
7 Innovation and R&D surveys in Norway

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1. INTRODUCTION

Norwegian surveys on innovation activity in the business enterprise sector have been undertaken by Statistics Norway in the form of representative sample surveys since the early 1990s. The surveys have been part of the Eurostat Community Innovation Survey (CIS), which has been developed gradually since the first innovation survey (CIS 1), undertaken for the year 1992. CIS 2 was carried through for the year 1997, CIS 3 for 2001, and since 2004 (CIS 4) the surveys have been performed every second year; the last one was CIS 2010.¹

The Norwegian surveys have closely followed the Eurostat recommendations for CIS, both in content and methodology, given in the *Oslo Manual* (OECD/Eurostat 2005). Almost all themes/questions in CIS have been implemented in the Norwegian questionnaire. All core activity classes in CIS have been included in Norway, but with some additional ones. The Norwegian survey covers the entire manufacturing sector and large parts of the services sector. It also covers extraction of oil and gas, aquaculture and construction. In the CIS 2010 the tourism sector was also included. The lower size limit for enterprises to be included was ten employees up until 2004, and from 2006 onwards it was five employees.

In most European countries innovation surveys have been performed as separate surveys with a dedicated questionnaire, but some countries have experience with combining the innovation survey with the R&D survey. Norway is one of these countries. In Norway, coordination of the R&D and innovation surveys has developed from no coordination at all for CIS 1 for 1992 into full coordination with CIS 3 for 2001 and subsequent surveys.

This chapter describes the general procedures for the innovation surveys in Norway and the specific procedure for combined R&D and innovation surveys.

2. GENERAL METHODOLOGY

Statistical Unit

The recommended statistical unit in innovation surveys is the enterprise. An enterprise is defined as the smallest combination of legal units that is an organizational unit producing goods or services.² An enterprise may be a sole legal unit. An enterprise carries out one or more activities at one or more locations and may consist of one or more kind-of-activity units (KAU) or local kind-of-activity units (LKAU).

There are pro and cons in using the enterprise as the statistical unit. Strategic decisions will typically be taken at the enterprise level, although such decisions may also be made at the corporate level for enterprises that are linked together in groups. Since innovation activities are closely linked to strategy, the enterprise is assumed to be best suited to provide answers in the area.

Collection of data from companies linked to a group represents a special challenge. Here, decisions at the group level on innovation activities to be used in several of the group companies may be attributed to an enterprise that is responsible for development work.

A drawback with the enterprise as the statistical unit is that the enterprise is not delimited by economic activity or region. If an enterprise has innovation activity in several local units and/or in several industries, all this innovation is assigned to the main activity of the enterprise. Moreover, the innovation activity is placed geographically where the headquarters is located, even in cases where this activity is carried out by a unit located elsewhere. In other words, for multi-activity enterprises it may not be possible to classify all innovation activity correctly by region or activity class. In the Norwegian survey additional information is collected by asking all the LKAUs in the enterprises, listed in the questionnaire, if they have been involved in innovation activity or are performing R&D. This information has been used in the regional breakdown of innovation activity.

Population and Sampling

To run a statistical survey a target population has to be defined and there must be a representative register of units within the target population of enterprises – that is, a business register. The business register used for the Norwegian innovation survey is Statistics Norway's Central Register of Establishments and Enterprises. The register is continuously updated. For each enterprise, information on activity class, location, employment and turnover is available.

The CIS-like innovation surveys are dedicated to the business enterprise sector. In principle, innovation occurs throughout all types of businesses independent of size and activity, but in practice a delimitation of the population of enterprises to specific activity and size classes is necessary. Otherwise the response burden and the cost of running the survey will be too high. The first innovation survey covered only manufacturing industries, but the coverage has gradually been extended to service industries and other industries. The latest survey for 2010 in Norway covered the following activities in the European classification NACE 2007:³ 03, 05–33, 35–39, 41–43, 46, 49–53, 58–66, 70–72, 74.9, 82.9.

Due to the large number of small enterprises, it is quite common to fix a lower size limit of the enterprises to be included. Normally the number of employees is used. In CIS the lower size limit has been ten employees. This has also been the case in Norway until the survey for 2006. Then the scope of the survey was expanded to include enterprises with five to nine employees. The main reason for this was to have more information on innovation activity among smaller enterprises and to allow for an expanded breakdown of results at detailed regional level. For enterprises with five to nine employees a somewhat reduced questionnaire is used.

