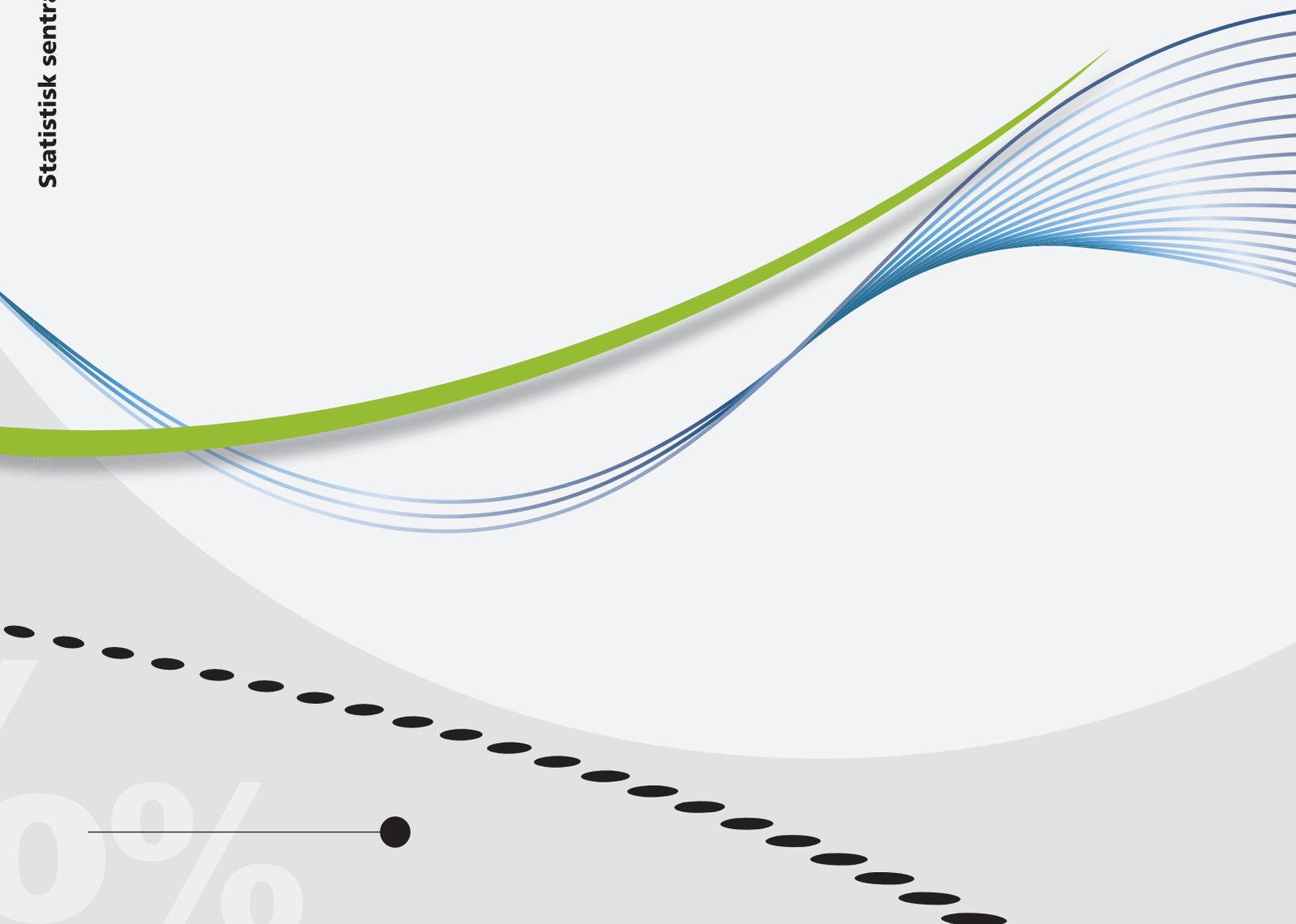


*Morten Renslo Sandvik and Frank Foyn*

## **Innovation costs in the Norwegian survey on R&D and innovation**

Evaluation of quality in the 2010 survey





*Morten Renslo Sandvik and Frank Foyen*

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R&D and innovation**

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## Preface

Questions on innovation costs are included in Eurostat's Innovation Survey (CIS) to provide a quantitative measure of innovation activity. Ever since the first survey was conducted in Norway for 1992, there have been problems in obtaining such information from the companies. This is partly due to the concept of innovation being difficult to delineate and partly because companies do not have those costs specified in their accounts. It is therefore a presumption that the costs of innovation, other than R&D, do not have adequate quality and in addition have been under-reported. In addition to the cost of R&D innovation expenditure includes Acquisition of machinery and equipment, Acquisition of other external knowledge and Other costs. The residual item includes training, market introduction of innovations and design.

