

# Redis News

2 □ 1996

Bi-annual

## FOREWORD

### *Innovation*

Two important conferences were held in May and June on innovation measurement and knowledge based economies. They both pointed in the same direction, concluding that economic growth cannot be explained anymore with the traditional statistical concepts. The financial or physical state of an enterprise does not give a full account of its chances of success, of development, of its competitiveness. Factors linked to its information state - research conducted, expertise of its staff, training policy, mode of organisations - have to be taken into account as well.

Initiatives along these lines which have already been taken by Member States, Eurostat and OECD are reported in this publication: revision of the Oslo manual, planning of a new CIS, study on intangible activities, measure of stocks and flows of human resources. Much is still to be done. The Blue Sky Indicators conference organised by the OECD secretariat dealt with many of these issues. Interesting pilot surveys have been launched by different countries on Information Technology, Innovation capabilities, links between estab-

lishment characteristics and its employees.

We will have to draw lessons from these exercises at the international levels. Our efficiency will be measured by our capacity and capability to adapt to a changing environment: the needs are becoming clearer, the statistical systems will have to evolve and we will try to support and coordinate the developments in Europe.

### **The Luxembourg Conference**

Technological innovation is recognised worldwide as a prime factor for sustainable growth and competitiveness of enterprises. Thus, measuring innovation has become a significant tool for strategic decision making at both the enterprise and political levels.

As a part of its support for Community initiatives, the European Commission (DG XIII and Eurostat) organised a conference in May 1996 in Luxembourg. The conference was aimed in part to get some input for future actions by the Commission in this field.

In addition to this conference focusing

on the integration of the results of innovation surveys, and related information into policy actions from the viewpoint of the Commission, Member States and individual researchers and enterprises, it had as its aims;

- to discuss the importance of measuring innovation;
- to discuss the results produced, especially from the first Community Innovation Survey (CIS).

Participants were from science and technology bodies in the Member States, organisations responsible for the Community Innovation Survey, universities, research institutes and enterprises, and a number of European Commission services.

### ***In this issue:***

<b>Foreword</b>	<b>1</b>
<b>The REDIS Management</b>	<b>2</b>
<b>R&amp;D statistics in Eurostat</b>	<b>3</b>
Human Resources in S&T	3
Intangibles	3
Patents	4
<b>Other activities (AGREP)</b>	<b>5</b>
<b>Databases &amp; Publications</b>	<b>5</b>
<b>Plans for coming months</b>	<b>7</b>
<b>Focus</b>	<b>7</b>
Speech of Mr. Y. Franchet	8

OFICINA ESTADÍSTICA DE LAS COMUNIDADES EUROPEAS  
DE EUROPÆISKE FÆLLESSKABERS STATISTISKE KONTOR  
STATISTISCHES AMT DER EUROPÄISCHEN GEMEINSCHAFTEN  
ΣΤΑΤΙΣΤΙΚΗ ΥΠΗΡΕΣΙΑ ΤΩΝ ΕΥΡΩΠΑΪΚΩΝ ΚΟΙΝΟΤΗΤΩΝ  
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### ***The REDIS Management***

The REDIS (Research Development and Innovation Statistics) Project is one of the projects of the Directorate for Business and Energy Statistics, Research, Development and Statistical Methods of Eurostat. It is managed by Unit D3 (R&D and Statistical Methods) headed by Mr. Daniel Defays under the director Mr. Photis Nanopoulos.

Mr. Maurits Pino and Mr. Mikael Åkerblom are jointly responsible for the day-to-day running of the project.

Since the last issue of this newsletter, the REDIS team has witnessed some changes. Mr. Werner Grünewald, who ran the project since 1992, has moved to another unit of Eurostat. Mr. Mikael Åkerblom, whose departure for Statistics Finland was announced in the last issue of the newsletter is once again back as a member of the team. He will be responsible mostly for Innovation Statistics especially the CIS-2. Mr. Cesar De Diego Diez, a new official, has joined the team to manage the REDIS database and publications.

Two new arrivals are Ms Sabine Gagel, who works on the regionalisation project and Mr. Youri Bayens (replacement for Mr. Per Andersen) who works on Innovation Statistics. Mr. Eric Ng Shing is back as a member of the team and continues to work on Innovation Statistics. The project secretary is Mrs. Anne-Françoise Van Schingen-Gonry.

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It is an integral part of our mission to continue serving you to the best of our ability. This newsletter is a mere summary of some of our activities. If you would like some more information, or if you have questions or comments on any of the issues mentioned in it, please do not hesitate to contact us. To ensure that you receive future issues of REDIS News, please notify us of any changes to your address as soon as possible

*REDIS News* is one of a series of three newsletters prepared by Unit D3 of Eurostat. The others are *Research in Official Statistics* (on DOSIS) and *The Panelists* (on Enterprise Panels Statistics).