Even though the target population for the survey is a subset of the population of all enterprises, the number of enterprises in the target population is normally too large to be included in the survey. A kind of representative sampling has to be done.

The Norwegian innovation survey is a census of all enterprises within the target population with at least 50 employees. Among enterprises with 5–49 employees a random sample is drawn within each stratum (NACE 2-digit and size class). The fraction rate is normally 35 per cent, but in some strata 5 and 10 per cent are used. The total sample of units is about 6800 (2010). The total number of enterprises in the target population was 18 600.

Capture and Treatment of Data

The data in the innovation survey have traditionally been collected by paper questionnaire. For 2005 an electronic questionnaire was introduced and electronic reporting has gradually increased. In the latest survey for 2010 an overwhelming majority of the enterprises used the electronic form.

All forms from the enterprises undergo different types of controls, checking whether all questions in the form have been filled in, if there are any obvious inconsistencies, if the data are consistent with data from the previous survey and with other information and so on. In the electronic questionnaire there are built-in controls for the enterprises to avoid

severely inconsistent answers, and this has improved the quality of the received answers.

The electronic questionnaire has also reduced the item non-response. But there is still item non-response that varies across the questions. Most of the item non-responses are adjusted for during the data revision process, but automatic procedures for imputation can also be used.

The introduction of the electronic questionnaire has not caused any shift in the innovation rate in Norway, but this may happen. With a large paper questionnaire there could be a tendency for enterprises to neglect reporting of innovation activity to avoid having to answer many questions. In an electronic questionnaire the situation is different and there is less tendency to underreport on innovation.

The notion of innovation may, for some enterprises, be difficult to interpret and distinguish from related activities. There are indications that the data may to some extent be influenced by respondents' varying degree of understanding or attention to the concepts and activities covered by the survey.

The unit response rate for the survey in Norway is fairly high at 95 per cent due to mandatory surveys and use of fines for non-responding enterprises. The high response rate is valid for the different size classes and industries. Results should not, for that reason, be biased by non-respondents and a non-response survey is not necessary. In cases with low response rate the results could be biased and a non-response survey should be carried out. Norway has done some testing on the effects of high and low response rates in innovation surveys. A valid result seems to be that a voluntary survey with a low response rate shows stronger innovation performance than a mandatory survey with a high response rate.

Estimating National Totals

Normally innovation surveys are performed as sample surveys, often as a census of enterprises above a certain threshold of employees and a representative sampling of smaller enterprises. In the Norwegian survey, enterprises with 5–49 employees are based on a sample of units. For this part of the survey population it is then necessary to scale the results to provide representative figures for the total population of enterprises based on the sample units. The scaling is performed in strata defined by industry and size groups, that is, the same groups that were used during the sample selection. These are based on the 2-digit industry codes (NACE 2007) crossed with enterprise size.

For each firm in the net sample a weight proportional to its representation of the total enterprise in the relevant stratum is calculated. Different

weights can be used depending on the variable to be grossed up. For binary variables (i.e. whether a company is innovative or not, and the importance of hampering factors), the weights are based on the number of units. This means that all the enterprises in the same stratum have the same weight. For quantitative variables (i.e. the cost of innovation), the ratio used is based on the number of employees, giving larger weights for large enterprises.

Since stratification and weights are based on NACE (2-digit) and number of employees, incomplete updating of these variables in the business register as well as the entry and exit of enterprises from the sample may cause errors in the results.

Since the Norwegian survey is a census of all enterprises with 50 employees or more, no weighting is necessary for this group (weight = 1). However, in principle correction for non-response should be made, specifically if the response rate is low. One method is to calculate weights also for this group based on the net sample or to estimate figures for non-responding enterprise using other sources, such as figures from the last survey.

3. COMBINED SURVEYS COMPARED WITH SEPARATE SURVEYS

Benefits of Integration

Statistics Norway is responsible both for R&D surveys and innovation surveys for the business enterprise sector. R&D surveys were performed by Statistics Norway every second year until 2001 (uneven years). From 2001 onwards the R&D survey has been performed on an annual basis. The frequency of innovation surveys has followed the CIS, with some deviation (1992, 1997, 2001). From 2004 innovation surveys have been performed every second year (2004, 2006, 2008, 2010).