Due to these problems the questions on innovation costs were not included in the Norwegian survey for 2004-2006. Innovation costs are, however, a key indicator, also in international comparisons, and was included again in the Norwegian surveys for 2006-2008 and 2008-2010.

For the 2008-2010 survey extra resources were allocated for the treatment of innovation costs. Besides the normal audit work, the objective of this work was to provide an indication of the occurrence and significance of the lack of reporting and other forms of misreporting of innovation costs, and what is the reason for erroneous reporting.

This report is a documentation of this work. The Norwegian Research Council has funded this quality study.

Statistics Norway, 11 July 2012

Jan Furseth  
(Acting Director General)

## Abstract

Work on the revision of the innovation costs has left three main impressions. Firstly, it seems to be low awareness among respondents of the innovation concept in itself and the boundaries between R&D and other innovation activities. This is underlined by the significant incidence of erroneous reporting in general and the lack of reporting of costs, especially among companies contacted. This implies a need for more comprehensive explanations of terms in the questionnaire even though many respondents seem to have difficulties understanding the explanations that are already included.

Secondly, the process has not resulted in any significant increase in innovation costs. However, the increase in the number and percentage of firms that report costs are significant. Contact with the ordinary enterprises has given an increase in innovation costs by around 3 percent (unweighted), while the contact with large enterprises resulted in a further increase of 1 – 1.5 percent. Overall, the work resulted in a rise of around 4 percent compared to the unweighted total before the revision work started. The main reason for this relatively modest increase is that the vast majority of the new estimates concern rather small amounts.

Thirdly, audit of large enterprises in terms of both R&D costs and other innovation costs seems very important. On the one hand, the prevalence of inadequate reporting of the innovation costs of major R&D players with suspicious reporting does matter, and audit of these gives a relatively large effect per entity. On the other hand, wrong downsizing of amounts, under suspicion of 1 000 error, is a trap that should be avoided.

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## 1. Introduction and background of the project

Questions on innovation costs are included in Eurostat's Innovation Survey (CIS) to provide a quantitative measure of innovation activity. However, this is an input indicator and does not measure the effect or impact of the innovation (output). Ever since the first survey was conducted in Norway for 1992, there has been problems in obtaining such information from the companies. This is partly due to the concept of innovation being difficult to delineate and partly because companies do not have those costs specified in their accounts. It is therefore a presumption that the costs of innovation, other than R&D, do not have adequate quality and in addition have been under-reported. It also appears that this trend has increased throughout the period with innovation surveys. In addition to the costs of R&D innovation expenditure includes Acquisition of machinery and equipment, Acquisition of other external knowledge and Other costs. The residual item includes training, market introduction of innovations and design.

Innovation costs, not included intramural and purchased R&D, as a share of total innovation costs:

1989-1991: 33 percent  
1995-1997: 34.6 percent  
1999-2001: 27.9 percent  
2002-2004: 23.9 percent  
2006-2008: 17.2 percent

The results are not directly comparable throughout the period. The first two surveys were separate innovation surveys, while from 2001 the survey has been a combined R&D and innovation survey. The questions have also been different. Specific for the first two surveys was that distribution of types of innovation costs were specified only for operating expenses.

In relation to EU countries, the proportion of other innovation costs has been low for Norway.

These different aspects were the main reasons why the questions on innovation costs were not included in the Norwegian survey for 2004-2006. Innovation costs are, however, a key indicator, also in international comparisons, and this question was included again in the Norwegian surveys for 2006-2008 and 2008-2010.

For the 2008-2010 survey extra resources were allocated for the treatment of innovation costs. Besides the normal audit work, the objective of this work was to provide an indication of the occurrence and significance of the lack of reporting and other forms of misreporting of innovation costs, and what is the reason for the erroneous reporting. This work will be an important input in the discussion of the quality of the reported costs of innovation and how the quality can be improved.