Please note that the opinions expressed are those of the authors alone. Neither the European Commission nor any person acting on its behalf is responsible for the use which might be made of the information contained in this newsletter.

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**Editor:** Edward OJO

# R&D STATISTICS IN EUROSTAT

## *Achievements and Results in the First Half of 1996*

### Human Resources in Science and Technology (HRST)

Following the announcement of the pilot HRST stock data collection exercise, organised jointly by the OECD and Eurostat, questionnaires were sent to all OECD countries between November 1995 and March 1996. Eurostat is responsible for the collection of data from all EEA member states (except Liechtenstein). The aim is to collect data on those people educated at the third level and/or those working in S&T occupations (according to the ISCO-88 classification), and subsequently broken down by age group, gender, and field of study. The next issue of *REDIS News* will highlight the results of this preliminary data collection exercise.

Based on the methodology of the Canberra Manual, a working paper was prepared to describe indicators which will measure certain key flows of HRST. The key flows proposed are the inflows of HRST from the education system, and the flows of HRST as a result of migration.

The first is recognised as being the most important source of new entrants into the stock of HRST and invaluable for replenishing stocks, a factor which will inevitably become more critical due to the ageing population which exists in most western European countries.

The second flow concerns the extent to which migratory flows affect the HRST stock within each country, identifying both temporary type flows (for example, exchange programmes for scientists) and permanent type flows, which relates to the "brain drain" / "brain gain" phenomenon. This working paper was presented to the NESTI group of the OECD in June for discussion.

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### Intangibles

#### ***Studies on Intangible Activities***

Eurostat has become active in the area of intangible activities within the last year. It has commissioned a study and has just launched a call for tender for a second study.

Present day economies seem to be more and more involved in dealing with production and transaction of intangibles (or "immaterial products"). Conceptually, these intangibles seem to evade a statistical system based on production, investment and consumption of "materials".

As the Director General of Eurostat, Mr. Y. Franchet, put it in his opening speech on the conference on Innovation (see page 8): "*Today, it is vital for policy makers to know what is going on... The emergence of intangibles creates a threat and an opportunity for existing statistics.*"

The *threat* which he referred to is that of diminishing value of the existing statistics while the *opportunity* will result from the options for increased understanding of economic and social processes.

Clearly, the importance of these concepts have increased enormously. In the previous century it could be ignored. In the de-industrialising 1980s an understanding of these issues was needed. Today, it is vital for policy makers to know what is going on. Given their nature, however, it is problematic to handle intangibles with the existing statistical framework.

The objective of the first study commissioned by Eurostat is to make a plan for future research into the subject area to find out what is available (methodology, data) and what is required for studies.

Five areas of focus have been chosen for the study:

These are R&D, informatics, marketing, the economics of knowledge, and human resources.

The second study is to produce a programme for the collection of data "regarding the statistical description of intangible activities and investments on the basis of existing statistics". This study builds on the first study and is supposed to start in before the end of 1996.

With the results of these studies, policymakers in the Member States and in the Commission should be informed of the possibilities of data collection and the merits of the available alternatives. It is then up to the policymakers to formulate the demand for future collection of statistics.

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## Patents

### **Co-operation with the European Patent Office:**

#### *Regional data on European patent applications now available!*

The new regionalised data on European patent applications have now been processed. The data on patent applications were provided in co-operation with the European Patent Office - EPO.