The first innovation survey for 1992 was done separately with no coordination at all with the R&D survey. CIS 2 for 1997 was partly coordinated with the R&D survey. Two different questionnaires were used, but were sent out together. The target population for the surveys was mainly the same (NACE groups and size classes). The selection/sampling of units in the survey was partly coordinated, but not completely; all enterprises participating in the innovation survey were also included in the R&D survey, but there were enterprises in the R&D survey that did not take part in the innovation survey.

The innovation survey for 2001 (CIS 3) was fully integrated with the

R&D survey and the coordination of the surveys has continued until now. These surveys are closely related and the main reason for the coordinated approach was to have a more consistent and efficient system for reporting of R&D and innovation activity from the enterprises.

- Enterprises reacted negatively to the number of surveys and surveys/questions that partly overlapped. For the enterprises involved an integrated survey would imply a lower response burden than two separate surveys.
- Administration costs for the statistical office are also lower for one large survey compared with two surveys.
- Integrated surveys would also eliminate the discrepancy in results, on both the micro and the macro level, that happened with separate surveys. This was specifically the case for R&D expenditure.
- Integrated surveys may allow for a more flexible questionnaire with a core set of questions on R&D and innovation each time, and a rotating set of other questions. One year the questionnaire may be dominated by innovation-related questions, but the next survey may put more focus on R&D questions and other possible topics, with a reduced number of innovation questions compared to the 'core questions'.

How are the Surveys Integrated?

First of all, a completely integrated questionnaire is used. The first integrated questionnaire was organized in three parts:

- Part A: Background information on the enterprise;
- Part B: R&D; and,
- Part C: Innovation.

R&D expenditure was asked about in both Part B and Part C (part of innovation expenditure), but the link between these questions was highlighted and instructions given that these amounts should be the same. The R&D part of the questionnaire was slightly reduced compared with the R&D questionnaire in the former surveys to avoid too large a questionnaire.

The structure of the integrated questionnaire in the latest survey is more or less the same, but the part dealing with background information of the enterprise has been reduced (using administrative information) and removed to the end. In the electronic questionnaire in use now there is also

an automatic link between the R&D expenditure in the R&D part and in the innovation part.

The statistical unit in the R&D survey was previously kind-of-activity unit (KAU). With the coordinated survey the statistical unit is now common to R&D and innovation: the enterprise. But to have the best distribution of R&D by sector and region the enterprises are asked also to specify their total R&D expenditure and R&D personnel at a more detailed level, by local kind-of-activity unit (LKAU) (establishment) listed in the questionnaire. The enterprises are also asked to specify which establishments are involved in innovation activity. This is done to give regional breakdown of innovation activity.

The target population is identical for the R&D and innovation part with respect to NACE groups and size classes.

The sampling of survey units is also fully integrated with the following structure:

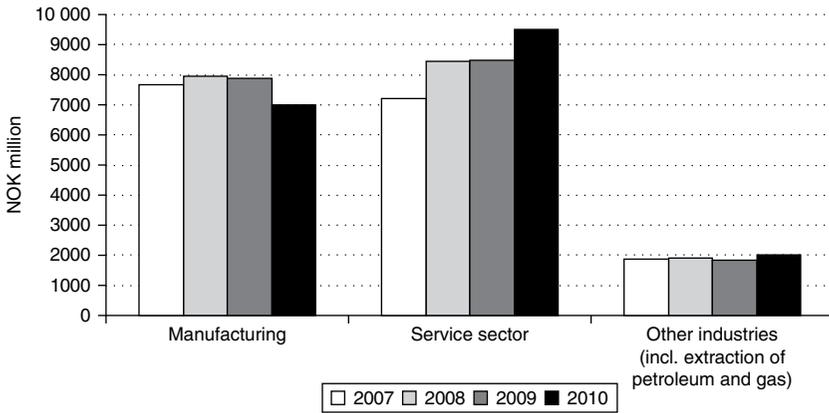
1. Enterprises with 50 employees or more: census of all enterprises
2. Enterprises with 5–49 employees:
 - (a) enterprises with reported R&D above a certain size from the last survey are included (either at least NOK 1 million of intramural R&D or at least NOK 5 million of extramural R&D);
 - (b) random sample of other enterprises with 5–49 employees, stratified by NACE (2-digit) and size class. The fraction rate was normally 35 per cent, but in some strata 5 and 10 per cent were used. However, the minimum number of enterprises in each stratum was set to 15, unless the total number in the population was lower.