In the innovation survey 2010 enterprises were asked about innovation activities carried out during the period 2008-2010 (question 20 in the Norwegian survey). In the next question (quest. 21) was asked for an estimate of costs in 2010 for these innovation activities. The audit work is primarily directed at firms that appear to have discrepancies between the completion of these two questions.

This paper distinguishes between the audit of large companies as measured by the sum of intramural and purchased R&D (the 122 largest) and the sum of the three types of innovation costs (the 98 largest) on the one hand, and corporations other than this - called ordinary enterprises - on the other hand.

## 2. Audit of ordinary enterprises

### Method

The work has primarily involved contact with the companies if the responses indicate a lack of reporting of innovation costs by:

- It has been reported that the firm in 2008-2010 has performed one or more of the innovation activities in question 20 (other than Intramural R&D and Acquisition of R & D services from others), without the associated costs given for 2010 in question 21;
- It has been reported for product and/or process innovation developed primarily or partly of their own enterprises in the first part of the questionnaire, without marking any innovation activity in question 20 and therefore not given any innovation costs in questions 21.

### 20. Innovation activities performed during the period 2008-2010.

Please indicate what kind of innovation activities your enterprise engaged in during the period 2008-2010.

	Yes	No
<b>Intramural R&amp;D costs (within your enterprise)</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Acquisition of R&amp;D services from others</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Acquisition of machinery, equipment and software (without R&amp;D)</b> Especially directed to development of new products and/or processes.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Acquisition of other external knowledge (without R&amp;D)</b> Acquisition of licensing of patents and non-patented inventions, know-how, trademark and other types of knowledge or services for development of new products and/or processes.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Training for innovative activities (without R&amp;D)</b> Training for your personnel specifically for the development and/or introduction of new or significantly new products and processes, both use of external services and internal training.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Market introduction of innovations</b> Include internal and external activities directed to market introduction of your new or significantly improved goods. This includes market research and launch advertising. Construction of distribution network for marketing shall not be included.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Design</b> Activities to design, improve or change the shape or appearance of new or significantly improved goods or services	<input type="checkbox"/>	<input type="checkbox"/>
<b>Other</b> Other activities to introduce new products and processes such as testing, routine software development, tooling up, engineering etc.	<input type="checkbox"/>	<input type="checkbox"/>

### 21. Please estimate the amount of expenditure in 2010 for the following innovation activities performed by the enterprise. Including compensation of employees, own current costs, acquisition of services and investment costs (not depreciation).

<b>Intramural R&amp;D costs</b>	Specified in question 4	
<b>Acquisition of R&amp;D services from others</b>	Specified in question 11	
<b>Acquisition of machinery, equipment and software (without R&amp;D)</b> Especially directed to development of new products and/or processes.	, , , , , ,	000
<b>Acquisition of other external knowledge (without R&amp;D)</b> Acquisition of licensing of patents and non-patented inventions, know-how, trademark and other types of knowledge or services for development of new products and/or processes.	, , , , , ,	000
<b>Other expenditures related to innovation activities</b> Training for innovation activities, market introduction of innovations, design and other activities	, , , , , ,	000

Of close to 2000 enterprises with product- and/or process-innovation in the Norwegian survey 758 ordinary companies had one of these two forms of malicious reporting. Of these, 574 enterprises have been contacted, of whom 359 responded. Of these there were 239 with own R&D and 120 without R & D activity.

Companies are contacted via e-mail, and have been asked to confirm, or reassess, that they have not had the appropriate innovation costs in questions 21.

## **Experience from contact with companies**

### **Lack of reporting of innovation costs**

Of the 359 enterprises contacted 50 percent had inadequate reporting of innovation costs; that means that the enterprises contacted had innovation costs, although this is not stated in the original report, or had innovation costs in addition to what is stated in the original report. Of these, 82 percent gave a new estimate, while the rest, 18 percent, said they could not or refused to give an estimate.

There is relatively little difference in the incidence of lack of innovation costs in the different industries and in the different size class. However, it seems that small enterprises have greater ability and willingness to provide new estimates of the costs. The same is true among firms with intramural R&D than for companies without.

