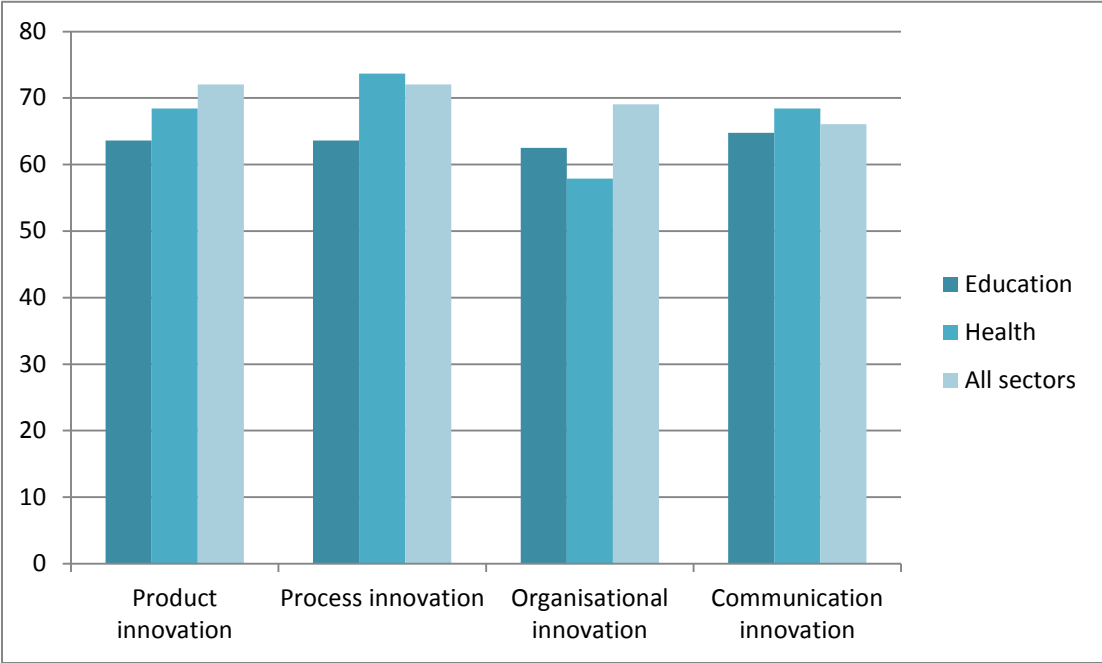
4 An assessment of the pilot studies – Discussions and recommendations

This section describes and discusses elements of the methodology and of the validity of the results based on analyses of the reporting and tabulations of the conductors. Based on this, the section offers tentative conclusions and recommendations for further work in this field. These conclusions are based both on assessment of the results of the surveys and the methodologies used. Section 5 below provides a detailed description of the methodologies used in each of the Nordic countries. The outcomes of the pilot studies indicate that it is indeed possible to construct a statistical system for the measurement of public sector innovation. Each of the countries were able identify a survey frame based on business registers, the surveys were able to use the same questionnaire across a diverse set of public sector organisations, and response rates were acceptable for a pilot study. In addition, there are a number of similarities in results across countries, which suggests that a satisfactory level of international comparability can be achieved in future exercises.

There are however a number of challenges that will need to be addressed in order to reach the levels of validity and international comparability that are required for full scale surveys. Among the main issues here are a feasible classification of units, delineating the target population, defining statistical units, the definition and understanding of the innovation concept, and measuring innovation expenditures. These issues will be identified and discussed below.

4.1 Methodology issues

Classifications

a. Institutional sectors

The classification of institutional sectors according to SNA, the System of National Accounts, seems to work and it can be used to identify potential units in the business registers. While it could be interesting to study the role of private enterprises in the provision of public services it is recommended to limit the target population to the public sector proper including also non-profit institutions, but not units providing market-based services.

However, there may be a number of subsectors or types of institutions where filling in the questionnaire is particularly difficult or would likely require a different approach. Examples are universities, research institutes, ministries, defence forces. One could possibly consider the exclusion of these.

b. Service groups

Service groups are needed in order to classify public sector units, much in the same way as industries in the business sector. The situation is, however, much like in the business sector: the units appointed are often involved in more service types which are cross-bordering the service groups used (e.g. observed in the Icelandic data, where some of the units appointed even included most of the seven core service groups). Part of this cross-bordering might be solved by selection of proper units.

Further work should consider the most appropriate number of service groups and whether to introduce subgroups, e.g. when direct service providers are included. An inspiration for that work would be the COFOG-classification. In any case, it will be important to keep the question on type of services of operation in the questionnaire, and eventually expand it by asking respondents to point out their main service (group).

c. Levels of activity

Public sector organisations differ greatly in terms of their level of activity, from central administrations to individual institutions that provide services directly to citizens. Experiences from the pilot studies suggest that it is best to utilize a simple distinction between two types of units: units administering services and the direct providers of public services.

d. NACE-classification

Four of the countries have used the National business register to identify the (gross) population frames, using the institutional sector and – to a lesser degree – NACE-classes of the core service groups. For the time being, this approach means that some manual sorting is needed. Also some investigation for valid units not included as enterprise or establishment units in the business register might be needed.

However, it seems obvious that if a common public innovation survey is to be conducted on a broader international, for example among the European countries under the auspices of Eurostat, then the recommendation would be to use the business register to identify the units to be included – thus increasing the pressure of improving the quality of the business register regarding public units. In the future, the option of using functional breakdowns should also be investigated. I.e. in addition to classify units according to sector or industry; ask for breakdowns of variables of units into industries or services provided using COFOG or NACE.

Units reporting and responding

a. Size of units

The size of units responding differs very much, the smallest units consisting of 5-7 employees and the largest 5.100/8.500/68.000 (data from Iceland, Sweden, Norway). The same differences are found in the business innovation surveys, and it can pose difficulties (re. the discussion in the Oslo Manual) for many of the topics in the questionnaire and when the large units have activities in more industries.

For public sector innovation, these problems can be regarded as even greater, as the purpose of the survey often might be broader with more emphasis on linkages, drivers, capabilities and barriers. Very large public units might probably better be seen as mediators (reporting unit) as was organised in Sweden and Finland for some of the municipalities, letting the respondents (statistical units) be Kind-of-Activity-Units of the large public unit.

b. Target population vs. population frame

The population frames available from business registers do not cover the target population perfectly for the time being. In order to assess how well business registers cover the target population, it would beneficial to compare with or include additional sources (such as institutional lists of government units) and reporting units may even be involved themselves (self-identification).

The completeness of coverage of the target population (or at least achieving the same level of coverage across countries) is important for the reliability of results, especially concerning quantitative variables (like expenditure or human resources for innovation).

Other issues

a. Unit response rates

A proper response rate is a precondition for valid and reliable results. The response rates in the Nordic surveys (around 45 per cent) were, with the exception for Iceland, were not high but can be regarded as satisfactory taking the pilot nature of the exercise into consideration. In addition, as shown through the results above, the results are overall fairly similar across countries, despite differences in samples and methodologies used. And, while there is clearly room for improvement, each of the countries were successfully able to use business register to draw their samples.

b. Who to ask

Identifying the right respondent is a crucial issue already discovered in testing the questionnaire. Most questionnaires are completed by one person, being the head or an adviser of the head of the unit. More than one respondent is probably needed to make the responses as valid as possible. In fact, 10 people have been involved in one of the responding units. Given that filling in the questionnaire is often the result of co-operation between several employees, special attention has to be paid to the motivation of respondents. For the survey agency it is difficult to find out the right respondent. It is recommended that at least for the biggest municipalities an attempt is made to predetermine the respondents to the survey.

4.2 Validity of the results

Here, elements of invalidity of the individual questions are examined based on the tabulations and additional analyses that were undertaken to examine selected issues. This also includes factor analyses that were conducted for selected questions[6]. Questions are discussed in the order that they appear in the Nordic common questionnaire.

Innovations (Part 1-5)

a. Propensity to innovate

The propensity to innovate is much higher than in the business sector. From 69-87 percent claim to have introduced product- or process innovation during 2008-09 and 86-92 percent have introduced at least one of the four types of innovation during 2008-09 or have had innovation activities during this period.

Shares of innovative organizations are very high. There may be a number of possible explanations for this result, for example that these measures also include day-to-day incremental changes or upwards bias due to higher response rate among innovation active organisations. Given that diffusion is important, it is very relevant to include innovations that are only new to the organization (but exist elsewhere). On the other hand, in order for this measure to be useful, they must reflect substantial changes that matter for the organisation's operations.

The usefulness of these indicators would be enhanced both by making the definitions more restrictive and potentially also introducing measures that allow the classification of innovations (where novelty is an example). At the same time, these changes should not be too drastic. A pragmatic approach would be to consider moderate changes (that may in themselves have a large impact). Some possible approaches that can be considered are the following:

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[6] Results of the factor analyses can be found in the appendix.

- Change the reference period to just one year. Many of the respondents interviewed suggested that the reference period should be only one year instead of the two-year period used in the pilot studies. However, it is unclear how large an influence this would have on results.
- Greater emphasis that innovations must constitute significant changes
  - Slightly strengthen the wording of the definition
  - Include examples (also of changes that should not be considered innovations)
  - Require that innovations constitute a significant change in the organisation's overall operations.
  - Require that they be from formal innovation projects
- Examine whether very large statistical units can be broken down into kind-of-activity units.

The heterogeneity of statistical units also needs to be addressed. The usefulness of indicators will depend greatly on the existence of harmonized procedures to identify the target population and define statistical units. Between 12-34% claimed to have introduced innovations of physical goods. Taking into consideration the limited number of physical goods in the parts of the public sector covered this seem to be rather high. Also, about 85-90% of these innovators of physical goods also claim to have introduced innovations of services (Norway/Sweden). Hence, a possible interpretation is that many of physical goods innovations are part of larger innovations in the public services offered by responding units.

The percentage claiming innovation of supporting activities is between 39-54%, and this is the highest share among the process innovation types in Norway and Sweden. All Icelandic innovators of supporting activities, however, also claim to have innovated at least one of the other types of process innovation, while this share is around 60% in Norway and Sweden. The relevance of including innovation of supporting activities could be further investigated by studying the examples given.

The organisational innovation type on *New systems for gathering new knowledge and building innovative capacity* was not included by Finland. 23-37% claimed this type of innovations, of which all Icelandic claimers also had introduced other types of organisational innovation, while the share among the Norwegian and Swedish claimers was around 80%.

Finally, the communication innovation type on *New methods of pricing goods and services* was neither included by Finland. A rather high share claimed this type of innovation in Iceland (36%), while the level was 6-16% in the last three countries. 60% of the Norwegian and 87% of the Icelandic and Swedish claimers also reported at least one of the other three types of communication innovation.

b. Development and newness

In both questions detailing the product and process innovation – W*ho developed the innovation* and *First developer/introduced by others* – at least one answer should be selected, as the outcomes are exhaustive. This is not the case – 10-15% did not tick any developer (Iceland +Norway+Sweden) or any newness. This would thus be item non-response.

Innovation activities (Part 6)

The reporting on human resources involved in innovation activities has higher item non-response than most of the other questions, from 20-36% for FTE's and 7-24% for HC's. Also, inconsistencies have been found, either reporting FTE as being higher than HC or reporting a level of HC close to or of the same size as the total staff of the organisation. At least some better wording and precision of what to include would be needed to try to improve the validity.

For innovation expenditures, respondents were asked to choose among the following categories:

- No expenditure
- Under 10K€
- 10K€ - 50K€
- 50K€ - 250K€

- 250K€ - 500K€
- 500K€ - 1 Mio.€
- 1 Mio.€ - 5 Mio.€
- 10 Mio€ or greater
- Expenditure unknown

Norway did not use the intervals and asked for actual amounts, while Finland asked respondent to provide actual amounts if their expenditures exceeded 10 Mio€. In addition, Finland did not include the option of answering that expenditure was unknown. Shares of respondents that either did not answer or ticked "expenditure unknown" were generally high. For the common specification of the question, non-response rates (including "unknown") were 25% in Denmark, 28% in Sweden and 46% in Iceland. In Finland, where the option, "expenditure unknown", was not included, non-response was lower, at 10%. In Norway where respondents were asked to provide the actual amount for expenditure, 68% either did not answer or ticked "unknown".

The conclusion on the reporting of innovation expenditure is that it is highly unreliable and that major changes are needed to improve the validity to a level where the information would be of any use. The questionnaire includes questions on three types of acquisitions for innovation, Consultancy services (incl. R&D services), machinery/equipment and know-how. A hypothesis that acquisition of know-how mostly would be in combination with one of the other types of acquisitions was investigated by calculating the share also reporting one of the other types. In Iceland and Norway it was almost all, while in Sweden it was 80%.

The question on financial support seems to work well with variation in shares of receivers among the four types of sources from 5% to 66%. Around 50% in Denmark, Norway, and Sweden report external funding, but in Iceland 96%, due to funding from private businesses or foundations.

The batteries of questions in Part 7-11

The next 5 parts of the questionnaire consists of batteries of questions on diverse aspects of the innovation process, from objectives to barriers. These batteries will be validated by observing the item non-response and the shares responding *High* or the equivalent. Also, factor analyses have been conducted to see whether the expected patterns among the questions in each battery can be confirmed. However, the few outcomes in the questions (2-3) boost the variability of the factor scores. Also, the number of factors had to be decided based on the rather small sample from Iceland. The results of the factor analyses are presented in an appendix.

Objectives and impacts (part 7)

The battery of questions on **objectives of the innovation activities** seems to work very well with variation in the shares of highly important objectives among the seven types and all countries from 28% to 85%. Also, the item response rate is around 90%. The factor analysis, see Table A.1, reveals two dimensions, an external (*social challenges* and *new regulations*) and an internal with a few discrepancies.

The questions on **measurement of the impact** of innovation seem to work as well as the former with shares of 24-74% and item response around 90%. The factor analysis detects 2 dimensions, one on surveys and one on savings, see Table A.2.

Linkages (part 8)

The battery on **information channels** for innovation has a high item response rate of 83-94% and the shares of high importance vary from 20-71%. The factor analysis suggests 2 dimensions from the Iceland - and Norway-data, but just 1 from the Swedish, see Table A.3. With 2 dimensions, *Networks, conferences* and *Hiring specialists* is the first dimension in Norway and Sweden, with the second

dimension including evaluations, user surveys and internet forums. In the Icelandic data *Hiring Specialist* and *Internet forums* swap dimension.

The battery on **co-operation partners** also has a high item response rate of around 90% and the shares of high importance vary from 15-63% among Denmark, Iceland , Norway and Sweden. The factor analysis gives 2 dimensions, but with an unclear pattern, see Table A.4. *Universities* and *public suppliers* and *public users* form the first dimension.

The **filter question on co-operation** seems to work well with very little item non-response, but a high share with co-operation (57-81%). The two follow-up questions on any co-operation with partners abroad also have little item non-response and vary from 16-41%.

The battery of questions on **procurement** has not been investigated by factor analysis, as the questions do not refer to the same filter question. The single questions, including the entry question on procurement through purchases, had high item response rates (85-100%), but large differences in the share using the different types of procurement. These questions have to be further investigated and changed, so they refer to the same filter question.