The reason for having group 2(a) is to ensure that large R&D performers, but small in terms of employment, are included in the R&D statistics. A separate innovation survey would not have included such a group. The results for enterprises with 5–49 employees are grossed up within each stratum using weighting factors. Enterprises in group 2(a) have the weight 1.

For more information see Statistics Norway (2004).

R&D and Innovation Activity in Norway

Norway is a small open economy with 5 million inhabitants that relies heavily on exploitation of several natural resources, specifically oil and gas. The Norwegian GDP per person is among the highest in the world; Norway also has a good performance on economic indicators related to



Source: Statistics Norway.

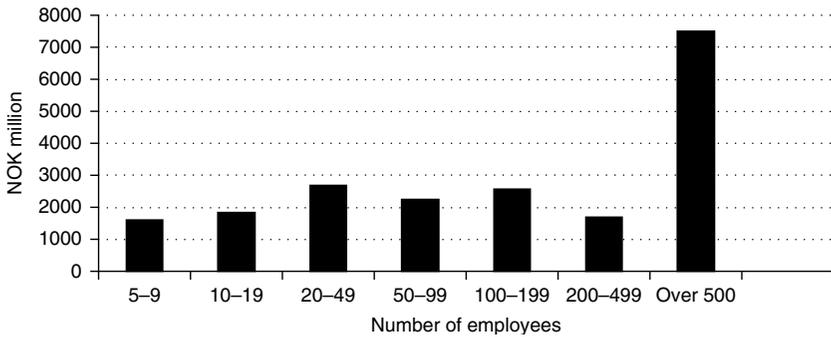
Figure 7.1 Intramural R&D expenditure in business enterprises in Norway, by main industry, 2007–10, NOK million at current prices

standard of living. However, in international comparison on R&D and innovation activity Norway ranks relatively low compared to other countries. One explanation for this has been the industry structure in Norway with a large oil and gas sector and low activity in the most R&D-intensive sectors. Total R&D expenditure as percentage of GDP is around 1.8 per cent, below the average of both the EU and the OECD. Compared to other countries the share for the business sector is low, around 0.9 per cent of GDP.

In the Norwegian business enterprise sector there has been a steady growth in R&D activity. This is mainly due to service industries. In manufacturing and other industries (including oil and gas) activity has been more stable (see Figure 7.1).

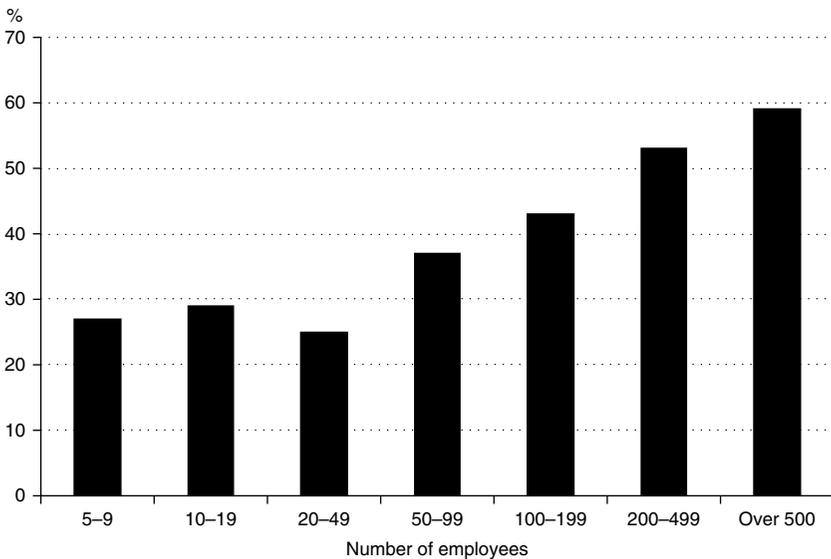
The large enterprises dominate in R&D activity in Norway. Enterprises with more than 500 employees have close to 40 per cent of total R&D expenditures (see Figure 7.2). The concentration can also be illustrated by the fact that 10 per cent of R&D performers, the largest, account for 72 per cent of total R&D and 20 per cent account for 84 per cent.

The innovation rate is also low in Norway. The share of product and process innovators is 30 per cent on average, compared to 33 per cent for the EU-27. As in other countries the share of innovators increases with size of the enterprises, from 27 per cent for the smallest to 59 for the largest (see Figure 7.3).



Source: Statistics Norway.