Explanations on both the lack of innovation costs in the original report and the inability to provide new estimates on contact fall largely into two groups: Problems with "separating out" such activities and such costs from other operations, and problems with defining innovation / innovation activity. Salaries and expenses incurred in their own innovation activities are rarely separated for accounting purposes, which particularly seems to result in underreporting of expenses for activities that are included under Other expenses related to the introduction of new products or processes. This problem is particularly evident in companies with many employees. When it comes to items Purchase of machinery, equipment and software (other than R&D) and the Acquisition of other external knowledge (other than R&D), it is often difficult to determine whether a purchase is aimed particularly at developing new products and / or processes – and not least, whether all or only part of the purchase must be included.

### **Other forms of misreporting of innovation costs**

Another common form of misreporting of innovation costs is that the respondents include the company's costs of the different innovation activities under item Intramural R&D or Acquisition of R & D services from other in question 20. 14 percent of the enterprises contacted state that sums from intramural and extramural R&D from the first part of the R&D and Innovation questionnaire covers the activities they have marked in question 20.

Roughly this form of erroneous reporting identifies two ways of thinking: on the one hand, the majority of companies ignored the activities it is asked for in question 20 as outside of R&D, and thus checked for activities which in their view is part of its own R&D work or purchase of R&D services. In these cases there is the answers in question 20, which is incorrect. A minority of companies "extended" the reporting of R&D costs to include the activities in question 20. Here both the reporting of R&D costs and the lack of reporting of innovation costs are wrong.

Generally it seems that the respondents have very little ability to distinguish between R&D and other innovation activities. Many respondents indicated (consciously and unconsciously) that their focus on answering the survey - and by contact - is aimed at research and development. A common and troubling example

is that the respondents answer an e-mail that explicitly asks for the costs of innovation activities other than R&D - and define the boundaries - with "the firm does not engage in R&D" or "the company has not had the R&D activity in addition to those included in questions 4 and 11".

A less common form of erroneous reporting suggests that the innovation concept in itself, independent of R&D, can be difficult to understand for some. 9 percent say they have used a too broad definition of innovation by filling in the innovation section of the survey. The incidence of such reporting is relatively uniform, both distributed by industry and size of employment. The item Training is repeated in the vast majority of these cases. Many respondents seem to interpret the text so that training is in itself innovative. The same reasoning can be expected to apply to a certain extent also for the design, but this has not been a clear tendency in the audit.

Although the incidence of such "expansion" of the concept of innovation among firms that have been contacted is relatively low, it raises questions about the understanding of the definition among enterprises that have provided innovation costs. Specifically under Other expenses it seems likely that there are reported costs of activities that can not be classified as innovation related costs.

### **Proper reporting**

A minority of the enterprises that has been contacted can confirm that questions 20 and 21 in the survey are completed correctly - they have performed one or more innovation activities during 2008-2010, but did not have associated costs in 2010. The innovation activities during the period are either completed or cancelled during 2008 or 2009. 15 percent of the enterprises reported this.

It seems to be a much larger proportion of such "sporadic innovators" among firms not engaged in R&D (23 percent) than among firms engaged in R&D (11 percent). Among industries and number of employees there are small differences.

Other explanations for carrying out innovation activities during the period without the associated costs in 2010 occur, but very little.

## **Results of audit of ordinary companies**

### **Innovation active enterprises that provide innovation expenditure**

The revision of the ordinary companies mentioned gives an additional number of innovation active enterprises with innovation expenditure (other than R&D) of 105. This corresponds to an increase by 10.1 percent. The proportion of innovation active enterprises who report such costs then increase from 52.7 to 58.0 percent. In addition 43 enterprises reported innovation costs on additional items than originally reported.

Distributed by main activity the percentage increase is relatively uniform in manufacturing (10.3 percent) and service industries (10.6 percent), and somewhat less in other industries (7.6 percent).

In terms of size group there is a larger increase among small businesses than for larger enterprises. This is explained mainly by the clear tendency that the ability and willingness to provide new estimates of the costs are lower among larger enterprises.

### **Innovation costs incurred**

The unweighted costs of innovation has increased by NOK 149.1 million after the revision of the ordinary companies, representing an increase of 2.9 percent.

Distributed by main industry there is a significantly greater percentage increase in other industries (6.6 percent) than in service industries (2.9 percent) and industry

(2.2 percent). This is mainly due to relatively high estimates from two companies in other industries that provide a major impact on the relatively small sample. Adjusted for this, it is a relatively steady increase across the main industries, reflecting the steady rise in the proportion of enterprises that provide costs except R&D.