Drivers (part 9)

The battery on **driving forces** has been replied by 83-90% and the shares of high importance vary from 7-90%. For a few of the questions there are large differences between Iceland and the other countries. The factor analysis detects 3 factors, but the pattern is a bit unclear and does not follow the sub-groups, see Table A.5. The first dimension includes all 4 *political forces*, while the second include *public organisations* and *business suppliers*. The last dimension then becomes a mix of the internal drivers and the users (businesses and citizens).

Capabilities (part 10)

The battery of questions on strategy and internal capabilities is the largest battery with 10 questions. The item response rate is high for Denmark, and 78% for Iceland . The share of *Fully apply* varies form 13-65%. The factor analysis has been conducted with 4 factors, based on the Icelandic data, but the analyses of Norway and Sweden suggest only 2 factors. With 4 factors the result is rather blurred, see Table A.6: the two questions on management is united with a question on formal projects, the first three question on innovation strategy form the second factor, while factor 3 and 4 shares the 3 questions on staff and could thus be united in one factor. The question on evaluation is spread over 3 factors.

Barriers (part 11)

The battery on barriers for innovation has high response rate of more than 95%, however 80% for Iceland. The shares of high importance vary from 3-75%, highest for Iceland. The factor analysis revealed 3 factors with a few deviations. The factors fit with the four subgroups, as *Organisation culture* and *Other internal conditions* is combined to one factor.

General information (part 12, A)

The level of government and the sector of operation were the first part of the basic information. This could either be included in the questionnaire or pre-completed. Also, the resources of the organisation – operating budget and staff – were to be reported for 2009. The item response for these questions were rather low, from 66% to 94% for the operating budget and 68-95% for the staff. Also, the relation between the reported budget and staff seem very weak – with a coefficient of variation of the budget per staff that is not lower than the CV's of budget and staff[7].

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[7] Based only on the Icelandic data.

5 National reports on the pilot surveys

This section of the report provides a description and analysis of the methodologies used in the Nordic pilot studies. A template for reporting the pilot surveys on public innovation in 2009 in the Nordic countries was set up, based on the templates used by Eurostat for their R&D- and innovation surveys. National reports based on this template form the basis for this section, which is designed to give a detailed description of methodologies employed and differences across countries. Section 2 of this report contains a brief overview of the approaches used among the Nordic countries.

5.1 Description of the National methodologies

The first Chapter describes the National methodologies on the issues included in the template by one or more countries and makes comparisons with the preliminary recommendations of this project (See Mortensen (2010) for discussion of these main issues and the preliminary methodological framework that formed the basis for the pilot studies).

Target population

a. Classification used to define the public sector

The public sector is defined as:

> The **public sector** <u>comprises</u> the general government sector plus all public corporations (OECD).

This definition has been related to the National System of Accounts including the market-orientation of the product. The recommendation for the pilot surveys was only to cover units within the public sector. Here, it is indicated which subsectors of the SNA-sectors each country has included in the survey.

Ownership	SNA-sector	SNA-subsector	Market-orientation of product	
			Non-market services & non-market goods	Other services & goods
Publicly owned	**General government sector**	Central Government	DK,FI,IS,NO,SE	IS, SE
		Regional Government	DK,NO,SE	
		Local Government	DK,FI,IS,NO,SE	SE
		Social security funds		Not included
		NPIs in non-market production	SE,	n.a.
	(Non-)financial corporations	Quasi-corporations		
		(Non-)financial corporations	NO	
	Non-profit institutions	NPIs in market production	n.a.	
Privately owned	**(Non-)financial corporations**		Not included	Not included
	Non-profit institutions		Not included	Not included
	Households/unincorporated enterprise		Not included	Not included

As can be seen from the table above, the general government sector comprised the core of populations covered by the surveys, typically covering all three levels of government. Finland did not include regional government in their population, but did include associations of municipalities (associations of municipalities were also included in Sweden). Iceland and Sweden also included some publicly owned organisations that provided market services or goods. Within these SNA sectors, selected subsectors were excluded from the survey and some manual sorting was undertaken based on an assessment of the relevance of individual units. These are described in more detail below.

b. Classification(s) used to define public services

Public services are defined as:

> **Public services:** "General-interest services" are services considered to be in the general interest by the public authorities and accordingly subjected to specific public-service obligations. They include <u>non-market services</u> (e.g. compulsory education, social protection), <u>obligations of the State</u> (e.g. security and justice) and <u>services of general economic interest</u> (e.g. transport, energy and communications) (EU-Glossary).

b.1 Types of classification used

The recommendation from the first stage of this project was to test the NACE-classification of the business registers to define the public services (see Mortensen, 2010). This also included a proposal to break down municipalities by selected sectors. The public service groups included in the pilot survey were functionally classified, partly using NACE-classes. The table below shows how they were

intended to be included in each of the National surveys. The first and second columns show the proposed classification and corresponding NACE-classes, while the third column shows the planned coverage for pilot surveys in each of the Nordic countries.

Core Services	Recommended NACE-classes	Use in the National surveys
1. Administration Services	84.11,13;84.2,3	DK: 84.1; part of 84.2-3; part of 85.41,86.1,90,91,93 FI: Municipalities; assoc. of municipalities; agencies (manually sorted) IS: 84.11; 84.2-3 NO: Institutional sectors SE: Institutional sectors in municipalities; recommended NACE in other
2. Education Services	85; part of 84.12	DK: 85.3; 85.41 FI: Combined with culture in municipalities IS: 85 SE: 85 in the selected municipalities; 85 in other
3. Health Services	86.1;86.21,22,23; 86.9; part of 84.12	DK: Part of 86.1 FI: Combined with social services in municipalities IS: 86.1-2 NO: Regional enterprises; municipalities SE: Regional institutional sector; 86 in other
4. Residential Care Services	87; part of 84.12	FI: Combined with Health services in municipalities IS: 87 NO: Municipalities SE: 87 in the selected municipalities; 87 in assoc. of mun.
5. Social Work Services	88; part of 84.12	FI: Combined with Health services in municipalities IS: 88 SE: 88 in the selected municipalities; 88 in assoc. of mun.
6. Cultural and Sports Services	90.01.10;90.02,04; 91;92.11,12,19	FI: Combined with Education in municipalities IS: 90.01; 91 SE: Recommended NACE; in municipalities: only in the selected
7. Technical & Environmental Services	Various classes	IS: Various classes SE: Various classes; in municipalities: only in the selected
R&D-services	72	None
Other services	Various classes	FI: In municipalities IS: 1 respondent SE: In all institutional sectors

However, it was also realised that more classifications like COFOG or CPA – and other ad hoc approaches – would be needed to identify relevant units. The following classifications and ad hoc approaches have been used as a supplement to NACE classifications:

Classification	Used by:
Institutional sectors in the business register	FI, SE
Manual sorting of units identified by NACE-codes or sectors	DK,FI, NO, SE
Governmental lists of administrative units	DK, IS
List of hospitals	SE
Relevant units identified by the units themselves	DK, IS, NO, SE, FI

d. Levels of activity, according to the classification in M2

There are a number of different levels of activity in the public sector. The initial proposal of the project was to classify units within three levels. However, more detailed examination of public sector units suggested that a simpler classification with two levels was more appropriate:

   a. The administrating units of a public service
   b. The direct providers of a specific public service

Note that many administrating units will also likely be active in service provision. The table below show coverage across countries for the two levels of activity.

Level	Description	Where level is included
a	The administering units of a public service (e.g. an agency, a hospital administration in a region or a municipal authority for "social welfare")	DK: Public Adm. service of all institutional sectors FI: Public Adm. Service in municipalities; assoc. of municipals; central gov.; health/social, education/culture and other services in municipalities IS: All core services and all institutional sectors NO: Public Adm. service of all institutional sectors SE: All core services and all institutional sectors
b	The direct providers of a specific public service (e.g. a hospital or a unit for day care in a specific geographic area)	DK: Hospitals and secondary schools IS: Secondary schools NO: Hospitals SE: Hospitals

Statistical and reporting units

The data sources used to identify the units have partly been revealed in 1.1. Here, it is further specified, and also if and how reporting units have been used to make contact with the statistical units. As can be seen below, the main source used to identify units was the business register, with the exception of Iceland.

Type of unit	Identification of unit
Statistical	DK: The business register, legal units (except education: local KAU)
	FI: The business register, legal units
	IS: The *Agency register*, the *register of municipalities* and official organizational charts of the municipalities.
	NO: The business register; list of hospitals.
	SE: The business register; list of hospitals (also taken from the business register.
Reporting	FI: Municipalities for health/social, education/culture and other.
	NO: Municipalities for health and residential care services.

The reference period

The reference period to be covered by this pilot survey is the two year period 2008-2009. However, selected questions (innovation personnel and innovation expenditures) referred only to 2009. All countries used these reference periods.

Survey information

a. Survey type

Data may be collected through a census, a sample survey or a combination of both. Here this is indicated for the pilot surveys. For central government, Denmark, Finland and Norway conducted a census survey, while Iceland and Sweden drew a sample from the total population of units. However, all three countries (Denmark, Finland and Norway) removed a number of units from the sample through a manual sorting procedure.

Institutional sector	Survey type	
	Census	**Sample**
Central government	DK: All (after sorting) FI: All (after sorting) NO: All (after sorting)	IS: All NO: Regional offices SE: All
Regional and local government	DK: All at level a; hospitals at level b FI: Largest municipalities/assoc. munic. NO: Regional + 20 largest municipalities	DK: Secondary education at level b FI: Smaller municipalities/assoc. munic. IS: All NO: The rest of the municipalities/hospitals SE: All

b.1 Information providers – type

Using the job titles given on the front page of the questionnaire, the survey conductors were asked to describe the persons from which the data is collected (e.g. top management, (type of) mid-level managers, secretaries, individual staff members, etc). Typically, the questionnaire was either directed towards the director or another member of top management.

Institutional sector	Information providers	
	Main type	**Other**
Central government	DK: Management FI: Senior advisor IS: Top management (director) NO: Director/ head of department SE: Management	DK: Adm. personnel FI: Top management IS: Seldom a second person involved NO: Senior advisor SE: Adm. personnel
Regional and local government	DK: Top management FI: Senior advisor IS: Mayors office/ head of dept. NO: Top management SE: Top management	DK: Sections of the hospitals FI: Top management IS: Seldom a second person involved NO: Head of administration SE: Adm. personnel

b.2 Information providers – number

In the questionnaire (apart from the Finnish) the respondents were asked to report how many persons had been involved in completing the questionnaire. The mean and maximum in each country is given here:

Sector	Mean					Maximum			
	DK	FI	IS	NO	SE	DK SE	FI	IS	NO
Central government	2.4 /	- /	1.1 /	1.7 /	1.8	10 /	- /	2 /	7 / 7
Regional and local government	2.0 /	- /	1.0 /	1.8 /	1.6	15 /	- /	1 /	10 / 7

Sampling design

a. Sampling frames

More sources were expected to be needed to build up a sample frame of potential respondents, due to the quality of the National business register regarding public units, see Mortensen (2010). However, at the same time it was acknowledged that a detailed analysis of the quality of business registers for public sector units was not possible within this current pilot study.

a.1 Sampling frames used

The sampling frames used for identification of reporting units and of statistical units when no reporting unit was used are specified here:

Countries	Sampling frame(s)
DK	The business register
FI	The business register and self-selection in larger municipalities
IS	*The Agency Register* and *The Register of Municipalities*
NO	The business register, enterprises and establishments
SE	The business register, enterprises and establishments

a.2 Testing the National business register as sampling frame

To get a more detailed evaluation of the usability of the business register, the survey conductors were asked to indicate – for the units in each combination of level and sector included in the pilot survey – to which degree the units are registered as enterprises or establishments in the National business register – from *fully* to *not at all*. However, only ticks have been marked. Based on the full description of each country the ticks have been qualified as "++"=full and "+"=partly.

Sectors	Central government			Regional and local government incl. associations		
Level \ type of unit	Enter-prises	Establish-ments	Not used bus.reg.	Enter-prises	Establish-ments	Not used bus.reg.
a. Administrating units	DK$^+$; FI$^+$; NO$^+$; SE$^+$;		IS;	DK$^+$; FI$^+$; NO^{++};		IS;
b. Direct providers		NO$^+$;	IS;		DK$^+$,NO$^+$; SE$^+$;	SE;

b. Allocation and selection scheme

The survey conductors were asked to describe the sampling schemes used:

Institutional sector	
Central government	**Regional and local government**
IS: Judgement sample NO: Regional offices: Sampled if more than 4 SE: Stratified, random sample	DK: Stratified by municipalities [education] FI: Random sample IS: Judgement sample NO: Municipalities: Stratified by size and region Hospitals picked manually SE: Stratified, random sample (hospitals)

c. Sample size – absolute and relative to the target population

The sample sizes in each combination of services, sectors and levels were asked to be reported. Also, the size of the target population could be reported, where sampling took place. In this simplified Table the reporting is given. It is denoted in the table where sampling took place, and where available, the size of the population is also given in brackets. The table also includes a breakdown of sample units by sector for Denmark, Iceland and Norway.

Sample/population	Central government		Regional and local government incl. associations	
Services \ Levels	a	b	a	b
All sectors	DK: 158 FI: 90 IS: 27 [204] NO: 318 [703] SE: 94 [253]	IS: 4 (sample)	DK: 106 FI[1]:120[190]/88 [349] IS: 48 [107] NO: 164 [448] SE: 211 [577]	DK: 340 SE: 100 (sample)
1. Public Administration	DK: 126 IS: 5 [88] NO: 267 [331]		DK: 104 IS: 7 [23]	
2. Education	DK: 10 IS: 1 [3]	IS: 4 (sample)	IS: 8 [13]	DK: 279
3. Health	IS: 5 [22] NO: 51 [372]		NO:144 [430]	DK: 61
4. Residential care	IS: 4		IS: 1 [1]	
5. Social work	IS: 3		IS: 8 [20]	
6. Cultural & Sports	IS: 3		IS: 8 [13]	
7. Technical & Environmental	IS: 3 [17]		IS: 9 [21]	
Other	DK: 22 IS: [3]		DK: 2 IS: 7 [14]	

1) Assoc. of municipalities+regional level / municipalities.
In Finland, selected municipalities received 3 questionnaires for education/culture, health/social and other services.

d. Enumeration to population totals

The main purpose of the pilot study is to test the whole setup for measuring public innovation. However, for sectors where a census or a proper sample is conducted – and the response rate is acceptable – it would be possible to estimate population totals. The survey conductors' comments:

Countries	Possibility of estimating totals
DK	Yes, by institutional sector. Probably difficult for secondary schools
FI	The response rates were too low for that
IS	Weights are calculated for estimating totals
NO	Technically possible, but the response rate is deemed to be too low
SE	Would be possible for institutional sectors at level a

Data collection

a. Mode of collection

Countries	Mode of collection
DK	Postal survey – a letter and the questionnaire
FI	Postal survey – a letter and the questionnaire
IS	Electronic questionnaire on the internet with a letter with a link sent to the respondents
NO	Electronic questionnaire on the internet with a cover letter sent to the respondents
SE	Electronic questionnaire on the internet with a cover letter sent to the respondents

b. Data capture method(s)

Countries	Data capture methods
DK	Excel-sheet, converted to SAS
FI	Data keying
IS, NO, SE	Electronic transfer of data

c. Reminders

Countries	Use of reminders
DK	One reminder by letter
FI	One reminder by letter
IS	3 reminders by letter, then one by phone
NO	One reminder sent by letter
SE	One reminder sent by letter

d. Time of data collection

Countries	Start of data collection	End of data collection
DK	Sept. 15 / hospitals+schools: Sept. 30	Nov. 17
FI	Mid. of May	End of August
IS	May 19	July 15
NO	Aug 17	Sept 22
SE	June 14	Sept 10

Data processing

a. Programmes, databases and formats used

Iceland has used SPSS, while the other conductors used SAS. Norway also used *Blaise Internet Services.*

b. Imputation methods, if any.