Figure 7.2 *Intramural R&D expenditure in business enterprises in Norway, by size group, 2010, NOK million*



Source: Statistics Norway.

Figure 7.3 *Share of innovative enterprises in Norway, by size group, 2008-10*

4. EXPERIENCE WITH THE COORDINATED APPROACH

Questionnaire

There have been no negative reactions from the enterprises on the integration of these topics. Even though the questionnaire is quite comprehensive, and longer than separate questionnaires for R&D and innovation, neither have there been many negative reactions to the length of the questionnaire. A separate innovation questionnaire would also have been quite long. The response rate of 95 per cent is also very satisfactory, even for a mandatory survey.

Methodology

The methodology used is fully acceptable both for the R&D and innovation statistics. It is important that the sample of enterprises is representative also for the innovation part; this means specifically that the sample not only includes R&D performers, but, as explained above, it is still possible to have separate subsamples of R&D performers if they are treated correctly.

Potential Effects

One important aspect is the effect on the reported figures from the enterprises. Does the combined questionnaire influence the answers from the enterprises in a negative or non-intended way that could give biased results? Possible problems could be:

- The questionnaire could prevent innovators from reporting on their innovation activity since it starts with the R&D questions and innovators find the questionnaire focused on R&D. This could be the case specifically for enterprises with no R&D activity.
- Innovators that normally would report no R&D activity in a standard R&D survey could now classify (part of) their innovation activity as R&D.
- The effect on the R&D and innovation expenditures and the distribution of types of cost could be different.

The effect on innovation rates

Evidence from time-series results and the results of an additional survey are considered.

Table 7.1 Share of enterprises with innovation activity: manufacturing industry, 1992–2010 (%)

1992	1997	2001	2004	2006	2008	2010
38	39	36	37	35	33	32

Table 7.2 Share of enterprises with innovation activity: service industries, 1997–2010 (%)

1992	1997	2001	2004	2006	2008	2010
:	22	30	28	28	28	25

Time-series results The potential effect of fewer enterprises reporting innovation activity was not observed when the structure of the survey was changed. The surveys are not directly comparable throughout the whole period from 1992, but the share of innovating enterprises in manufacturing industry does not seem to be affected in a significant way by this change (see Table 7.1).

For service industries, included in the survey from 1992, there was an upward shift from 1997 to 2001, opposite of what might be expected. From 2001 the share of innovation enterprises in services has stayed rather stable with a downward trend in the latest year (see Table 7.2).

Looking at innovating enterprises not engaged in R&D, this share has been quite stable throughout the period, also from 1997 to 2001. However, the situation is different for manufacturing and service industries. Among innovating enterprises in services the share of enterprises not engaged in R&D is in fact higher in the 2001 survey than in the 1997 survey (respectively 49 and 34 per cent). The distribution by size class gives the same picture. But, as already mentioned, the share of innovating enterprise in total services increased by around 8 percentage points from 1997.

The situation for manufacturing is different. Among innovating enterprises the share of enterprises not engaged in R&D activities was reduced from 37 to 31 per cent from 1997 to 2001. This decline occurred mostly for the small enterprises, but there was also a decline for the medium-sized.

From this partial analysis of aggregated time series it is difficult to draw robust conclusions. On the basis of the evidence, it cannot be said that the combined questionnaire has prevented innovators with no R&D activity from reporting on their innovation activity.

However, the innovation rate in Norwegian businesses has been generally rather low compared to other countries since the start of the innova-

tion surveys. Users of the statistics, like policy makers and others, are partly worried, partly astonished by this, and several types of explanations have been given. In addition to the Norwegian industry structure, the effect of the mandatory combined R&D and innovation survey (with high response rate) has often been used as an argument for the low rate for Norway compared to countries with separate innovation surveys with considerable lower response rates.