In monetary terms the increase is greatest in the service sector with NOK 91.4 million, compared to NOK 37.5 million in manufacturing and NOK 20.3 million in other industries. Related to the number of enterprises that have come up with new estimates, the new estimates on innovation costs from companies in the service and other industries on average are much higher (respectively NOK 1.4 million and NOK 1.6 million per enterprise) than new figure from companies in manufacturing (NOK 0.6 million per company). This has been a clear tendency during the audit; enterprises in manufacturing industries provide less cost largely composed of smaller sums for activities that are included in Other expenses, while large investments - especially the purchase of machinery, equipment and software - appear more frequent in contact with companies in services and other industries.

Furthermore, it is a relatively large percentage increase among smaller companies, in comparison to the overall increase of 2.9 percent (6.0 percent for enterprises with 10-19 employees, 8.4 percent for those with 20-49 employees).

Distributed by the three types of innovation costs the largest rise is in purchase of machinery, equipment and software (3.4 percent), the audit has captured that the substantial investment mainly relates to purchase of computers etc. Acquisition of other external knowledge increases by 2.7 percent Other expenses of 2.4 percent.

### **Modest increase**

The increase of 2.9 percent of innovation expenditure (beyond R&D) among the ordinary enterprises is relatively modest in relation to both the increase in the number and percentage of enterprises that provide innovation costs except R & D, the high incidence of inadequate reporting among companies contacted, and the hypothesis on underreporting. Compared with what the firms with innovation costs in the original statement provided on average, NOK 5.0 million per enterprise, the "average estimate" in the revision of the ordinary business is significantly lower, NOK 1.0 million per enterprise that provides new estimates.

The reason for this tendency is not obvious. On the one hand, it can be argued that companies with the lack of reporting that is captured by this revision basically have considered their innovation costs too small and too "insignificant" to be bothered with the extra work to provide a reasonable estimate. Consequently, the sums stated in the audit just that - small and "insignificant". In general, this is consistent with the impression much of the contact has left us with. On the other hand, it is conceivable that respondents find it difficult to admit that they have dropped out significant numbers from the original report. It may also be the case that providing a relatively small number acts as an "easy way out" confronted with an erroneous reporting the respondents know would require additional work to correct.

However, it is the general impression that the first argument seems most likely.

### **Reasons for further upward adjustment**

There are some factors which point to a greater real growth. Firstly, the audit includes only 359 of 758 firms that had one form of malicious reporting. During the audit it has not been discovered anything indicating that the result of contact with the 399 remaining firms would have differed significantly from the results above. Very roughly, based on the ratio 399/359, it is thus possible to estimate an increase by complete revision of the ordinary business of reporting suspicious of about NOK 315 million (6.1 percent) against NOK 149 million (2.9 percent). Such an estimate entails much uncertainty.

71 percent of the enterprises that provided new estimates of the costs basically did not have innovation costs whatsoever, except for research. This proportion is expected to be significantly lower among the 399 enterprises that have not been contacted due to the nature of the sample. Thus, the number and proportion of enterprises that provide R&D costs cannot be expected to be affected to the same extent of an audit of these.

18 percent of the enterprises contacted stated that they had costs, but did not give any estimate. Given that even among these firms it is 71 percent which basically do not have innovation costs, except R&D, an estimate of all these provide a further increase in the proportion of enterprises that provide costs except R&D (from 58.6 to 59.1 percent). Given that the average estimate among these entities is equal to that of firms that provide new estimates (NOK 1.0 million) this equates to an additional increase in innovation costs by NOK 33 million. If this is added to the estimated NOK 315 million above, this points to an overall increase of innovation costs, apart from R&D, of about NOK 348 million (6.7 percent). As mentioned, these estimates involves considerable uncertainty.

Finally, it must be expected that a lack of reporting occur among firms that by contact has given limited answers. These are referred to about 7 percent.

### 3. Audit of large enterprise

#### Method

Beyond the ordinary enterprises there are the firms with the highest costs of R & D (sum of intramural and purchased) that needs special treatment.

Of the 122 firms with the highest costs of R&D there are 46 companies with suspicious reporting in the original report; having reported one or more of the innovation activities in 2008-2010 (apart from intramural R&D and acquisition of R&D services from others), without stating costs for 2010. Each of the 46 firms have been contacted. Among the remaining 76 companies, whose report has no inconsistency in completing questions 20 and 21, we made contact when there was a reason to suspect underreporting of cost. These are companies that have provided relatively small amount of innovation costs in relation to R&D or companies that are suspected to have innovation costs beyond what is reported.