Iceland , Norway and Sweden used the logical imputations included in the SAS-program.

Overall assessment of the National methodology

	Assessment = problems/improvements
DK	Concerning the Business Register as frame: the Business Register has proved to be a possible frame for extraction of units for the survey. In some cases units have been integrated into other units, without this being reflected in the register, but the overall impression is, that is a functional frame. Responding units: Units in the central and regional government seem to be fairly clear of what to respond for. For local municipalities there are obviously difficulties, as some units answer for the total activities and employees in the municipality, including institutions, whereas others respond for the administration part only. There is a need to be specific when contacting these units of what to include in the response.
FI	1) In a country size of Finland it is preferable and feasible to conduct census of local and central government if the unit is legal unit such as municipality. 2) More effort should be put on reminders etc. in order to increase participation.
IS	The pilot study coincided with exceptional and difficult circumstances in Iceland as a result of the financial crisis which hit Iceland in September 2008. For the majority of government agencies, cuts in the Government budget for 2010 from the previous year were 10%, except for educational institutions 7%, and hospitals, medical services and services for the handicapped 5%. Similarly, municipalities were hit hard by the economic crisis. During telephone reminders it came out that some respondents found it hard to report on "luxury items" such as innovation at the same time they were cutting programmes, lowering salaries and laying off employees. Others were more positive and argued that hard times called for more innovation activities.
NO	As explained in 2.5 it was difficult to decide on the best reporting unit in the health sector. The medium (firm) level did not work very well. Some hospitals (formally a part of a larger regional enterprise) reported back that they did not consider themselves the right reporting unit and had

	an inclination to defer to a higher level administrative authority. Some of these issues might have been alleviated by the information letter for the survey giving a batter explanation and rationale for the choice of respondents. However, our general experience is that reliably targeting public-sector service providers will require a mapping and coordination effort in collaboration with the relevant administrative authorities for the respective sectors. This was beyond the possible scope of a voluntary pilot survey.
SE	Business frame a feasible approach to conduct the survey. More time for reminders should be put in to increase response rate. With this experience, a broader non-response analysis could be made by interviewing the non-respondents. This was beyond the possibilities of a voluntary pilot survey conducted in a short period of time.

5.2   Evaluation of the National surveys

Introduction

All relevant elements of the quality report used by EUROSTAT to validate S&T-surveys are included here. The aim is to describe the extent to which the survey fulfilled its purpose and to point out where improvements are needed.

Completeness

Completeness is assessed via comparison of the questions collected compared with the core questionnaire, agreed between Denmark, Iceland , Norway and Sweden. As can be seen below, Denmark, Iceland, Norway and Sweden included all questions in the common questionnaire, with few exceptions. The Finnish questionnaire uses the same definitions of innovations as the other countries and covers most of the same questions. However, there are a number of differences in the Finnish questionnaire compared to the other four countries. Questions on innovation drivers and innovation strategy were not included in the Finnish questionnaire, selected sub-questions for other topics were omitted, and lesser modifications were made in the formulations of some questions.

Thematic groups	Questions			Changes inQuestions
	Core	Questions with changes[8]		
1.Product innovation (INPDSV-RODNEWORG)	8	InPdWBusPub (product innovations developed together with public organisations or businesses)	FI	Split in two, Bus/Pub
2. Process innovation (INPCSPD-PCSNEWORG)	9	InPcsWBusPub(process innovations developed together with public organisations or businesses)	FI	Split in two, Bus/Pub
		PcsNewMkt/Org (novelty of process innovations)	FI	Omitted
3. Organ. innovation (OrgManSys-ORGINNICAP)	4	OrgInnoCap (new systems for gathering knowledge or building innovative capacity)	FI	Omitted
4.Comm. innovation (COMPROM-COMPRICE)	3	ComPrice (first time commercialisation)	FI	Omitted
5. Examples of innovat. (INPDSV-RODNEWORG)	1-2	InnoEx1 InnoEx2	FI SE	For each type of innovation Only for product and process innovations
6. Innovation activities (INAB-RTOT)	12	RRdExBus/Uni/Pub RMacBus/Uni/Pub	FI	Omitted

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[8] Extra questions in any of the thematic groups are reported in 2.3.

Module	#	Question	Country	Change
		ROekBus/Uni/Pub (type of source)		
		Innovation funding	FI	Omitted
		EmpHC/FTE	SE	Split in male/female
7. Objectives, impacts (ObjSocChal-ImpStaffSave)	12	ObjSocChal (social challenges)	FI	Omitted
		ObjUseSat	FI	*Improve* not incl. in wording
		ObjOnline	FI	*Develop* instead of *Improve*
		ImpUserSurv— ImpStaffSave	FI	Omitted
8. External linkages (INFOONLINE-PROCPPP)	20	InfoConf (networks, conferences)	FI	Split in *Network* and *Other contacts*
		InfoHiring		
		CoBusSup/CoBusUsers (cooperation with business suppliers, users)	DK FI NO	*Hiring* not included Combined
		CoPubSup/Users	FI	Before *CoPubSup*
		CoUni	FI	Split in *Uni, polytech, PRO*
		CoOtherPub		Split in *Your sector, Other*
		Procurement for innovation	FI	Other wording
		ProcAcqICT-PPP (procurement activities)	FI	Omitted
9. Innovation drivers (DrivIntMan-DrivCitizen)	10	All questions	FI	Omitted
10 Strategy, capability (CapStratGoal-CapStaffDiv)	10	All questions	FI	Omitted
11 Barriers to innovate (BarPolInflex-BarOther)	11	BarPolInflex (lack of flexibility in laws, regulations)	FI	*Rigidity* instead of *Lack of flexibility*
		BarPolFunds (lack of funding)	FI	*Inadequate* instead of *Lack*
		BarOrgNoCoop (lack of cooperation within organisation)	FI	Omitted
		BarExtRules (contractual rules)		
		BarExtSup (lack of supplier capabilities)	DK,NO	Omitted
		BarOther (other barriers)	NO	Omitted
		BarOtherType		Included
		3 new items	FI	
12 Basic information (GovLevel-RespChange)	7	SecPubAdm- SecOtherType	FI	Omitted
		Budget08/Staff08	FI	Omitted
		TimeUsed/StaffInvolved	FI	Omitted

Sweden placed the basic information module at the beginning of the questionnaire.

Optional questions

A number of questions in the full questionnaire are optional. Also, countries were permitted to include other optional questions. The following table lists additional questions that were included by individual countries.

Thematic groups	Questions	
	Number of questions	Included in questionnaire
2. Developed org.inno	4	None
4. Developed comm.inno	4	None
1-4. Examples on each inno.-type	4	FI
6. In-house inno. activity	3	FI
6. Inno.expenditure	1	FI (optional, if expenditures>10 mio. €)
7. Effects	8	SE
NATIONAL:		
26. Degree of objective achievement	1	NO
8.1 Information channels (supp.)	3	FI
9.2 Co-operation (supp.)	2	FI
11.2 Procurement types (other)	4	FI
37-42. Module on Social *Care*	19	NO
In which sector did you innovate?	1	NO

Accuracy and errors

Accuracy in the statistical sense denotes the closeness of estimates or computations to the exact or true values. Statistics are not equal with the true values because of variability (the statistics change from implementation to implementation of the survey due to random effects) and bias (the average of the possible values of the statistics from implementation to implementation is not equal to the true value due to systematic effects). Several types of statistical errors occur during the survey process. The following typology of errors has been adopted from the quality reports of Eurostat:

  a. Sampling errors. These only affect sample surveys that are enumerated. They are due to the fact that only a subset of the population, usually randomly selected, is enumerated.
  b. Non-sampling errors. Non-sampling errors affect sample surveys and complete enumerations alike and comprise Coverage errors, Measurement errors and Processing errors.
  c. Non response errors.

a. Sampling errors

None of the conductors have used the data collected to enumerate values for any part of the population. Thus, it is not relevant to estimate sampling errors.

b. Non-sampling errors

Non-sampling errors occur in all phases of a survey. They add to the sampling errors (if present) and contribute to a decreasing overall accuracy. It is important to assess their relative weight in the total error and devote appropriate resources for their control and assessment.

b.1 Coverage errors

Coverage errors (or frame errors) are due to divergences between the target population and the frame population. This error is present in most pilot surveys, as the business registers cannot be used as the sole source, see Chapter 1. The comments from the survey conductors were:

Countries	Comments on coverage errors
DK	It is not possible to estimate to what extent there may be frame errors due to the Business Register not being updated.
FI	Mostly insignificant; in the case of federations of municipalities some relevance.
IS	As reported earlier 2.5.c. there were large discrepancies between how the respondents and how we at Rannis have classified the public sector organisations according to the NACE categories. These discrepancies may result in coverage errors.
NO	In the [business] register there were public enterprises we found not eligible for the survey; like national defence units, local units within the Norwegian church (deanery), and artificial units. These units were manually deleted from the target population. This process was somewhat arbitrary; which to delete/which to keep. The health sector was problematic regarding reporting units. There are large regional health entities in Norway and we found these too large to be the statistical units. It was also our opinion that each single hospital/day centre was too detailed for the survey. We tried a medium level, local group of hospitals.
SE	Problematic to estimate due to the Swedish business register. Difficult to assess how well the public sector is covered.

b.2 Measurement errors

Measurement errors occur during data collection and generate bias by recording values different than the true ones. The survey questionnaire used for data collection may have led to the recording of wrong values, or there may be respondent or interviewer bias.

The survey conductors have only few remarks to this type of error:

Countries	Comments on measurement errors
DK	Errors due to registration errors are likely to exist. Some have been corrected via checks, but others may still be in the data.
FI	Not known.
IS	As web survey was used recording of wrong values should be minimal. As the respondents belonged to the top management they may have responded in a way to cast a positive light on their institutions. [Also] the questionnaire was tested before launching it.
SE	Not known.

From the tabulations the testing of the questionnaire did reveal more measurement problems, e.g. that many respondents were not able to give even rough estimates of the resources used for innovation activities in 2009, neither the funding, nor the human resources.

b.3 Processing errors

Between data collection and the beginning of statistical analysis on the base of the statistics produced, data must undergo a certain processing: coding, data entry, data editing, imputation, etc. Errors introduced at these stages are called processing errors. Data editing identifies inconsistencies in the data which usually represent errors.

Only a few remarks were given by the survey conductors:

Countries	Comments on processing errors
FI	Considered insignificant.
IS	QuestionPro allows each respondent to take a break and resume work.If this is the case, it may appear that the respondent has sent in two or more responses. In case of multiple responses from the same person they needed to be edited. This editing process may result in processing errors. Coding: No wrong coding.
NO	In the electronic questionnaire there were built-in controls to avoid serious illogical answers. No explicit editing of the received data. Coding: Expenditure for innovation was asked for in amount of 1000 NOK; has been recoded to the corresponding classes in Euro. No other coding.
SE	No built-in controls in the questionnaire. However, there were no inconsistencies found.

c. Non-response errors

Non-response occurs when a survey fails to collect data on all survey variables from all the population units designated for data collection. There are two elements of non response:

- Unit non-response which occurs when no data (or so little as to be unusable) are collected on a designated population unit.
- Item non-response which occurs when data only on some, but not all survey variables are collected on a designated population unit.

The extent of response (and accordingly of non response) is measured with response rates.

c.1 Unit response rate

The main interest is to judge if the response from the target population was satisfying by computing the (unweighted) response rate. Also, the weighted response rate could be computed, but only IS has calculated the weights needed.

> Unweighted Unit Response Rate= (Number of units with a response) / (Total number of eligible and unknown eligibility units in the sample)

The survey conductors were asked to calculate the unit response rate for the total and by institutional sectors and public service groups and a SAS-program was provided for that. Here are the results:

Sector	Public service group	DK	FI	IS	NO	SE
Total	Total	42% (604)	45% (334)	78% (79)	45% (626)	45% (405)
Total	1. Public Administration	56% (230)		91% (35)		40% (227)
	2. Education	32% (289)				56% (43)
	3. Health	31% (61)			36% (195)	36% (47)
	4. Residential care					36% (14)
	5. Social work					
	6. Cultural & Sports					50% (36)
	7. Technical & Environmental					47% (17)
	(All) Other public services	63% (22)		66% (41)	49% (431)	100% (21)
Central	Total	56% (158)	58% (89)	81% (31)	51% (318)	62% (94)
Regional/assoc.		38% (446)	51% (107)	76% (45)	39% (18)	40% (311)
Local			30% (138)		38% (290)	

Countries	Comments on unit response rates
DK	*Other public services* includes Sectors 4-7.
FI	The figures don't correspond with the reported results for indicator, as the results do not include the "subunits of municipalities", only municipalities as a whole (ie. results are based on 131 responses out of 283).
IS	IS has included responses by sector and public service group (not all specified here, due to confidentiality).
NO	There are missing values on the grouping variable(s) for some units. Due to the nature of the variable, the sector grouping does not make much sense, and we have not thoroughly gone through the grouping by centrality. Several are also ambiguous, in particular with regards to units who are formally central government authorities, while in practice being "decentralized" and enjoying varying degrees of regional autonomy.
SE	Considering it is an voluntary pilot the unit response rate is acceptable. The response rate was higher in central government compared with regional/local government.

c.2 Reasons for non-response

Countries	Reasons
DK	Lack of time for voluntary surveys/other priorities Perceived non-relevancy.
FI	Pilot, voluntary survey.
IS	Some respondents seemed to give up half way through the process of filling out the questionnaire. They seemed to have stopped at a particular question, which they perhaps found difficult to answer, without returning to the questionnaire again. Also, the terminology might be too complicated.
NO	Roughly half of our sample never even logged in to the web-based form and then even didn't have a look at the questionnaire. We see the following main reasons for this: - problem within the organisation to find the right person responsible Anecdotal evidence suggests that it has been difficult to reach the right "respondent" within the surveyed organizations in a timely manner. Some invitation letters have been "making the rounds" within the respondents organization while other have been put aside by the person receiving it internally without passing it on. - unfamiliar with or not interested in the topic - voluntary survey A common reason for non-response amongst units having attempted to respond was that the respondents found the survey difficult to grasp. They were not familiar with the terminology. The questionnaire was also large with different types of question and answers were needed from several parts of the organisation. It was difficult for the institutions to find the right persons to answer the different questions.
SE	Voluntary pilot survey. Uncertainty regarding the actual person answering the questionnaire.

c.3 Item response rate

Definition: Unweighted Item Response Rate=
(Number of units with a response for the item) / (Total number of eligible[2] for the item, units in the sample)

Question	DK[9]	FI	IS	NO[10]	SE
1.1 INPD…	>99%	100%	100%		97%
1.2 INPDW…	>51%	99%	100%		100%
1.3 PRODNEW..	>44%	98%	100%		88%
2.1 INPCS…	>96%	100%	100%		96%
2.2INPCSW…	>43%	98%	100%		100%
2.3 PCSNEW…	>47%	98%	100%		93%
3.1 ORG…	>97%	100%	100%		95%
4.1 COM…	>97%	100%	100%		96%
5. INNOEX…	-	-	50%		100%
6.1 I NAB/INON	>93%	100%	100%		95%
6.2 RRDEX/RMAC/ROEK	>89%	87-94%	100%		97%
6.2.A RRDEX…	>62%	-	100%		100%
6.2.B RMAC…	>56%	-	100%		100%
6.2.C ROEK…	>28%	-	100%		100%
6.3 FUN…	>85%	-	89-93%		98%
6.4A EMPHC		87%	93%	81%	76%
6.4.B EMPFTE		80%	85%	69%	64%
6.5 RTOT	75%	90%	54%	32%	<72%
7.1 OBJ…	>87%	93%	87%		99%
7.2 IMP…	>88%	-	85%		93%
8.1 INFO	>87%	94%	83%		99%
8.2 CO	87%	95%	100%		93%
8.3 CO…	>87%	91%	100%		99%
8.4 CO…ABROAD	>89%	97%	100%		99%

[9] Logical imputation not conducted.
[10] Some error in the calculation means that figures are not available yet.