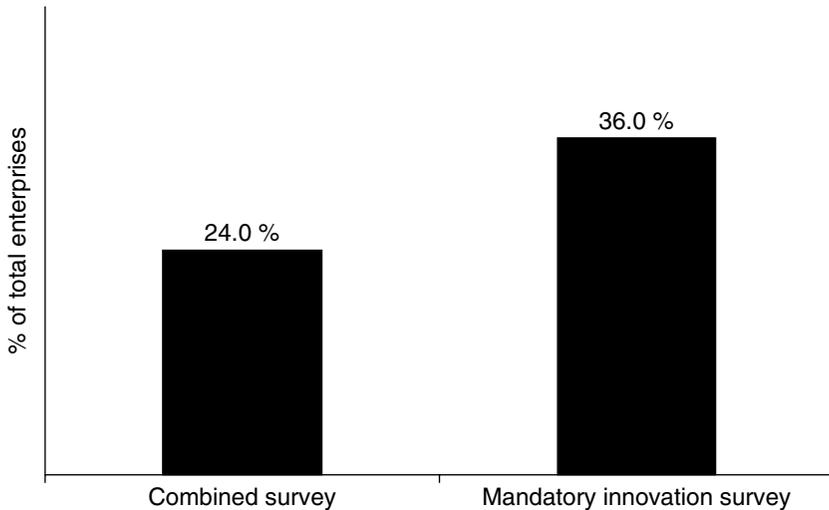
For this reason Statistics Norway tested these hypotheses by performing an additional separate innovation survey in 2010 among small enterprises – mandatory for one group of enterprises and voluntary for another group. For full documentation see Wilhelmssen (2012).

Results from additional survey 2010 The general research design chosen for testing was to implement a version of the questionnaire without the R&D module and to send this to two different samples. One of these samples would be mandatory – with a goal of maintaining the response rate of the standard survey – while the other would be voluntary, and thus likely to achieve a substantially lower response rate. The questionnaire for the special surveys was based directly on the original questionnaire for the combined R&D and innovation survey, adding as few alterations as possible for it to work as a stand-alone survey. The most important and obvious difference was the R&D module preceding the innovation questions being completely cut.

The two special studies were developed and implemented after the regular survey was put in the field. Overlap in samples for the different surveys was avoided. Since the regular survey is a census for all enterprises with more than 50 employees in most industries, it was decided to limit the extra samples for this project to enterprises with fewer than 50 employees. It was also decided to limit the response burden of the smallest enterprises, and therefore no enterprises in the five to nine employee size group were chosen.

Rather than spreading the additional samples over more industries, a collection of strata was chosen from ten industries. The gross population of enterprises was 4506 in these industries. The gross sample of enterprises was 819 in the additional mandatory survey, and 1020 in the ordinary combined survey. The mandatory extra sample reached a response rate of 95 per cent – just 1 per cent point lower than for the ordinary survey.

The results showed that there was a significantly higher share of enterprises with innovation activity (product/process) in the additional survey than in the ordinary survey: 36 and 24 per cent respectively. This indicated that a combined survey compared with a separate innovation survey had an impact on the results (see Figure 7.4). Looking at the industry



Source: Statistics Norway.

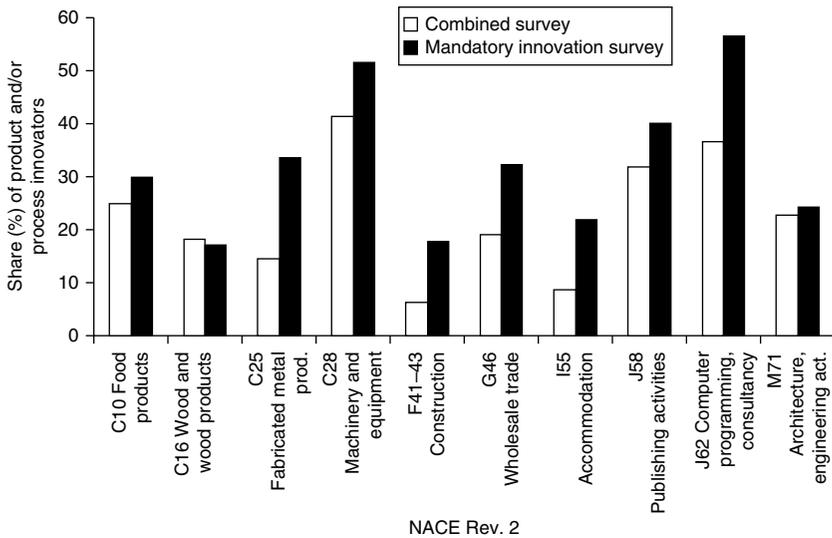
Figure 7.4 Product and/or process innovation: share of all enterprises in specific NACE classes (combined survey compared with the mandatory innovation survey, 2008–10)

breakdowns, it seems that the change from a combined survey to a separate innovation survey will have the biggest impact on the industries with low R&D intensity as well as industries that previously reported a low incidence of innovators (see Figure 7.5).