Companies are contacted via e-mail, and have been asked to confirm, or reassess, the appropriate innovation costs in questions 21 They are also reminded of the split between R&D and other innovation activities, and informed that the purpose of the contact is to elucidate a possible under-reporting of innovation costs.

#### Experiences

Of the 46 firms with the inconsistency of the completion of questions 20 and 21, we got answers from 30. 11 of these companies confirmed that they have had innovation costs above those reported in the original report, and provided new estimates. Seven companies reported the cost of purchase of machinery, equipment and software (total NOK 30.5 million), two reported on the costs to the Acquisition of other external knowledge (NOK 1.2 million), and six stated Other costs associated with the introduction of new products or processes (NOK 28.4 million).

Companies that provide new estimates of the costs usually respond with a description of one or more activities and questions about whether these should be classified as innovation related. More or less all these questions involve innovation activities. Accordingly, many respondents seemed to have a too narrow definition of innovation and innovation activity as the basis for the original report. The reason

could be that their main focus is on R&D and that the innovation part of the survey is perceived as a subset rather than an independent part.

The remaining 19 firms, which confirms that the absence of innovation costs are real, give more varied explanations for this than was the case with ordinary enterprises. In many cases we are talking about corporate structures, where the costs to the company's innovation activities claimed to be from other group companies. A small number of companies believe that the costs of their innovation activity is included in the cost of R&D.

Of the 76 firms with no inconsistency in completing questions 20 and 21, there has been contact with 26 due to some kind of suspected under-reporting. Of these, only an entity confirmed under-reporting, while the remainder - with different reasons - confirmed the information in the original report.

## **Results of audit**

There were 11 large enterprises that provided innovation cost during the audit. The total innovation costs increased by 1.3 percent from these enterprises. It must be emphasized that the sample is too small to say anything about trends in both overall and within the main industries, size group and type of innovation costs.

Nevertheless, the increase in innovation costs as a result of these 11 new estimates constitutes 46 percent of the increase in the audit of the ordinary enterprises, where there are 148 new estimates.

## **Other audits of large corporations**

### **Firms with high innovation costs**

Beyond efforts to elucidate the incidence of inadequate reporting of innovation costs at major research players, work has been done to ensure the quality of the numbers of enterprises that are greatest in innovation costs, except R&D. The focus has been on 98 firms with the highest innovation costs (the sum of the three types of innovation costs) and the purpose has been to contact them to avoid false downsizing of amounts due to the suspicion of "thousand errors."

Of the 98 firms with the highest innovation costs are initially used common sense to assess whether the numbers seem reasonable. Innovation costs are assessed against the entity (business, number of employees, turnover, etc.). The assessment are as follows:

- 13 answers are reasonable.
- 27 answers contain obvious one thousand mistakes, and has been revised down accordingly.
- 33 answers contain obvious one thousand errors in addition to the firm is not active in innovation (product or process innovation). Here are the three types of innovation costs in question 21 set to zero.
- The remaining 25 answers are doubtful, and all of these have been contacted.

In the 25 cases of doubt, the enterprises were contacted via e-mail and have been asked to reconsider what they have stated in innovation costs. Of 22 answers, it turned out to be four correct answers, nine cases of thousand errors, three cases of hundred errors, three cases for ten errors, and three cases in which some of the numbers in the original task can not be regarded as innovation related. It should be mentioned that one of the three firms in the latter category after the audit has the highest innovation expenditure (beyond R&D) by all firms in the survey. The outcome of this work shows the importance of this type of audit.

**Enterprises in which the costs of R&D = innovation costs except R&D**

Among the 122 largest R & D actors, there are three entities where the sum of intramural R&D and purchased R&D in the original statement is the same as the sum of the three types of innovation costs. The three enterprises have been contacted and have been asked to revise the reporting of costs, and answers are directed accordingly. All the cases is about double reporting.

**Enterprises with over NOK 10 million in innovation costs (except R&D) in 2008-study**

In the 2008 survey, there were 69 enterprises with more than NOK 10 million in innovation costs. A review of these shows that 39 firms have zero or relatively low innovation costs in 2010. Contact with them was commenced, but was not completed due to limited time. The contact gave no indication of error reporting for 2010.