8.5 PROCURE	85%	98%	83%		96%
8.6ABC PROCACQ	>87%	-	100%		100%
8.6DEPROC	>83%	-	100%		100%
9.1 DRIV…	>90%	-	83%		97%
10 CAP…	>96%	-	78%		95%
11. BAR…	>93%	98%	80%		93%
12.3A BUDGET	83%		66%	85%	94%
12.3.B STAFF	68%		68%	88%	95%

The item response rates are reported by group of items, as logical imputation[11] has been recommended. For many questions, the item response rates are quite high. However, there are also some questions with substantial item non-response. This is particularly the case for the questions on the number of innovation personnel (EmpHc and EmpFTE) and innovation expenditures (RTOT). For Denmark, item non-response is high for follow questions concerning innovations (eg. INPDW – who developed the product innovation and ProdNew on the novelty of product innovations). Though, it should be noted that logical imputation was not conducted in Denmark.

c.4 Reasons for item non-response

Countries	Possibility of estimate totals
DK	Perceived lack of relevance. The question is complicated to answer (e.g. needs involvement of several others). Possibly some questions might be perceived to be sensitive.
IS	The terminology might be too complicated. In most cases only one person answered the questionnaire and might have skipped those questions where he/she were lacking information.
NO	The questionnaire was … large with different types of question and answers were needed from several parts of the organisation. It was difficult for the institutions to find the right persons to answer the different questions. Some responses were abandoned 'half way through' if the respondent wasn't able to answer a particular question. In this regard, the electronic questionnaire made the process of completing the questionnaire somewhat problematic since it was not possible to print out the questionnaire for internal distribution. Several institutions contacted us regarding this. While our general experience is that the on-the-fly consistency checks made possible by electronic data gathering lessens missing data- and item non-response problems, a printable overview of the required data should have been made available before starting the survey. In particular for a new field such as this where the respondents could not be assumed to be familiar with the subject matter beforehand.
SE	Quite high item response rate. As expected lower item response rate on questions regarding resources.

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[11] For items in a question (like *Barriers of innovation*) logical imputation means that if at least one item is ticked, the non-ticked items are assigned the negative value (e.g. *No/Not relevant*).

c.4 Non-response survey

No non-response surveys were conducted in the pilot studies, but telephone interviews were conducted in Icelandafter three postal reminders.

Timeliness and punctuality

Timeliness and punctuality refer to time and dates, but in a different manner: the timeliness of statistics reflects the length of time between their availability and the event or phenomenon they describe. Punctuality (shown in the table below) refers here to the time lag between the actual and planned delivery of the report and tabulations.

a. Punctuality

The definition of the punctuality of time schedule of report and tabulations is:

(Actual date of the effective report/tabulations) - (Scheduled date of the effective report/tabulations)

Country	Contractual defined deadline of report transmission	Actual date of transmission of the report		Actual date of transmission of the tabulations
DK	Sept. 15, 2010	Oct. 4/Nov. 26 2010		Oct. 29 / Nov. 27
FI	Sept. 15, 2010	Oct. 7, 2010		Sept. 29
IS	Sept. 15, 2010	Oct. 11, 2010		Sept. 27
NO	Sept. 15, 2010	Oct. 4, 2010		Oct. 27
SE	Sept. 15, 2010	Oct. 4/Nov. 26 2010		Sept. 28

These delays reflect a too optimistic deadline compared to the working amount and conditions for the conductors.

Costs

The assessment of costs associated with a statistical product is a rather complicated task since there must exist a mechanism for appointing portions of shared costs (for instance the business register or shared IT resources and dissemination channels) and overheads (office space, utility bills etc) and must become detailed and clear enough so as to provide for international comparisons among agencies of different structures. Overall costs include costs for the conductors of the survey and costs for respondents. The calculations below estimate costs for respondents of participating in the survey.

The overall cost on respondents for delivering the information depends on four components:

N = the number of responses

R = the average number of respondents involved in the completion of the questionnaire

T = the average time per respondent involved required to provide the information, including time spent assembling information prior to completing a form or taking part in interview and the time taken up by any subsequent contacts after receipt of the questionnaire ('Recontact time').

C = the average hourly cost of a respondent's time.

Thus, if we neglect costs such as the start-up costs of creating systems to comply with the survey, computing costs or the use of consumables, etc., the cost on respondents should be estimated as follows:

Total Cost = N x R x T x C

The formula should in principle include also the cost to non-respondents (until they decide to stop dealing with the survey). This is however very difficult to estimate as it requires a separate survey on non-respondents for the establishment of the average time spent on the survey until they stop dealing with it. This survey would still not cover all non-respondents and its estimates would not be accurate. For this reason the formula is confined to respondent cost only.

The estimates for the pilot survey look like that for the Nordic countries:

Burden Component	DK	NO	SE
Number of Responses (N)	256	287	176
Number of Respondents (R)	1.95	1.73	1.69
Average Time required to complete the questionnaire in hours[1] (T)	0.84	1.20	0.64
Hourly cost of a respondent[2] (C)	500	736	600
Total cost	210000	437504	113400
Currency	DKR	NOK	SEK

1) From Question A.1a.
2) i.e. based on Labour costs, actual response based to a direct question.

Comments

a. Comments from the respondents

Here, a summary of the comments given by the respondents in the questionnaire - from general to relevant specific comments – is given for each country:

Countries	Comments from the respondents
DK	Benchmark/experiences from other local municipalities/regions Benchmarking Lack of categories for responses, e.g. 'To some extent' as a supplement to 'To a high extent' and 'To a small extent'. The concept of innovation is not precisely defined in relation to 'development' and 'higher efficiency'. A waste of time. Longer time for responding. Exchange of experiences with the other Nordic countries. More clear wording and more simple language needed. Fewer and more precise questions. Is policy-development=innovation? Generally a difficult questionnaire. Innovation is difficult to isolate/identify. Higher response rate could be obtained by information on where to see the results. A very extensive use of time - and a non-precise result. Not clear what is/what is not innovation. Newer figures. The information and the collection of them increase the notification of innovation, and could result in new inspiration. Lack of precision as regards the financial issues. Reflection. Base line. More precise questions can be used for exchange of experiences. We are working on development of innovation, e.g. through the ABT-fund, and would like to hear about the barriers. For a possible next round we will use another way of responding by letting the questionnaire be discussed by the relevant managers. Would like to see the results - if there are clear negative and positive tendencies, preferably for each country.

IS	Useful to receive a comparison of the development of innovation between the public sector on the one hand and the private sector on the other.
	Useful to know which factors inhibit innovation in the public sector.
	Not exactly at this point in time. Our interest is first and foremost directed at the further development of our own (internal) potential. Including and focusing on the significant and diverse human resources that are found among our employees.
	May be useful to recognise the extent of innovation and whether respondents are dealing with the same or similar obstacles. Perhaps the results should be followed up with a seminar, which potentially could increase their 'learning effect'.
	Unclear.
	Cannot see it as being of use.
	Compare us to similar institutions. The questions could be better adapted to different institutions.
	To facilitate the analysis of obstacles in innovation.
	To create a discussion within the field, place innovation in a more specific process.
	Questions and answers are not descriptive of the operations.
	Unclear. Results would probably encourage discussion.
	Not much – but served, however, as a reminder of the importance of placing innovation on a clearer course within the division.
	Compare us to other institutions. See which focal points we are not using to our advantage.
	Better instructions, a more defined survey, many questions in the survey are only partly applicable to 'my' institution and, as a result, answers to those questions provide a limited picture of the actual nature of things.
	Make this a bit more effective.
	It can be difficult to give one answer when there are many projects, as can be the case when answering for 11 subunits. In addition, increasing the number of possible answers and adding a comment box to use if needed, would be preferable.
	See no point in this survey and hope that a stop will be put on allocating tax money for these kinds of projects.
	Yes, it has to be made possible to go back and forth in the survey, store those answers completed and start again. In addition, it would be better to be able to view what will be asked about in order to figure out which answers need to be collected from others.
	Good initiative
SE	Of the organisations that responded to the questionnaire most of them responded no or were doubtful about the usefulness. Some respondents said that the results indeed were useful and this was mainly divided in to three aspects: one concerning raising the awareness about public innovations; one concerning the possibility to compare innovation activities in the public sector; one to look inside their own organisation and look at what is actually being done that could be regarded as innovative.
	A more precise definition of what an "innovation" is would be beneficial. When development work takes place, it is difficult to get this in to the definition if only "great leaps" are to be included.
	The questionnaire as such was easy to work with, however, in large organizations it is a one year project to go around and discuss what innovation activities are in relation to all the activities taking place.
	For institutions of higher education it should be more adapted to their activities.
	The questionnaire contains words that are abstract and the questions are difficult to put in to the context of the work activities, so more explanatory text is needed.
	Difficult to separate the various types of innovations as a lot of development work touches upon what [SCB] defines as an innovation.
	A new question on "plans for innovation activities" would be good.
	Asking about innovation activities is a sensitive subject. It is election year and as a municipality you really want to show that there is a "drive" for development within the organisation.
	Some questions might need a look over if perhaps there should be more "not relevant" alternatives.

b. General comments from the conductor

Which was the good and problematic elements in the pilot survey, and how do we progress from here.

	General comments – the conductors
DK	Statistics Denmark has received many useful examples of innovations in the public sector. Especially two providers of examples are important: The national hospital (Rigshospitalet) has provided many examples from each of their five centres. Also the Ministry of Culture has provided a range of examples. Several respondents have asked for examples, and for future surveys a list would be valuable. In fact this could be both a 'positive'-list and a 'negative-'list (examples of things that are NOT innovations). Probably more definitions and examples are needed concerning innovations including ICT. A range of the innovations included in product innovation have strong ICT elements, and may as such be categorised elsewhere, e.g. as communication innovations.Need for general directions concerning what to be included in responses from local municipalities, cf. comments above.
SE	Many useful examples collected. SCB now has a lot of information ranging from first focus group meetings to the two pilots that can be of great use to researchers, government institutions etc. Many have shown interest in the project and its results. Feedback to respondents is important. E.g. in the Swedish BERD survey we send out a four page leaflet containing the main results to the respondents. They also get web-links to the reports. This would be a good way to both thank the respondents and encourage them to answer in future surveys. The examples could be analysed further to define what the innovation really is to be categorised as. E.g. many or most have strong ICT aspects but might be categorised as another type of innovation. Need to clarify what is meant by goods and services in the public sector or public services.

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Appendix

Tables with country results for the pilot studies

The tables below present the main results of the Nordic pilot studies. The goals of the Nordic pilot studies were to test our measurement framework with respect to validity, potential comparability and usefulness. Hence, it is important to avoid overinterpretation of these results and they should not considered suitable for benchmarking. The populations in each country are different, as country's explored different methods to address many of the challenging statistical issues for the survey, and some countries also experimented with the inclusion of special groups, such as hospitals and schools. In addition, given that this is a pilot study, a full validation procedure has not been employed. Finally, many of the concepts used in this survey are very much new to public sector organizations. Despite extensive testing, we lack a full knowledge of how these concepts are understood by various respondents.

Table 1 - innovations, All government levels		Denmark	Finland	Iceland	Norway	Sweden
Product innovations						
New or significantly improved services	% all units	70,7	52,3	71,2	55,4	42,4
New or significantly improved goods	% all units	23,0	15,4	33,9	11,5	12,8
Developed mainly by own organisation	% product innovators	48,8	67,9	38,1	57,4	51,3
Developed in cooperation with business	% product innovators	36,7	49,4	21,4	33,8	42,1
Developed in cooperation with public organisations	% product innovators	30,5	48,1	26,2	38,2	43,4
Developed mainly by other public organisations or businesses	% product innovators	9,4	19,8	9,5	11,8	9,2
Introduced product innovation new compared to others	% product innovators	38,7	53,8	26,2	34,8	42,6
Introduced product innovation new to organisation only	% product innovators	44,1	68,8	31,0	80,0	62,5
Any product innovation	% all units	71,9	55,0	71,2	56,7	43,9
Process innovations						
A new or significantly improved method of production	% all units	58,2	47,7	54,2	37,9	43,0
A new or significantly improved logistic, delivery or distribution system	% all units	25,8	28,9	44,1	25,7	19,8
A new or significantly improved supporting activity	% all units	51,2	39,6	39,0	53,8	45,2
Developed mainly by own organisation	% process innovators	43,4	54,3	40,6	48,4	55,2
Developed in cooperation with business	% process innovators	39,8	51,1	40,6	44,7	47,6
Developed in cooperation with public organisations	% process innovators	27,7	42,4	25,0	35,4	33,3
Developed mainly by other public organisations or businesses	% process innovators	10,9	15,2	9,4	14,3	10,5
Introduced process innovation new compared to others	% process innovators	28,1	N/A	34,4	27,3	26,8
Introduced process innovation new to organisation only	% process innovators	47,3	N/A	53,1	82,6	69,5
Any process innovation	% all units	71,9	63,1	54,2	67,1	61,0
Any product or process innovation	% all units	84,4	71,8	76,3	74,6	68,8
Organisational innovations						
New management systems	% all units	41,4	35,6	42,4	15,5	25,1
New methods of workplace organisation	% all units	49,2	47,7	39,0	48,8	39,9
New methods of organising external relations	% all units	32,4	35,6	45,8	29,2	21,5
Building innovative capacity	% all units	34,0	N/A	37,3	22,5	36,1
Any organisational innovation	% all units	66,4	61,7	86,4	62,9	56,8
Communication innovations						
New methods of promoting the organisation or its services and goods	% all units	49,2	23,5	30,5	31,5	37,7
New methods of influencing the behaviour of users, citizens or others	% all units	48,8	25,5	50,8	30,1	32,7
First time commercialisation (for sale) of existing services or goods	% all units	16,0	N/A	35,6	5,5	10,2
Any communication innovation	% all units	64,1	34,2	86,4	44,6	47,1
Any innovation	% all units	87,9	79,2	91,5	83,3	80,9