When it comes to organizational innovation, the rate is slightly higher in the mandatory extra sample. The difference is not major – from 15 to 20 per cent – but it is significant. Most of the additional organizational innovators came from the increased share of enterprises with innovation activity in general.

The same trend, although slightly weaker and only of borderline significance for the samples as a whole, is also present with regard to marketing innovations, where there is a slightly higher rate reported for enterprises in the mandatory sample than in the regular sample – a change from 16 to 20 per cent.

The results show that there are clear and significant differences in the results based on whether the innovation survey is carried out separately or integrated with the business enterprise R&D survey. However, the results do not show clearly which of the two sets of data is technically most accurate. Neither is it obvious that the most accurate set of results is also the



Source: Statistics Norway.

Figure 7.5 Product and/or process innovation, by NACE: share of all enterprises (combined survey versus mandatory innovation survey, 2008–10)

most useful for any particular purpose, as long as the less valid set is also reliable and has other advantageous properties that the other may lack.

The effect on number of R&D performers

When introducing combined surveys it was not expected that this would influence the reporting of R&D. But one option could be that innovators that would normally report no R&D activity in a standard R&D survey could classify (part of) their innovation activity as R&D in the combined survey. One method to evaluate this could be to check whether there were many new small R&D performers compared with the separate R&D survey. This was not found.

Results from the additional survey in 2010 showed, however, that the number of R&D performers in the separate innovation survey was higher than in the combined survey. Among innovators, the share of R&D performers was 66 per cent in the separate survey and 59 per cent in the combined survey. This trend was even more significant for enterprises having external R&D – 31 and 16 per cent respectively.

The results are perhaps surprising. One would expect that any increase in the observed innovation rate caused by eliminating the detailed

R&D module from the questionnaire would primarily come from lower-threshold non-R&D-performing innovators. Thus we would expect the number of R&D performers to stay more or less unchanged between the samples while the share of innovation active enterprises involved in R&D would be seen to decrease.

One possible explanation could be the much simpler formulation of the R&D questions in the CIS. The presence of more detailed questions on R&D in the full R&D survey could limit the overall level of reporting R&D. The threshold for defining an activity as R&D seems to be lower in a sole innovation survey. If this is the case, the question arises as to whether the threshold for defining an activity as innovation in the innovation survey is too low, or if the threshold in the combined survey is too high.

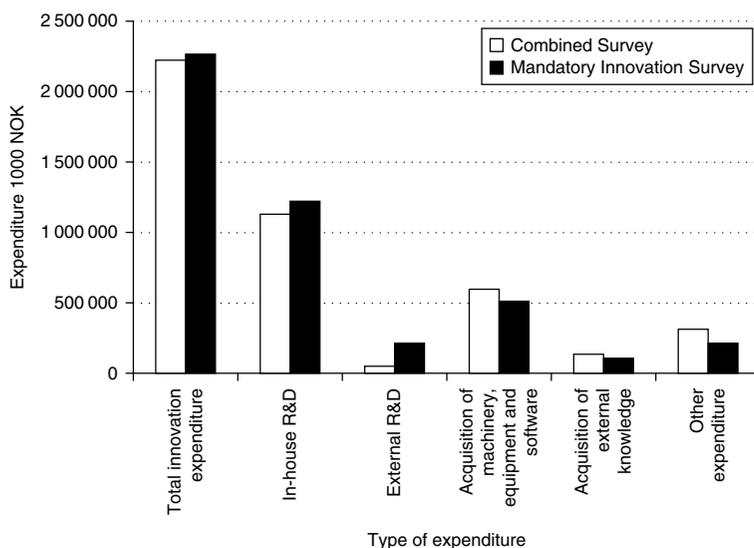
The effect on R&D and innovation expenditures

Switching from combined to separate surveys, one might expect some effects on the R&D and innovation expenditures and the distribution of types of cost. One hypothesis would be that innovation expenditures other than R&D are underreported in a combined survey.

One positive effect of combined surveys is first of all that the official R&D figures for Norway are consistent with the R&D expenditure as part of the total innovation expenditure. This does not mean that these figures were consistent in the two different parts of the paper questionnaire for all the enterprise reports that were received. For a majority of reports this was the case, but in several cases inconsistencies had to be corrected, in agreement with the enterprises. In the electronic version of the questionnaire consistency is *per se* obtained by logical control.