**4. Results on aggregated level**

It's hard to calculate exact the effect of the extra audit work on aggregated level, due to weighting etc. The results on aggregated level show a modest increase of 5 percent in total innovation expenditure from 2008 to 2010. The main reason is the weak development in R&D expenditures. For intramural and extramural R&D together the expenditures in nominal values are in practice the same for both years. For other innovation costs the increase in nominal values are 30 percent from 2008. The largest increase is for Other costs (40 percent) followed by Purchase of machinery, equipment and software (30 percent). Roughly speaking we can say that of the increase in non-R&D innovation costs  $\frac{1}{4}$  is due to the extra audit work, while  $\frac{3}{4}$  is due to increase in original reporting from the enterprises.

In spite of the large increase in other innovation costs the expenditure on intramural and extramural R&D is still much higher. This means that the share of R&D in the total costs has been reduced, but is still dominating. The share falls from 83 percent in 2008 to 79 percent in 2010.

**5. Conclusions**

Work on the revision of the innovation costs has left three main impressions.

Firstly, it seems to be low awareness among respondents of the innovation concept in itself and the boundaries between R&D and other innovation activities. This is underlined by the significant incidence of erroneous reporting in general and the lack of reporting of costs, especially among companies contacted. It can then be argued that there is an urgent need for more comprehensive explanations of terms in the questionnaire. However, understanding perceived by many respondents seems so low that there may be doubt as to whether they read and understand the explanations that are already included.

This observation is in line with the findings in the SINTEF-report *Is R&D in the business enterprise sector in Norway under-reported?* (SINTEF A20772). Different reasons for under-reporting is given, but in the report is also stated that "a possible source of over-reporting (of R&D), may be that firms do not distinguish between R&D and other innovation activities".

Secondly, and in spite of the first point, the process has not resulted in any significant increase in innovation costs. However, the increase in the number and percentage of firms that report costs can said to be significant. Contact with the ordinary enterprises has given an increase in innovation costs by around 3 percent (unweighted), while the contact with large enterprises resulted in a further increase of 1 – 1.5 percent. Overall, the work resulted in a rise of around 4 percent

compared to the unweighted total before the revision work started. The main reason for this relatively modest increase is that the vast majority of the new estimates concerns rather small amounts. Companies in the manufacturing industry have more or less exclusively given small estimates, well below the average for the costs provided by companies in the same industry with original reporting. The estimates from companies in service industries have also largely been dominated by small amounts and are well below average compared with the original reporting, although there has emerged a number of significant investments. In other industries, the number of observations is limited and influenced by a small number of firms with large estimate, but even here the average is just below the original reporting.

The reason for this underlying trend is somewhat unclear, but it appears that many respondents chose to drop innovation costs since these are too small and insignificant to be worth the trouble to provide a reasonable estimate. Simply put - and in a very general way - it appears that substantial innovation costs are more likely to come from companies with original reporting, than "negligible" costs that are largely captured by this revision. Thus it can be argued that the occurrence of lack of reporting is mainly in terms of number of enterprises than in innovation costs incurred.

There are however a number of factors that indicate that a full audit of companies with suspicious reporting will provide a further increase in innovation costs, more or less linearly with the increase in the number of companies audited. Increase by complete revision of the ordinary companies with suspicious reporting is estimated to be about some more than NOK 300 million (around 6 percent), though uncertain estimate. Furthermore, one can anticipate (though with substantial uncertainty) that it can be about NOK 30 million lacking in innovation costs among firms contacted that claims that they have cost, but that they cannot or do not wish to provide these. Figures from the ordinary companies put together with these estimates point to a recovery of innovation costs of approximately NOK 350 million (close to 7 percent). Added together with the results of the audit of large companies with suspicious reporting this gives an increase of some more than NOK 400 million (around 8 percent). Roughly estimated this means  $\frac{1}{4}$  of the total increase in innovation expenditure (other than R&D) from 2008 to 2010 at aggregated weighted level.

Thirdly, audit of large enterprises in terms of both R&D costs and other innovation costs seems very important. On the one hand, the prevalence of inadequate reporting of the innovation costs of major R&D players with suspicious reporting does matter, and audit of these gives a relatively large effect per entity. On the other hand is wrong downsizing of amounts, under suspicion of 1 000 error, a trap that is easy to fall into. As in the case with the 2010 survey this could result in a greater decline in innovation costs, than the rest of the revision has resulted in an increase.



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