Table 2 - innovations, central government		Denmark	Finland	Iceland	Norway	Sweden
Product innovations						
New or significantly improved services	% all units	69,3	50,0	72,0	60,4	38,2
New or significantly improved goods	% all units	23,9	11,5	48,0	9,0	13,5
Developed mainly by own organisation	% product innovators	45,5	69,2	50,0	58,1	52,4
Developed in cooperation with business	% product innovators	45,5	69,2	33,3	40,3	57,1
Developed in cooperation with public organisations	% product innovators	28,4	50,0	44,4	27,4	57,1
Developed mainly by other public organisations or businesses	% product innovators	8,0	15,4	11,1	8,1	4,8
Introduced product innovation new compared to others	% product innovators	42,0	76,0	38,9	50,8	55,0
Introduced product innovation new to organisation only	% product innovators	36,4	40,0	44,4	63,9	52,6
Any product innovation	% all units	71,6	51,9	72,0	61,4	38,2
Process innovations						
A new or significantly improved method of production	% all units	59,1	46,2	60,0	43,6	45,5
A new or significantly improved logistic, delivery or distribution system	% all units	23,9	34,6	56,0	29,0	24,5
A new or significantly improved supporting activity	% all units	51,1	32,7	52,0	54,0	50,0
Developed mainly by own organisation	% process innovators	39,8	42,9	46,7	57,5	72,2
Developed in cooperation with business	% process innovators	45,5	53,6	46,7	52,1	52,8
Developed in cooperation with public organisations	% process innovators	23,9	42,9	33,3	21,9	30,6
Developed mainly by other public organisations or businesses	% process innovators	8,0	14,3	13,3	6,8	0,0
Introduced process innovation new compared to others	% process innovators	30,7	N/A	33,3	38,4	35,3
Introduced process innovation new to organisation only	% process innovators	37,5	N/A	60,0	74,0	52,9
Any process innovation	% all units	71,6	57,7	60,0	72,3	65,5
Any product or process innovation	% all units	84,1	65,4	80,0	78,2	70,9
Organisational innovations						
New management systems	% all units	31,8	21,2	40,0	17,8	20,4
New methods of workplace organisation	% all units	48,9	44,2	36,0	50,0	33,3
New methods of organising external relations	% all units	29,5	28,8	48,0	24,8	17,0
Building innovative capacity	% all units	36,4	N/A	20,0	22,8	27,8
Any organisational innovation	% all units	61,4	57,7	80,0	60,8	50,0
Communication innovations						
New methods of promoting the organisation or its services and goods	% all units	51,1	32,7	32,0	41,4	33,3
New methods of influencing the behaviour of users, citizens or others	% all units	44,3	28,8	44,0	34,7	24,1
First time commercialisation (for sale) of existing services or goods	% all units	14,8	N/A	48,0	4,0	9,3
Any communication innovation	% all units	60,2	40,4	88,0	52,5	40,7
Any innovation	% all units	86,4	78,8	88,0	83,3	78,2

Table 3 - innovations, Non-central government		Denmark	Finland	Iceland	Norway	Sweden
Product innovations						
New or significantly improved services	% all units	71,4	53,6	70,6	49,7	43,7
New or significantly improved goods	% all units	22,6	17,5	23,5	13,7	11,3
Developed mainly by own organisation	% product innovators	50,6	67,3	29,2	57,1	49,1
Developed in cooperation with business	% product innovators	32,1	40,0	12,5	27,4	36,4
Developed in cooperation with public organisations	% product innovators	31,5	47,3	12,5	44,0	38,2
Developed mainly by other public organisations or businesses	% product innovators	10,1	21,8	8,3	15,5	9,1
Introduced product innovation new compared to others	% product innovators	36,9	43,6	16,7	21,4	36,2
Introduced product innovation new to organisation only	% product innovators	48,2	81,8	20,8	94,0	67,4
Any product innovation	% all units	72,0	56,7	70,6	50,9	45,8
Process innovations						
A new or significantly improved method of production	% all units	57,7	48,5	50,0	31,5	41,1
A new or significantly improved logistic, delivery or distribution system	% all units	26,8	25,8	35,3	22,1	16,2
A new or significantly improved supporting activity	% all units	51,2	43,3	29,4	51,2	41,4
Developed mainly by own organisation	% process innovators	45,2	59,4	35,3	38,8	47,8
Developed in cooperation with business	% process innovators	36,9	50,0	35,3	39,8	43,5
Developed in cooperation with public organisations	% process innovators	29,8	42,2	17,6	45,9	33,3
Developed mainly by other public organisations or businesses	% process innovators	12,5	15,6	5,9	20,4	15,9
Introduced process innovation new compared to others	% process innovators	26,8	N/A	35,3	18,4	21,0
Introduced process innovation new to organisation only	% process innovators	52,4	N/A	47,1	90,7	77,0
Any process innovation	% all units	72,0	66,0	50,0	59,4	58,0
Any product or process innovation	% all units	84,5	75,3	73,5	68,5	66,9
Organisational innovations						
New management systems	% all units	46,4	43,3	44,1	13,4	28,4
New methods of workplace organisation	% all units	49,4	49,5	41,2	45,1	41,9
New methods of organising external relations	% all units	33,9	39,2	44,1	29,7	22,1
Building innovative capacity	% all units	32,7	N/A	50,0	22,4	38,1
Any organisational innovation	% all units	69,0	63,9	91,2	62,4	59,3
Communication innovations						
New methods of promoting the organisation or its services and goods	% all units	48,2	18,6	29,4	21,8	39,7
New methods of influencing the behaviour of users, citizens or others	% all units	51,2	23,7	55,9	24,4	36,8
First time commercialisation (for sale) of existing services or goods	% all units	16,7	N/A	26,5	6,7	10,3
Any communication innovation	% all units	66,1	30,9	85,3	35,2	49,6
Any innovation	% all units	88,7	79,4	94,1	81,2	81,8

Table 4 - innovation activities, funding and objectives, All government levels		Denmark	Finland	Iceland	Norway	Sweden
Abandoned innovation activities	% all units	22.3	43.6	25.4	14.2	44.0
Ongoing innovation activities	% all units	55.1	10.1	59.3	64.6	19.0
Any innovation or innovation activities	% all units	89.5	81.9	91.5	87.1	85.5
External purchases						
Contracting of consultancy services	% innovation active units	68.0	N/A	53.7	73.1	61.2
From Private businesses	% with contracting of consulta	62.1	N/A	79.3	86.8	85.1
From Universities, governmental research institutes	% with contracting of consulta	16.4	N/A	48.3	39.7	29.9
From Public service organisations	% with contracting of consulta	14.5	N/A	24.1	27.2	24.1
Acquisitions of machinery, equipment and software	% innovation active units	59.0	63.5	27.8	57.7	40.6
From Private businesses	% with acquisitions of machin	55.9	N/A	93.3	94.1	98.3
From Universities, governmental research institutes	% with acquisitions of machin	2.3	N/A	20.0	1.7	11.9
From Public service organisations	% with acquisitions of machin	7.4	N/A	0.0	18.5	10.2
Acquisition of external know-how	% innovation active units	48.0	15.1	14.8	25.0	40.0
From Private businesses	% with acquisitions of externa	27.7	N/A	100.0	85.7	62.7
From Universities, governmental research institutes	% with acquisitions of externa	24.2	N/A	50.0	14.3	40.7
From Public service organisations	% with acquisitions of externa	25.4	N/A	25.0	26.5	47.5
Funding for innovation						
From local or regional authorities	% innovation active units	21.9	N/A	28.0	18.8	28.3
From central Government	% innovation active units	35.5	N/A	32.0	37.5	41.4
From the European Union	% innovation active units	14.5	N/A	18.0	7.2	32.4
From private businesses or foundations	% innovation active units	16.8	N/A	66.0	4.8	11.7
Any external funding	% innovation active units	52.0	N/A	96.0	53.8	55.2
Objectives of innovation activities						
Address social challenges	% innovation active units	28.9	N/A	42.6	21.7	39.5
Fulfill new regulations	% innovation active units	48.4	27.9	51.1	48.8	39.5
Increase efficiency	% innovation active units	59.4	56.1	76.6	71.5	70.1
Any external objectives (social challenges, regulations, efficiency)	% innovation active units	77.0	62.3	87.2	86.0	84.4
Improve quality of services or goods	% innovation active units	77.7	50.0	85.1	82.6	74.8
Improve user satisfaction	% innovation active units	69.5	65.5	85.1	71.0	73.5
Improve online services	% innovation active units	43.8	55.4	46.8	38.6	50.3
Any user objectives (quality, user satisfaction, online)	% innovation active units	82.0	81.6	93.6	87.4	88.4
Improve working conditions	% innovation active units	51.6	N/A	51.1	37.7	51.7
Other	% innovation active units	3.9	N/A	10.6	3.4	8.2

Table 5 - innovation activities, funding and objectives, central government		Denmark	Finland	Iceland	Norway	Sweden
Abandoned innovation activities	% all units	19.3	44.2	20.0	16.0	50.0
Ongoing innovation activities	% all units	56.8	7.7	64.0	71.0	28.3
Any innovation or innovation activities	% all units	88.6	84.6	88.0	86.3	85.5
External purchases						
Contracting of consultancy services	% innovation active units	72.7	N/A	50.0	84.9	73.9
From Private businesses	% with contracting of consulta	71.6	N/A	72.7	95.9	88.2
From Universities, governmental research institutes	% with contracting of consulta	14.8	N/A	18.2	35.6	23.5
From Public service organisations	% with contracting of consulta	8.0	N/A	27.3	21.9	20.6
Acquisitions of machinery, equipment and software	% innovation active units	60.2	65.0	27.3	62.8	45.7
From Private businesses	% with acquisitions of machin	59.1	N/A	83.3	98.1	100.0
From Universities, governmental research institutes	% with acquisitions of machin	3.4	N/A	33.3	0.0	9.1
From Public service organisations	% with acquisitions of machin	8.0	N/A	0.0	14.8	9.1
Acquisition of external know-how	% innovation active units	47.7	11.4	13.6	27.9	41.3
From Private businesses	% with acquisitions of externa	30.7	N/A	100.0	95.8	70.0
From Universities, governmental research institutes	% with acquisitions of externa	23.9	N/A	66.7	20.8	50.0
From Public service organisations	% with acquisitions of externa	21.6	N/A	33.3	20.8	45.0
Funding for innovation						
From local or regional authorities	% innovation active units	3.4	N/A	9.5	2.3	17.0
From central Government	% innovation active units	38.6	N/A	42.9	43.7	34.0
From the European Union	% innovation active units	11.4	N/A	23.8	8.0	25.5
From private businesses or foundations	% innovation active units	13.6	N/A	57.1	4.6	19.1
Any external funding	% innovation active units	44.3	N/A	90.5	49.4	44.7
Objectives of innovation activities						
Address social challenges	% innovation active units	14.8	N/A	52.4	13.8	25.5
Fulfill new regulations	% innovation active units	48.9	34.2	57.1	54.0	42.6
Increase efficiency	% innovation active units	61.4	62.5	76.2	79.3	70.2
Any external objectives (social challenges, regulations, efficiency)	% innovation active units	78.4	70.0	90.5	93.1	83.0
Improve quality of services or goods	% innovation active units	75.0	43.6	85.7	85.1	63.8
Improve user satisfaction	% innovation active units	68.2	55.0	90.5	77.0	66.0
Improve online services	% innovation active units	53.4	62.5	38.1	57.5	61.7
Any user objectives (quality, user satisfaction, online)	% innovation active units	77.3	80.0	95.2	90.8	87.2
Improve working conditions	% innovation active units	50.0	N/A	47.4	55.2	34.1
Other	% innovation active units	46.6	N/A	42.1	47.1	13.6

Table 6 - innovation activities, funding and objectives, Non-central government		Denmark	Finland	Iceland	Norway	Sweden
Abandoned innovation activities	% all units	23.8	43.3	29.4	14.2	40.2
Ongoing innovation activities	% all units	54.2	11.3	55.9	57.4	13.5
Any innovation or innovation activities	% all units	89.9	80.4	94.1	86.7	85.1
External purchases						
Contracting of consultancy services	% innovation active units	65.5	N/A	56.3	63.3	52.6
From Private businesses	% with contracting of consulta	57.1	N/A	83.3	79.1	80.8
From Universities, governmental research institutes	% with contracting of consulta	17.3	N/A	66.7	41.9	32.7
From Public service organisations	% with contracting of consulta	17.9	N/A	22.2	29.1	26.9
Acquisitions of machinery, equipment and software	% innovation active units	58.3	62.7	28.1	52.5	37.4
From Private businesses	% with acquisitions of machin	54.2	N/A	100.0	90.4	97.3
From Universities, governmental research institutes	% with acquisitions of machin	1.8	N/A	11.1	4.1	13.5
From Public service organisations	% with acquisitions of machin	7.1	N/A	0.0	20.5	13.5
Acquisition of external know-how	% innovation active units	48.2	16.9	15.6	20.9	38.9
From Private businesses	% with acquisitions of externa	26.2	N/A	100.0	77.8	59.0
From Universities, governmental research institutes	% with acquisitions of externa	24.4	N/A	40.0	7.4	35.9
From Public service organisations	% with acquisitions of externa	27.4	N/A	20.0	29.6	48.7
Funding for innovation						
From local or regional authorities	% innovation active units	31.5	N/A	41.4	30.1	32.0
From central Government	% innovation active units	33.9	N/A	24.1	31.6	44.0
From the European Union	% innovation active units	16.1	N/A	13.8	6.0	35.0
From private businesses or foundations	% innovation active units	18.5	N/A	72.4	4.5	8.0
Any external funding	% innovation active units	56.0	N/A	100.0	55.6	58.0
Objectives of innovation activities						
Address social challenges	% innovation active units	36.3	N/A	34.6	27.7	44.1
Fulfill new regulations	% innovation active units	48.2	24.7	46.2	44.6	37.3
Increase efficiency	% innovation active units	58.3	52.7	76.9	66.9	67.6
Any external objectives (social challenges, regulations, efficiency)	% innovation active units	76.2	58.1	84.6	81.5	83.3
Improve quality of services or goods	% innovation active units	79.2	53.4	84.6	80.8	79.4
Improve user satisfaction	% innovation active units	70.2	71.2	80.8	66.2	75.5
Improve online services	% innovation active units	38.7	51.4	53.8	24.6	43.1
Any user objectives (quality, user satisfaction, online)	% innovation active units	84.5	82.4	92.3	85.4	88.2
Improve working conditions	% innovation active units	57.1	N/A	50.0	38.5	51.0
Other	% innovation active units	3.6	N/A	11.5	3.1	6.9

Table 7 - Information channels, cooperation and procurement, All government levels		Denmark	Finland	Iceland	Norway	Sweden
Information channels for innovation						
Internet and online discussion forums	% innovation active units	40.6	18.9	28.9	23.8	33.6
User satisfaction surveys	% innovation active units	32.4	33.6	40.0	26.2	28.1
Networks, conferences, seminars	% innovation active units	56.3	N/A	55.6	42.7	70.5
Hiring specialised personnel	% innovation active units	23.4	22.1	40.0	19.9	57.5
Evaluations	% innovation active units	43.8	27.7	31.1	23.3	52.7
Any information channel	% innovation active units	78.9	57.4	84.4	71.4	90.4
Innovation cooperation						
Innovation cooperation	% innovation active units	66.4	81.0	57.4	57.7	76.1
Enterprises as suppliers	% innovation active units	47.7	N/A	35.5	52.9	63.5
Enterprises as users	% innovation active units	16.4	N/A	29.0	26.1	49.0
Any cooperation with the business sector	% innovation active units	47.7	N/A	51.6	60.5	76.0
Public organisations as suppliers	% innovation active units	19.9	N/A	22.6	31.1	35.6
Public organisations as users	% innovation active units	21.5	N/A	38.7	26.1	32.7
Universities, governmental research institutions	% innovation active units	16.0	N/A	32.3	31.9	42.3
Other public organisations	% innovation active units	15.2	N/A	35.5	16.8	61.5
Any cooperation with the public sector	% innovation active units	27.7	N/A	58.1	50.4	75.0
Citizens, as users	% innovation active units	34.0	5.8	41.9	40.3	53.8
Enterprises abroad	% innovation active units	16.0	19.1	22.6	14.3	25.7
Public organisations abroad	% innovation active units	27.3	40.9	35.5	25.2	35.2
Innovative procurement						
Innovative procurement	% all units	45.7	50.0	48.9	16.3	40.1
Acquisition of components or software from ICT-suppliers	% units with innovative procur	45.7	N/A	40.9	91.2	65.5
Acquisition of other machinery and equipment	% units with innovative procur	24.6	N/A	63.6	29.4	37.9
Contracting of consultancy services	% units with innovative procur	54.3	N/A	27.3	61.8	67.2
Outsourcing of service provision	% units with innovative procur	10.9	N/A	13.0	1.4	10.1
Public-private partnerships	% units with innovative procur	18.8	N/A	33.3	2.9	13.5