What was experienced was that the distribution by type of innovation expenditures differed in the 1997 and 2001 surveys. In the 2001 survey the share of R&D is considerably higher than in the 1997 survey. In CIS 2 for 1997 the R&D share was around 30 per cent in both the manufacturing and the service sector. These shares were considerably lower than the average for the EU countries (around 50 per cent). The R&D expenditure in CIS 2 was also lower than the figure in the Norwegian R&D survey for the same year. If we had substituted the CIS 2 figures with the figures from the R&D survey, the R&D shares would have been respectively 37 and 33 per cent in manufacturing and services, of the increased total innovation expenditure.

In CIS 3 for 2001 the R&D share for Norway was as high as 63 per cent in manufacturing and 51 per cent in the service sector. It should be mentioned that there has been a high increase in R&D expenditure in this period. And this trend with high R&D dominance in costs has continued



Source: Statistics Norway.

Figure 7.6 Innovation expenditure, by type in specific NACE classes (combined survey compared with the mandatory innovation survey, 2008–10)

in later surveys, escalating to 66 and 72 per cent for 2008 (manufacturing and services respectively). In the ordinary 2010 combined survey, extra resources were used to improve the quality of the data on innovation expenditure. But even for 2010 the R&D dominance is quite high.

Results from the additional innovation survey in 2010 are quite interesting. Total innovation expenditure is estimated to be more or less the same in the separate innovation survey and in the combined survey for the same population of enterprises. And the distribution by type of cost shows also more or less the same pattern across the two surveys (see Figure 7.6). In-house R&D is the dominating type – 51 per cent in the ordinary combined survey (subsample) and 54 in the separate extra survey. Notable for external R&D, the shares are even relatively higher in the separate innovation survey, 9 and 2 per cent respectively. These results are in line with the share of the number of R&D performers in the two surveys. In general the average cost per enterprise is lower in the separate survey than in the combined survey.

It is difficult to draw strong conclusions from the effect of innovation expenditure in the separate questionnaire compared with the combined

questionnaire. It seems that there are more reliable figures on R&D expenditure in a combined survey than in a separate innovation survey. But it is also known that measuring the other types of innovation expenditure is difficult. The hypothesis that the underreporting of other costs is more dominating in combined surveys than in separate surveys seems hard to prove.

5. CONCLUSION

There are positive and negative aspects both with integrated R&D and innovation surveys and separate surveys. There is no obvious recommendation on which alternative to choose. The choice will depend on users' priorities at national level, available resources for surveys, respondents' motivation, if surveys are being used for the first time or have a history, and so on.

The main positive aspects with integrated surveys are as follows:

- Combined surveys are cost-effective compared to two separate surveys for the statistical agencies.
Only one questionnaire has to be worked out, with only one procedure for sending out questionnaires and reminders and receiving data, and control and check of received data.
- Integrated surveys are the best tool for obtaining consistent results on related items, in particular R&D expenditure.
Two separate surveys will quite often result in inconsistencies in answers from the same enterprise. The same enterprise can report on R&D activity, but no innovation activity, or no R&D activity, but innovation activity including R&D activity. These inconsistencies may be reduced by common control of the reports, but this means additional costs for the statistical agency.
Inconsistencies at the micro-level are a distorting factor in micro-data analyses, but will also result in some inconsistencies at the macro-level. Different sampling will also result in inconsistencies at the macro-level.
- The integrated approach will normally imply a reduced response burden on the enterprises compared with separate surveys.
Small and medium-sized enterprises participating in both surveys in the same year will normally find this an extra resource burden and may also be confused since the difference in concepts is not always clear. For large enterprises the situation may be different.

The main positive effects with separate surveys are as follows:

- The concepts of R&D and innovation are different. Combined surveys may give different results compared to separate innovation surveys. Starting with the R&D questions may put too much focus on R&D and be answered by persons from R&D or accounting departments. The reporting on innovation may be negatively biased and result in underreporting of innovation activity.
- Sampling and coverage of activity classes may be different. Splitting the surveys may reduce the number of enterprises answering both surveys, but is unlikely to balance the increased total response burden.

NOTES

1. The Community Innovation Surveys are discussed in more detail in Chapter 3.
2. See Council Regulation on Statistical Units (EEC) no. 696/93.
3. Nomenclature général des activités économiques dans les Communautés Européenes. See Council Regulation no. 1893/2006. NACE is based upon the UN's International Standard Industrial Classification (ISIC).

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