Table 8 - Information channels, cooperation and procurement, central government		Denmark	Finland	Iceland	Norway	Sweden
Information channels for innovation						
Internet and online discussion forums	% innovation active units	42.0	19.5	10.5	25.6	25.5
User satisfaction surveys	% innovation active units	38.6	31.7	42.1	25.6	29.8
Networks, conferences, seminars	% innovation active units	46.6	N/A	52.6	41.9	70.2
Hiring specialised personnel	% innovation active units	28.4	26.8	42.1	30.2	63.8
Evaluations	% innovation active units	40.9	25.0	42.1	25.6	53.2
Any information channel	% innovation active units	77.3	59.5	89.5	73.3	93.6
Innovation cooperation						
Innovation cooperation	% innovation active units	71.6	83.3	59.1	50.6	84.4
Enterprises as suppliers	% innovation active units	58.0	N/A	38.5	68.2	65.8
Enterprises as users	% innovation active units	18.2	N/A	46.2	38.6	44.7
Any cooperation with the business sector	% innovation active units	58.0	N/A	61.5	72.7	76.3
Public organisations as suppliers	% innovation active units	23.9	N/A	23.1	34.1	42.1
Public organisations as users	% innovation active units	29.5	N/A	53.8	31.8	36.8
Universities, governmental research institutions	% innovation active units	12.5	N/A	23.1	34.1	47.4
Other public organisations	% innovation active units	17.0	N/A	30.8	25.0	63.2
Any cooperation with the public sector	% innovation active units	29.5	N/A	61.5	52.3	78.9
Citizens, as users	% innovation active units	33.0	0.0	38.5	27.3	39.5
Enterprises abroad	% innovation active units	22.7	21.9	30.8	18.2	45.9
Public organisations abroad	% innovation active units	37.5	51.4	46.2	40.9	54.1
Innovative procurement						
Innovative procurement	% all units	47.7	53.5	57.9	20.7	39.1
Acquisition of components or software from ICT-suppliers	% units with innovative procur	46.6	N/A	45.5	88.9	68.4
Acquisition of other machinery and equipment	% units with innovative procur	22.7	N/A	72.7	22.2	31.6
Contracting of consultancy services	% units with innovative procur	55.7	N/A	36.4	72.2	63.2
Outsourcing of service provision	% units with innovative procur	9.1	N/A	13.6	2.3	10.6
Public-private partnerships	% units with innovative procur	15.9	N/A	36.4	2.3	17.0

Table 9 - Information channels, cooperation and procurement, Non-central governme		Denmark	Finland	Iceland	Norway	Sweden
Information channels for innovation						
Internet and online discussion forums	% innovation active units	39.9	18.6	42.3	21.9	34.7
User satisfaction surveys	% innovation active units	29.2	34.7	38.5	26.6	27.7
Networks, conferences, seminars	% innovation active units	61.3	N/A	57.7	42.2	70.3
Hiring specialised personnel	% innovation active units	20.8	19.4	38.5	13.3	52.5
Evaluations	% innovation active units	45.2	29.2	23.1	21.9	51.5
Any information channel	% innovation active units	79.8	56.2	80.8	68.8	88.1
Innovation cooperation						
Innovation cooperation	% innovation active units	63.7	79.7	56.3	61.2	71.6
Enterprises as suppliers	% innovation active units	42.3	N/A	33.3	44.9	59.7
Enterprises as users	% innovation active units	15.5	N/A	16.7	17.9	50.7
Any cooperation with the business sector	% innovation active units	42.3	N/A	44.4	53.8	74.6
Public organisations as suppliers	% innovation active units	17.9	N/A	22.2	29.5	32.8
Public organisations as users	% innovation active units	17.3	N/A	27.8	21.8	28.4
Universities, governmental research institutions	% innovation active units	17.9	N/A	38.9	29.5	37.3
Other public organisations	% innovation active units	14.3	N/A	38.9	11.5	61.2
Any cooperation with the public sector	% innovation active units	26.8	N/A	55.6	48.7	71.6
Citizens, as users	% innovation active units	34.5	8.9	44.4	46.2	58.2
Enterprises abroad	% innovation active units	12.5	17.5	16.7	11.5	13.0
Public organisations abroad	% innovation active units	22.0	34.5	27.8	15.4	23.2
Innovative procurement						
Innovative procurement	% all units	44.6	48.1	42.3	12.4	39.8
Acquisition of components or software from ICT-suppliers	% units with innovative procur	45.2	N/A	36.4	93.8	66.7
Acquisition of other machinery and equipment	% units with innovative procur	25.6	N/A	54.5	37.5	43.6
Contracting of consultancy services	% units with innovative procur	53.6	N/A	18.2	50.0	69.2
Outsourcing of service provision	% units with innovative procur	11.9	N/A	12.5	0.7	10.7
Public-private partnerships	% units with innovative procur	20.2	N/A	31.3	2.8	10.7

Table 10 - Innovation drivers, strategy and barriers, All government levels		Denmark	Finland	Iceland	Norway	Sweden
Innovation drivers						
Internal - management	% innovation active units	83,2	N/A	80,0	76,7	89,5
Internal - staff	% innovation active units	74,2	N/A	68,5	51,5	76,9
Any internal driving forces	% innovation active units	85,2	N/A	75,9	83,5	93,0
Political - budget changes	% innovation active units	36,3	N/A	44,4	38,3	36,4
Political - new laws	% innovation active units	31,6	N/A	24,4	24,3	37,1
Political - changes	% innovation active units	18,4	N/A	17,8	11,7	22,4
Political - new policy priorities	% innovation active units	40,2	N/A	17,8	32,0	42,7
Any political driving forces	% innovation active units	59,4	N/A	57,8	55,8	66,4
Public organisations	% innovation active units	16,4	N/A	84,4	17,0	27,3
Businesses - suppliers	% innovation active units	14,5	N/A	6,7	14,1	14,7
Businesses - users	% innovation active units	18,4	N/A	33,3	16,0	27,3
Any business drivers	% innovation active units	27,7	N/A	35,6	25,2	32,2
Citizens	% innovation active units	32,4	N/A	44,4	35,9	53,1
Innovation strategy and management						
Specific goals for innovation activities	% all units	27,3	N/A	65,2	39,1	31,4
Innovation strategy included in overall strategy	% all units	31,3	N/A	52,2	26,5	26,6
Development department	% all units	26,2	N/A	43,5	12,8	23,7
Innovation activities mainly organised as projects	% all units	50,8	N/A	47,8	47,4	37,3
Evaluations conducted regularly	% all units	17,6	N/A	50,0	15,4	16,1
Any strategy	% all units	72,7	N/A	95,7	63,0	62,7
Managers give high priority to developing new ideas	% all units	57,0	N/A	63,0	46,6	52,4
Top management is active in leading the implementation of innovations	% all units	50,0	N/A	47,8	47,4	42,9
Members of staff have part of their time devoted to innovation projects	% all units	40,6	N/A	65,2	36,8	17,3
Staff have incentives to identify new ideas	% all units	27,0	N/A	39,1	15,4	22,6
Staff has diverse background	% all units	49,6	N/A	39,1	30,8	32,1
Any management of staff capability	% all units	82,4	N/A	87,0	71,4	69,6
Barriers to innovation activities						
Political - lack of flexibility in laws	% all units	23,8	13,4	52,1	8,5	24,7
Political - lack of incentives	% all units	11,7	17,9	56,3	10,6	21,1
Political - lack of funding	% all units	48,0	39,0	27,1	29,4	47,6
Any political barriers	% all units	58,6	N/A	72,9	34,5	60,8
Organisation - risk of failure	% all units	8,2	3,5	58,3	6,8	9,0
Organisation - lack of cooperation	% all units	13,7	N/A	62,5	5,1	18,1
Any organisational barriers (risk of failure or lack of cooperation)	% all units	17,6	N/A	70,8	9,0	21,7
Internal - inadequate time	% all units	35,2	42,9	74,5	26,9	53,0
Internal - lack of incentives	% all units	16,0	22,4	53,2	16,7	29,1
Internal - any internal barriers (time or incentives)	% all units	38,7	N/A	80,9	29,9	59,0
External - rules hinder collaboration	% all units	13,3	N/A	29,2	5,1	10,2
External - lack of innovative suppliers	% all units	9,4	N/A	29,2	3,8	3,0
External - resistant users	% all units	5,9	7,0	43,8	4,3	7,9
Any external barriers (rules, lack of innovative suppliers, resistant users)	% all units	22,7	N/A	56,3	11,1	18,7

Table 11 - Innovation drivers, strategy and barriers, central government		Denmark	Finland	Iceland	Norway	Sweden
Innovation drivers						
Internal - management	% innovation active units	80.7	N/A	78.9	77.6	91.5
Internal - staff	% innovation active units	72.7	N/A	72.7	49.4	83.0
Any internal driving forces	% innovation active units	83.0	N/A	77.3	84.7	95.7
Political - budget changes	% innovation active units	28.4	N/A	36.8	36.5	34.0
Political - new laws	% innovation active units	30.7	N/A	31.6	31.8	46.8
Political - changes	% innovation active units	15.9	N/A	15.8	8.2	27.7
Political - new policy priorities	% innovation active units	42.0	N/A	15.8	34.1	46.8
Any political driving forces	% innovation active units	54.5	N/A	57.9	57.6	66.0
Public organisations	% innovation active units	19.3	N/A	73.7	21.2	25.5
Businesses - suppliers	% innovation active units	11.4	N/A	10.5	16.5	14.9
Businesses - users	% innovation active units	26.1	N/A	36.8	20.0	38.3
Any business drivers	% innovation active units	33.0	N/A	36.8	25.9	42.6
Citizens	% innovation active units	33.0	N/A	31.6	29.4	48.9
Innovation strategy and management						
Specific goals for innovation activities	% all units	37.5	N/A	55.6	45.8	43.6
Innovation strategy included in overall strategy	% all units	31.8	N/A	33.3	33.3	29.1
Development department	% all units	21.6	N/A	61.1	15.6	20.0
Innovation activities mainly organised as projects	% all units	55.7	N/A	50.0	51.0	38.2
Evaluations conducted regularly	% all units	18.2	N/A	38.9	17.7	18.5
Any strategy	% all units	72.7	N/A	100.0	67.7	74.5
Managers give high priority to developing new ideas	% all units	55.7	N/A	44.4	50.0	63.0
Top management is active in leading the implementation of innova	% all units	55.7	N/A	22.2	54.2	48.1
Members of staff have part of their time devoted to innovation pro	% all units	46.6	N/A	61.1	46.9	25.9
Staff have incentives to identify new ideas	% all units	33.0	N/A	33.3	18.8	29.6
Staff has diverse background	% all units	55.7	N/A	38.9	36.5	44.4
Any management of staff capability	% all units	85.2	N/A	72.2	77.1	81.5
Barriers to innovation activities						
Political - lack of flexibility in laws	% all units	15.9	23.8	52.6	7.3	31.5
Political - lack of incentives	% all units	10.2	12.8	26.3	6.3	14.8
Political - lack of funding	% all units	43.2	51.2	21.1	20.8	48.1
Any political barriers	% all units	52.3	N/A	68.4	27.1	64.8
Organisation - risk of failure	% all units	9.1	2.4	52.6	10.4	5.6
Organisation - lack of cooperation	% all units	11.4	N/A	52.6	7.3	14.8
Any organisational barriers (risk of failure or lack of cooperation	% all units	14.8	N/A	68.4	14.6	18.5
Internal - inadequate time	% all units	25.0	38.1	72.2	17.7	48.1
Internal - lack of incentives	% all units	9.1	19.5	27.8	13.5	24.1
Internal - any internal barriers (time or incentives)	% all units	29.5	N/A	72.2	20.8	55.6
External - rules hinder collaboration	% all units	13.6	N/A	15.8	4.2	9.3
External - lack of innovative suppliers	% all units	12.5	N/A	15.8	2.1	1.9
External - resistant users	% all units	5.7	5.1	21.1	2.1	5.6
Any external barriers (rules, lack of innovative suppliers, resistan	% all units	23.9	N/A	36.8	7.3	16.7

Table 12 - Innovation drivers, strategy and barriers, Non-central government		Denmark	Finland	Iceland	Norway	Sweden
Innovation drivers						
Internal - management	% innovation active units	84.5	N/A	80.8	75.6	88.8
Internal - staff	% innovation active units	75.0	N/A	65.6	53.5	71.4
Any internal driving forces	% innovation active units	86.3	N/A	75.0	82.7	91.8
Political - budget changes	% innovation active units	40.5	N/A	50.0	38.6	35.7
Political - new laws	% innovation active units	32.1	N/A	19.2	18.1	30.6
Political - changes	% innovation active units	19.6	N/A	19.2	13.4	17.3
Political - new policy priorities	% innovation active units	39.3	N/A	19.2	29.1	39.8
Any political driving forces	% innovation active units	61.9	N/A	57.7	52.8	65.3
Public organisations	% innovation active units	14.9	N/A	92.3	14.2	27.6
Businesses - suppliers	% innovation active units	16.1	N/A	3.8	12.6	14.3
Businesses - users	% innovation active units	14.3	N/A	30.8	12.6	21.4
Any business drivers	% innovation active units	25.0	N/A	34.6	24.4	26.5
Citizens	% innovation active units	32.1	N/A	53.8	38.6	53.1
Innovation strategy and management						
Specific goals for innovation activities	% all units	22.0	N/A	71.4	34.7	25.0
Innovation strategy included in overall strategy	% all units	31.0	N/A	64.3	21.7	24.1
Development department	% all units	28.6	N/A	32.1	10.5	25.0
Innovation activities mainly organised as projects	% all units	48.2	N/A	46.4	44.8	37.1
Evaluations conducted regularly	% all units	17.3	N/A	57.1	14.0	15.5
Any strategy	% all units	72.6	N/A	92.9	59.7	56.9
Managers give high priority to developing new ideas	% all units	57.7	N/A	75.0	44.1	46.6
Top management is active in leading the implementation of innova	% all units	47.0	N/A	64.3	42.7	39.7
Members of staff have part of their time devoted to innovation pro	% all units	37.5	N/A	67.9	30.1	13.8
Staff have incentives to identify new ideas	% all units	23.8	N/A	42.9	13.3	17.2
Staff has diverse background	% all units	46.4	N/A	39.3	28.0	25.0
Any management of staff capability	% all units	81.0	N/A	96.4	67.1	63.8
Barriers to innovation activities						
Political - lack of flexibility in laws	% all units	28.0	7.8	51.7	9.4	20.9
Political - lack of incentives	% all units	12.5	20.5	75.9	13.7	23.5
Political - lack of funding	% all units	50.6	32.0	31.0	35.3	45.2
Any political barriers	% all units	61.9	N/A	75.9	39.6	56.5
Organisation - risk of failure	% all units	7.7	4.1	62.1	4.3	9.6
Organisation - lack of cooperation	% all units	14.9	N/A	69.0	3.6	19.1
Any organisational barriers (risk of failure or lack of cooperation	% all units	19.0	N/A	72.4	5.1	22.6
Internal - inadequate time	% all units	40.5	45.5	75.9	33.3	53.0
Internal - lack of incentives	% all units	19.6	24.0	69.0	18.8	30.7
Internal - any internal barriers (time or incentives)	% all units	43.5	N/A	86.2	36.2	58.3
External - rules hinder collaboration	% all units	13.1	N/A	37.9	5.8	9.6
External - lack of innovative suppliers	% all units	7.7	N/A	37.9	5.1	3.5
External - resistant users	% all units	6.0	8.0	58.6	5.8	8.8
Any external barriers (rules, lack of innovative suppliers, resistan	% all units	22.0	N/A	69.0	13.8	18.3

Examples of public sector innovations

Examples of innovations Denmark
Product innovations

- Climate- and energy guides
- Development of new product for sterilizing of blood catheters, based on a new invention
- Establishing of an innovative hospital in Struer
- Guidance for adopters who have had a child from foreign countries

Process innovations

- Climate secretariat intended for reduction of energy and CO2 emission
- Digital self-service
- Digital solutions for handling of vouchers, travel accounts etc.
- Disease prevention and activities aiming at promotion of health
- ICT system for management of building projects
- Integrated meat control of hogs, which is more efficient for meat inspection
- Introduction of national tests for basic schools
- Town council without use of paper
- Use of PARO seal in nursing homes (the PARO seal is a robot in the shape of a seal, able to move its eyes and make sounds)
- Robot vacuum cleaners in nursing homes for elderly people
- Tools for supporting dialogue between town council and local fora

Organisational innovations

- Building of a new school in public/private cooperation
- Establishment of full electronic registration of real estate
- Establishing the 'Cultural pearls' - a common entrance to the digitized cultural inheritance of Denmark
- Establishment of a new unit for welfare-innovation
- Establishing of 'idea clinics'
- Improved interdisciplinary cooperation between administration, nurseries and settling in schools, which in time is expected to lead to better services
- Introduction of LEAN management
- Involvement of the civil society into the production of welfare

Communication innovations

- A new TV channel shows the debate in the Danish Parliament, meeting of the European committee and open consultations and hearings
- International marketing of educations
- Self service via the Internet
- SMS solutions for citizens
- Weekly video-link meetings for the management (nationwide)

Examples of innovations Finland
Product innovations

- Implementation of online services (examples building permits, tax declarations)
- Various portals
- Group therapy and training for depressed people at home using video
- Surgery robots
- Art pharmacy

Process innovations
- Online procurement processes
- Results of medical checks given online from health center to service homes
- Planning for hospitals using virtual environment
- New type of co-operation between various organisations (example special health services, social services from the same place, home health care together with other home services)
- Service concepts for various customer categories

Organisational innovations
- Implementation of contact center
- Increasing the responsibility of immediate superior
- New method for regional co-operation
- First use of team work
- Implementation of Customer Relationship Management (CRM) system
- The establishment of a new administrative unit in a research center
- New methods of organising work (integration or de-integration)

Communication innovations
- Email free of charge to all inhabitants in a municipality
- Collecting the opinions of citizens in the strategic and program work
- First use of social media
- Campaign against false drugs
- Transfer from product marketing to image marketing

Examples of innovations Iceland
Product innovations
- Development of a software solution to register place names on top of an aerial photograph database for specialists and the public
- Development of a software solution to cast location data, i.e. GPS data, between coordination systems on the web
- Reception of electronic documents for future storage. Handbooks, courses – education
- Participation in a project on electronic log books on fish statistics
- Treatment for children who have been the victims of physical abuse or witnessed violence within the home. Treatment for teenagers who display an inappropriate sexual behaviour (sexual offence)
- A new treatment for children, so called Multi-systemic Therapy (MST), which is provided within the environment of the family and local community. Replaces institutionally based treatment, i.e. the separation of the child from its parents.
- Introduction of hotel management education in cooperation with the Cézar Ritz Hotel Schools in Switzerland. Hotel management has not been taught before in Iceland.
- Translation and adaptation of the teaching material „Friends", and the examination of the impact of its introduction on 9th grade pupils. The material is supposed to look out for anxiety and depression
- Translating and adjusting the analytic tool LOGOS, which efficiently detects reading difficulties and dyslexia and provides advice on further work.
- To improve services for disabled children and their families in the following manner: The State Diagnostic and Counselling Centre should take an advantage of ICT to develop knowledge on autism with specialists working outside Reykjavik.

- "The School in Our Hands" project, which works towards improving the school's atmosphere and preventing bullying.

Process innovations
- The implementation of a quality management system according to ISO 9001 quality standards which has been certified for all operations within the school
- Development of quality management system for the department
- The creation of a quality manual and the implementation of a quality system within the administrative division of a municipality

Organisational innovations
- Transfer of registration projects to an agency outside Reykjavik
- The implementation of new laws on upper secondary schools, which entered into effect on the 1st of August 2008. The laws contain increased responsibility in shaping the content and structure of the education offered by the school. Increased leeway in developing a unique position for the school. The school year extended by 5 days. A new upper secondary school credit – a student's three day work. The upper secondary core consists of 45 credits total minimum in Icelandic, Math and English. Obligatory education until age 18. New emphasis in teaching methods.
- In relation to the new law the focus is put on Europe and the education categorised according to an EQF standard on ability objectives. Studies in upper secondary schools are now divided into three steps. On each step the pupil needs to demonstrate; knowledge, skills and ability. All course descriptions are rewritten with this in mind, along with many key ability factors, which the Ministry of Education, Science and Culture had asked the schools to look into, i.e. reading, expression, sustainability and many other things.

Examples of innovations Norway
Product innovations
- Establishment of 'the Family House'; coordination of service provision to children and youth in the municipality.
- New own developed IT system for handling monitoring of vessels
- Altered organisational affiliation for three divisions in order to improve communication with customers
- Serving a prison term at home with electronic foot-chain. Pilot project coordinated by the Ministry of Justice.
- Establishment of new co-located housing for persons with psychological dysfunctions which has increased living standards, improved professional services and improved the work environment

Process innovations
- Merger of management of small peripheral schools
- Development of IT solution for joint login to public services which enables switching between various public services without new login for each service.
- Establishing model for entrepreneurs in cooperation with neighbour municipalities
- Improvement of computer software to strengthen remote services and self-service
- New ICT solutions for drawing up budgets
- Enabling electronic applications for marketing permissions from the pharmaceutical industry

Organisational innovations
- Digitization of work processes; electronic interaction across services

- One stop shop: New and integrated services towards children and youth
- Establishment of an inter-municipal ICT company across three municipalities
- Introduction of computer based journal system
- Coordination of services towards persons with mental disabilities

Communication innovations

- Branding
- New way of instructing and informing users jointly in different media, i.e. information meetings instead of a 1 to 1 meeting, and use of film as communication channel together with other channels.
- Notification to citizens by sms to reach citizens with information about incidents, i.e. if the water is shut down temporarily in an area of the city all registered residents of that area get an sms about this.
- Video communication

Examples of innovations Sweden

Process innovations

- Revised processes for issuing degrees and for local admission work
- E-log book for reporting of commercial fishing in accordance with EU decision
- Eservice development of payment services
- Internet-based system for allowing hunting of small wild animals
- New website with much better functionality for users (in the first place scholarship seekers)
- Identifying processes for safer, more efficient and more relaxed work
- "Trial School" is addressed to all who want to learn how a Swedish trial is run and is available via a website.
- New treatment process of petitions. Electronic file and document management systems, introduced as a new diary
- New forms of support for the commercialization of research results. Improved support for distance learning
- New and improved Electronic processing system
- New registration routine of crime reports received, which contributed to significantly fewer registration errors of criminal charges in the activities of investigative support.
- Self-service in the personnel and payroll system
- Schools had the opportunity to see educational films on our website on the internet.
- New SMS service

Product innovations

- Board of Trade developed two information systems to facilitate the free movement within the EU internal market: IMI - Internal Market Information system and point of contact for the service directive 2006/123/EC
- Different types of geodata services
- Digital Zoo through cooperation with, among others, a university.
- All departments affiliated to the municipality, [now has] one contact point for the whole municipality for customers/citizens. Customer service makes it easier to make contact with the municipality, 70% of the cases are to be answered directly by the customer service and 90% will receive a response within 120 seconds.
- "Cut extinguisher", cutting water jet technology with very high pressure. Penetrates building constructions and cools down hot fire gases inside the construction
- Introduction of environmental ambulances

- Mobile phone technology in the exhibition production
- IPPI - a communication system for the elderly and the disabled based on GSM and television teleCARE - a developed system of various components to improve safety alarms
- Native language education via the Web
- Binder for dusty roads (Dustex) Samples with desalination technology

Factor analyses of the batteries of question

Factor analysis was conducted as an added assessment for many of the questions in the survey. The assessment includes an evaluation of the logic of the pooling of variables into factors and an evaluation of the differences in the patterns between countries.

A common procedure was developed based on the Icelandic data[12] and the procedure was then implemented for Iceland, Norway and Sweden. As this is mainly intended as an exploratory exercise, the factor analysis procedure has not undergone further refinements based on the results from Norway and Sweden. The number of factors was set to two for objectives of innovation, measurement of the impact of innovation, information channels and innovation cooperation; to three for innovation drivers and innovation barriers; and to four for strategy and innovative capability. The tables below show results for each country, displaying eigenvalues and correlations between questions and factors (only those greater than 40% displayed).

Table A.1. Factor analysis of Objectives for your innovation activities

Objectives	Factor 1			Factor 2		
	IS	NO	SE	IS	NO	SE
Eigenvalue	2.54	2.64	3.48	1.55	1.11	1.03
Social Challenges				82%	85%	89%
New Regulations		54%	41%	56%		57%
Quality	57%	75%	67%	48%		
Efficiency	66%	71%	80%			
User Satisfaction		78%	72%	70%		
Online services	74%	47%	77%		-56%	
Work Conditions	78%	61%	74%			
Respondents	(47)	(222)	(145)			

Note: <40% removed

Table A.2. Factor analysis of Measurement of impact of innovation

Impact measurement	Factor 1			Factor 2		
	IS	NO	SE	IS	NO	SE
Eigenvalue	1.79	1.97	2.44	1.74	1.15	0.84
User Survey				93%	85%	86%
Staff Survey				92%	87%	87%
CostSave	94%	87%	77%			47%
StaffSave	94%	90%	95%			
Respondents	(46)	(222)	(143)			

Note: <40% removed

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[12] The number of factors for each factor analysis was decided based on the rule that the eigenvalue of each factor should be larger than one – in the Icelandic dataset.

Table A.3. Factor analysis of Information channels for your innovation

Information Channels	Factor 1			Factor 2		
	IS	NO	SE	IS	NO	SE
Eigenvalue	2.32	1.70	2.92	1.05	0.99	0.71
Internet forums		**71%**	**85%**	**88%**		
User surveys	**80%**	**73%**	**79%**			
Conferences…			48%	**79%**	**48%**	**65%**
Hiring specialists	**77%**				**87%**	**92%**
Evaluations	**75%**	**57%**	**58%**			57%
Respondents	(31)	(219)	(165)			

Note: <40% removed

Table A.4. Factor analysis of Co-operation partners to your innovation

Cooperation	Factor 1			Factor 2		
	IS	NO	SE	IS	NO	SE
Eigenvalue	2.44	1.71	2.75	1.39	1.30	1.33
Business suppliers	**72%**				**67%**	**81%**
Business users				**76%**	**74%**	**71%**
Public suppliers	**73%**	**67%**	**65%**			
Public users	54%	43%	**73%**	**62%**	**44%**	
Universities	**61%**	**59%**	**81%**			
Other public org.			71%	**66%**	**49%**	
Citizens	-52%	**67%**		**54%**		**68%**
Respondents	(31)	(124)	(110)			

Note: <40% removed

Table A.5. Factor analysis of Driving forces for your innovation

Drivers		Factor 1			Factor 2			Factor 3		
		IS	NO	SE	IS	NO	SE	IS	NO	SE
	Eigenvalue	2.54	2.76	4.46	1.55	1.43	1.16	1.55	1.13	1.05
Internal	Management	40%	51%		50%				43%	88%
	Staff							-77%	69%	85%
Political forces	Budget changes	63%	76%	80%						
	Laws/regulations		69%	81%	77%					
	Other changes	87%		77%		78%				
	New priorities	87%	57%	57%			47%			
Public org	All types	60%				70%	61%			
Business	suppliers				84%	49%	78%			
	users						83%	65%	62%	
Citizens	users	42%		49%				70%	51%	
	Respondents	(45)	(215)	(115)						

Note: <40% removed

Table A.6. Factor analysis of Strategy and internal capabilities for innovation

Capability / strategy		Factor 1			Factor 2			Factor 3			Factor 4		
		IS	NO	SE	IS	NO	SE	IS	NO	SE	IS	NO	SE
	Eigenvalue	2.52	4.70	4.64	2.07	0.91	0.98	1.36	0.83	0.85	1.15	0.77	0.80
Innovation strategy	Specific goals/targets			55%		82%	67%				80%		
	Inno. part of total vision	53%			49%	83%	77%						
	Development section				77%		78%					94%	
	Inno. in formal projects		55%	79%	85%								
	Evaluate inno.proces			60%		59%		71%					
Manage-ment	High priority to inno.	78%	85%	66%									46%
	Leads implementation	90%	74%	66%									
Staff	Time devoted to inno.		54%					91%	57%	78%			
	Incentives to inno.	71%							71%	83%			
	Diverse background								74%			86%	88%
	Respondents	(46)	(240)	(164)									

Note: <40% removed

Table A.7. Factor analysis of Barriers for innovation

Barrierer		Factor 1			Factor 2			Factor 3		
		IS	NO	SE	IS	NO	SE	IS	NO	SE
	Eigenvalue	1.55	0.96	4.87	3.61	1.49	1.26	1.29	4.02	0.85
Political factors	BarPolinflex	49%	88%	54%			51%	49%		
	BarPolNoinc	86%	70%	82%					48%	
	BarPolFunds	69%	46%	72%					50%	
Organisation culture	BarOrgRisk				77%				57%	80%
	BarOrgNoCoop				76%				67%	82%
Other int. conditions	BarIntTime			63%				81%	76%	
	BarIntNoinc			81%				69%	78%	
External conditions	BarExtRules				71%	76%	80%			
	BarExtSup				73%	83%	84%			
	BarExtResist				67%	57%	66%			43%
	Respondents	(47)	(234)	(159)						

Note: <40% removed

The Nordic common questionnaire

The Nordic Survey on Public Innovation 2009

(Pilot study)

The Nordic Survey on Public Innovation 2009 seeks for the first time to collect information on innovation activities in organisations throughout the public sectors in the Nordic countries. The purpose of this survey is to gather internationally comparable data on what types of innovations organisations are implementing, how they innovate and the drivers and barriers to innovation in the public sector. The survey seeks to provide much needed measures that can improve understanding of public sector innovation and how to promote it.

An **innovation** is the implementation of a significant change in the way your organisation operates or in the products it provides. Innovations comprise new or significant changes to services and goods, operational processes, organisational methods, or the way your organisation communicates with users.

Innovations must be new to your organisation, although they can have been developed by others. They can either be the result of decisions within your organisation or in response to new regulations or policy measures.

This questionnaire includes questions on innovations introduced as well as ongoing innovation projects in your organisation in 2008-09.

Both organisations with innovation activities and those without innovation are asked to fill in this questionnaire. All questions should be answered unless instructed otherwise.

Name: _____

Job Title: _____

Organisation: _____

Address: _____

Phone, direct: _____

Fax: _____

E-mail, direct: _____

1. Product innovation

A **product innovation** is the introduction of a service or good that is <u>new or significantly improved compared to existing services or goods</u> in your organisation. This includes significant improvements in the service or good's characteristics, in customer access or in how it is used.
Exclude services and goods where all activities, including their development, have been outsourced to other organisations.

1.1	**During 2008 and 2009 did your organisation introduce:**	Yes	No
	a. New or significantly improved services	☐	☐
	b. New or significantly improved physical goods	☐	☐

If YES to 1.1, Answer 1.2 and 1.3. Otherwise, go to question 2.

1.2	**Who developed these product innovations?**	Tick all that apply
	Mainly your own organisation	☐
	Your organisation together with businesses	☐
	Your organisation together with other public sector organisations	☐
	Mainly by other public sector organisations or businesses	☐

1.3	**For any of the product innovations introduced during 2008-09 was**	Tick all that apply
	your organization the **first to develop** and introduce the innovation (to your knowledge)?	☐
	the innovation already **introduced by others**, but new for your organization?	☐

2. Process innovation

A **process innovation** is the implementation of a method for the production and provision of services and goods that is <u>new or significantly improved compared to existing processes</u> in your organisation This may involve significant improvements in for example, equipment and/or skills. This also includes significant improvements in support functions such as IT, accounting and purchasing.

Exclude purely organisational innovations; these are covered in question 3.

2.1	**During 2008 and 2009 did your organisation introduce:**	Yes	No
	a. New or significantly improved methods of producing services or goods (techniques, equipment, software)	☐	☐
	b. New or significantly improved delivery methods (logistics or delivery for inputs, services or goods).	☐	☐
	c. New or significantly improved supporting activities for your processes (ie. Maintenance systems, operations for purchasing, accounting, computing)	☐	☐

If YES to 2.1, Answer 2.2 to 2.3. Otherwise, go to question 3.

2.2	**Who developed these process innovations?**	Tick all that apply
	Mainly your own organisation	☐
	Your organisation together with businesses	☐
	Your organisation together with other public sector organisations	☐
	Mainly by other public sector organisations or businesses	☐

2.3	**For any of the process innovations introduced during 2008-09 was**	Tick all that apply
	your organisation the **first to develop** and introduce the innovation (to your knowledge)?	❒
	the innovation already **introduced by others**, but new for your organization?	❒

---

3.   Organisational innovation

An **organisational innovation** is the implementation of a <u>new method</u> for organising or managing work that <u>differs significantly from existing methods</u> in your organisation. This includes new or significant improvements to management systems or workplace organisation.

3.1	**During 2008 and 2009 did your organisation introduce:**	Yes	No
	a. New management systems (eg. Lean management, performance management, quality management)	❒	❒
	b. New methods of organising work responsibilities and decision making (eg. Employee responsibilities, team work, decentralisation, reorganisation of departments)	❒	❒
	c. New ways of organising external relations with other public or non-profit organisations or enterprises (eg. <u>First use</u> of alliances, partnerships, outsourcing, subcontracting)	❒	❒
	d. New systems for gathering new knowledge and building innovative capacity (knowledge management systems, education/training systems)	❒	❒

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4.   Communication innovation

A **communication innovation** is the implementation of a <u>new method</u> of promoting the organisation or its services and goods, or new methods to influence the behaviour of individuals or others. These <u>must differ significantly from existing communication methods</u> in your organisation.

4.1	**During 2008 and 2009 did your organisation introduce:**	Yes	No
	a. New methods of promoting the organisation or its services and goods (eg branding, non-functional design, campaigns, media)	❒	❒
	b. New methods of influencing the behaviour of users, citizens or others (eg campaigns, media)	❒	❒
	c. First time commercialisation (for sale) of existing services or goods	❒	❒

---

5.   Examples of innovations

5.1   Please provide a short description of 1-2 examples of innovations introduced during 2008-09.

i. _____

_____

ii. _____

_____

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6. Innovation activities during 2008-09

Innovation activities are all activities conducted in-house or externally through acquisitions which actually, or are intended to, lead to the implementation of innovations.

These include:

- In-house activities, such as in-house research and development (R&D); planning and design; market research and other user studies; feasibility studies, testing and other preparatory work for innovation
- Training and education of staff for innovation
- External R&D, other external know-how (patents, licenses, etc), other consultancy services for innovation
- Acquisitions of machinery, equipment and software for innovation

---

6.1 During 2008-09 did your organisation have any innovation activities that did not lead to the introduction of an innovation because the activities were:

		Yes	No
a.	Abandoned or suspended before completion?	☐	☐
b.	Still ongoing at the end of 2009?	☐	☐

6.2 Did your organization purchase goods or services for its innovation activities during 2008-09?

If Yes, from which sources? (tick all that apply)

		Yes	No	Private businesses	Universities, Govt. Research institutes	Public service organisations
a.	Contracting of consultancy services (External R&D, management, other) for innovation	☐	☐	☐	☐	☐
b.	Acquisitions of machinery, equipment and software for innovation	☐	☐	☐	☐	☐
c.	Acquisitions of external know-how (patents, licenses) for innovation	☐	☐	☐	☐	☐

6.3 Has your organization received any financial support for its innovation activities during 2008-09?
(Include only external funding earmarked for specific innovation projects)

		Yes	No
a.	From local or regional authorities?	☐	☐
b.	From Central government?	☐	☐
c.	From the European Union?	☐	☐
d.	From private businesses or foundations?	☐	☐

Resources for innovation

6.4 Please estimate the number of personnel that have been involved in innovation activities in 2009 in your organization (include also direct support for innovation activities, such as managers and administrative staff)

		Total
a.	Employees	
b.	Full time equivalents (FTE)[*)]	

Note: *) For example, 4 employees that each spend 25% of their time on innovation gives 1 full time equivalent.

6.5 Please estimate the total amount of expenditure for your organisation's innovation activities in <u>2009</u>

(Including in-house and external activities as defined above)	(tick one box only)
No expenditures in 2009	❐
1 to 10.000	❐
10.001 to 50.000 Euros..	❐
50.001 to 250.000 Euros..	❐
250.001 to 500.000	❐
500.001 to 1 million Euros………………………………………………………………	❐
1.000.001 to 5 million Euros……………………………………………………..	❐
5.000.001 to 10 million…………………………………………………………………	❐
Over 10 million Euros…………………………………………………………………….	❐
Don't know / Not able to make estimate.....………………………………………………	❐

Please fill in Part 7 if your organization had any innovations or innovation activities during 2008-09

7. Objectives and impacts of innovation during 2008-09

7.1 How important were each of the following objectives for your organisation's innovation activities during 2008-09?

Importance:	High	Low	Not relevant
1. Address social challenges (eg. Health problems, inequalities, others)	❐	❐	❐
2. Fulfill new regulations, policies or other politically mandated changes	❐	❐	❐
3 Improve the quality of services or goods	❐	❐	❐
4. Increase efficiency (costs per service/good; reduced administration)	❐	❐	❐
5. Improve user satisfaction	❐	❐	❐
6. Improve online services	❐	❐	❐
7. Improve working conditions for employees	❐	❐	❐
8. Other (please specify):_____	❐	❐	❐

7.2 Does your organisation measure the impact of its innovations?

	YES, systemtically	YES, ad hoc	No
1. User surveys	❐	❐	❐
2. Staff surveys	❐	❐	❐
3. Cost savings	❐	❐	❐
4. Staff savings (hours, FTE's) per service/good	❐	❐	❐

Please fill in Part 8 if your organization had any innovations or innovation activities during 2008-09

8. External linkages

8.1 **How important were the following <u>information channels</u> for your innovation activities during 2008-09?**
(both for new innovation projects and for the completion of existing innovation projects)

Importance:	High	Low	Not relevant
a. Internet and Online discussion forums	❑	❑	❑
b. User satisfaction surveys (or other user surveys)	❑	❑	❑
c. Networks, Conferences, seminars, other gatherings	❑	❑	❑
d. Hiring specialised personnel	❑	❑	❑
e. Evaluations (E.g. of quality, impact, efficiency)	❑	❑	❑

8.2 **Innovation cooperation**

Has your organisation cooperated with others for its innovation activities? Innovation cooperation is active participation with enterprises or other public organisations on innovation activities. Exclude pure subcontracting of work with no active cooperation.

	Yes	No
	❑	❑

If YES to 8.2:

8.3 **How important were the following <u>co-operation partners</u> to your innovation activities during 2008-09** (both for new innovation projects and for the completion of existing innovation projects)**?**

Importance:	High	Low	Not relevant
a. **Enterprises**			
1. As suppliers (incl. consultancy services)	❑	❑	❑
2. As clients / users	❑	❑	❑
b. **Public organisations**			
1. As suppliers (excl. Universities / gov. research institutions)	❑	❑	❑
2. As Clients / users (excl. Universities / gov. research institutions)	❑	❑	❑
3. Universities / gov. research institutions	❑	❑	❑
4. Other public organisations	❑	❑	❑
c. **Citizens**			
1. As users, others	❑	❑	❑

If YES to 8.2:

8.4 **Please indicate whether any of the cooperation partners listed above were <u>located in other countries</u>.**

	Yes	No
1. Enterprises	❑	❑
2. Public organisations	❑	❑

8.5 **Procurement for innovation**

During 2008-09, did your organization make purchases that encouraged the development of products or processes that do not yet exist or require new features? (promoting innovation, for example through the specification of contracts and orders, through dialogue, or by other means)

	Yes	No
	❐	❐

8.6 Which of the following activities has your organization used to promote innovation among your suppliers (businesses or other public organizations) during 2008-09?

		Used to promote innovation	Not relevant / Not used to promote innovation
a.	Acquisition of components or software from ICT-suppliers	❐	❐
b.	Acquisition of other machinery and equipment	❐	❐
c.	Contracting of consultancy services (ICT, management, user studies, other)	❐	❐
d.	Outsourcing of service provision	❐	❐
e.	Public-Private partnerships	❐	❐

Please fill in Part 9 if your organization had any innovations or innovation activities during 2008-09

9. Innovation drivers

9.1 How important were the following <u>driving forces</u> to your innovation activities during 2008-09? (both for new innovation projects and for the completion of existing innovation projects)

	Importance:	High	Low	Not relevant
a.	**Internal driving forces**			
	1. Management	❐	❐	❐
	2. Staff	❐	❐	❐
b.	**Political forces**			
	1. Mandated changes in budget for your organisation	❐	❐	❐
	2. New laws or regulations	❐	❐	❐
	3. Changes, innovations implemented in partner or higher level organisations (eg. new procedures or services, organisational changes, deregulation)	❐	❐	❐
	4. New policy priorities	❐	❐	❐
c.	**Public organisations**	❐	❐	❐
d.	**Enterprises**			
	1. As suppliers	❐	❐	❐
	2. As clients / users	❐	❐	❐
e.	**Citizens -** As clients / users (i.e. feedback, complaints; influence from associations)	❐	❐	❐

Parts 10, 11 and 12 should be filled in by <u>all organisations</u>

10. Strategy and internal capabilities

How well do the following descriptions on innovation strategy and capacity apply to your organisation for the period 2008-09?			
a. **Innovation strategy and organisation**	Fully	Partly	Not at all
1. The organisation has specific goals/targets for innovation activities	❏	❏	❏
2. An innovation strategy is included in the overall vision or strategy of the organisation	❏	❏	❏
3. The organisation has a development department/section	❏	❏	❏
4. Innovation activities are mainly organised as projects, steered by a dedicated group	❏	❏	❏
5. Evaluations of the innovation processes are conducted regularly	❏	❏	❏
b. **Innovation management and staff**			
1. Managers give high priority to developing new ideas or new ways of working	❏	❏	❏
2. Top management is active in leading the implementation of innovations	❏	❏	❏
3. Members of staff have part of their time devoted to development/innovation projects	❏	❏	❏
4. Staff have incentives to identify new ideas and take part in their development	❏	❏	❏
5. The staff is diverse in terms of background (demographic, educational)	❏	❏	❏

11. **Barriers to innovation**

During 2008-09, how important were the following factors for hampering your innovation activities or projects or influencing a decision not to innovate?

a. **Political factors**	Importance: High	Low	Not relevant
1. Lack of flexibility in laws and regulations	❏	❏	❏
2 Lack of incentives for organisation as a whole to be innovative	❏	❏	❏
3. Lack of budgetary funding	❏	❏	❏
b. **Organisation and culture**			
1. Risk of failure	❏	❏	❏
2. Lack of cooperation within your organisation	❏	❏	❏
c. **Other internal conditions**			
1. Inadequate time allocated to innovation	❏	❏	❏
2. Lack of incentives for staff to innovate	❏	❏	❏
d. **External conditions**			
1. Contractual rules hinder collaboration with suppliers	❏	❏	❏
2. Lack of main suppliers' capability to provide innovative solutions	❏	❏	❏
3. Resistance of users to changes	❏	❏	❏

e. **Other (please specify)**:

_____

_____

12. Basic information on your organisation

12.1 Your organisation's level of government (just one tick)

a. ❏ Local (municipality)   **d.** ❏ Association of regions

b.	❒ Association of municipalities	**e.**	❒ National (Central govt. service or agency)
c.	❒ Regional (region)	**f.**	❒ National (Department of ministry in the central government)

g. ❒ Other, please describe:_____

12.2 Your organisation's sector(s) of operation (one or more ticks)

a.	❒ Public Administration Services	**e.**	❒ Social Work Services
b.	❒ Education Services	**f.**	❒ Cultural & Sports Services
c.	❒ Health Services	**g.**	❒ Technical & Environmental Services
d.	❒ Residential Care Services	**h.**	❒ Research & Development Services

i. ❒ Other, please describe:_____

12.3 Resources in your organisation 2008-2009

a.	**Operating budget of your organisation**	**b.**	**Staff of your organisation** (Full time Equivalents)
	2008:_____; 2009:_____;		2008:_____; 2009:_____;

IF MAJOR CHANGES in your organisation's fields of responsibility during 2008-09:

c. **Please give a short description of major changes in your organisation's fields of responsibility:**

_____

_____

A. Questions and comments concerning this questionnaire

A.1 Resources used to collect and fill in the reporting schema

a. Time used:_____ (excl. time used on comments)

b. No. of staff involved:_____

A.2 The usefulness of the questionnaire and results for your organisation

a. How could you use the information collected in the questionnaire, when collected in all Nordic countries? Any suggestions on how to increase the usability for your organisation?

_____

_____

A.3 Response burden

a. Do you any suggestions on how to reduce the burden of filling in this questionnaire?

_____

_____

A.4 Other suggestions?

_____