They comprise of European patent applications having at least one

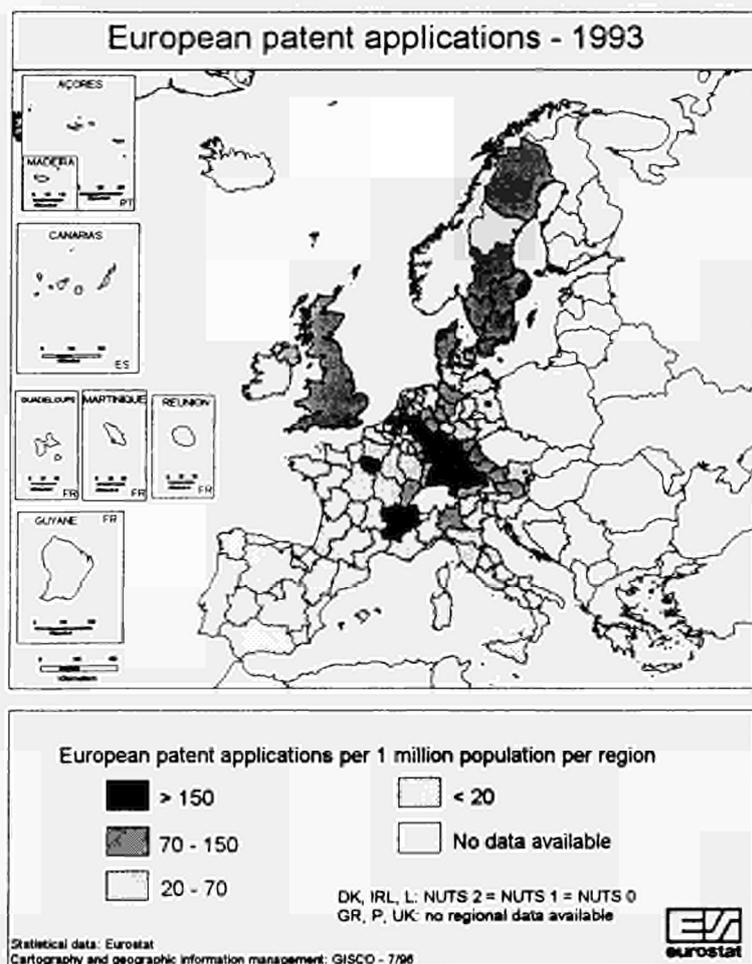
inventor resident in the EU excluding Finland. (Finland has not yet acceded to the European Patent Convention which establishes a uniform patenting system for all countries signatory to the convention.

In not being a member, the number of patent applications with a Finnish inventor is liable to bias and has thus not been taken into account.)

The most detailed regional breakdown available for the majority of countries is at NUTS level 3. Furthermore, the patent applications can be broken down by field of technology (according to the International Patent Classification (IPC), subsection level). A concordance table between

IPC and NACE will be developed. Annual data will be shown for 1989 to 1994 for each of the 14 countries (the EU less Finland) and will be included in the REGIO database soon. Co-operation with the EPO will continue and the database will be updated yearly.

One methodological particularity of the patent data should be stressed. An objective of the compilation



of regional patent data is to provide an indication of the innovative potential within the regions. Therefore, the regional assignment of a patent application was done by the address of the inventor or, if more than one, by the addresses of the inventors. This differs from the way the data are published by the EPO itself where statistics on patent applications are indicated for the country of the first applicant.

To give a first impression of inventive activities and potential within the European regions, the map shown above indicates the number of patent applications (according to our definition) per one million population for 1993 at NUTS level 1. More methodological information and statistics on the new patent data will be found in a future edition of *Statistics in Focus* and in our

forthcoming yearly publication *Research and Development: Annual statistics 1996*.

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## Community Innovation Survey (CIS)

Preparatory work has now started on the next round of the Innovation Surveys CIS-2 which should be launched hopefully in 1997.

In parallel with this, tables are being prepared for the publications and the CD-Rom on the CIS-1.

The joint DGXIII-Eurostat international conference was held in Luxembourg as planned in May. The focus in this issue of REDIS News is devoted to the conference.

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### ***Other Activities***

#### **AGREP**

On 14 March 1996 a meeting with DG VI for Agriculture (of the European Commission) took place in Brussels to discuss a possible future of AGREP. AGREP is an annually updated information system on ongoing, publicly funded, agricultural research projects which is currently implemented in 11 EU Member States (the former 12 with the exception of Luxembourg). The Commission has produced AGREP since 1975 through the DG XIII information industry

development budget and subsequently through the DG VI agricultural research budget.

A future AGREP system could have closer links to other databases, for example those of CORDIS and Eurostat. Eurostat could contribute information on the national profile of the countries, providing data, for example, on GBAORD, R&D expenditure and R&D personnel, and also on general economic indicators like GDP or labour force, referring, where possible, to the agricultural sector. Eurostat should be involved in the definition of variables that would be surveyed in the frame of a new AGREP system and contribute to the methodological framework to facilitate the comparability with other databases.

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### ***Database and Publications***

#### **The indicators report**

In 1994 the first European Report on Science and Technology Indicators was published by DG XII of the European Commission. The principal aim of the Report was to assess the scientific and technological performance of the European Union (EU) in the world.

Though the Report is conceived to be a biennial publication, the second edition is planned for end of 1997. The principal aim of the second edition remains the provision of a systematic comparison between the EU and other major trading blocs. For this purpose, indicators will be analysed in the field of R&D funding and expenditure, human resources in S&T, patents and scientometrics. The coverage goes well beyond the European and other OECD countries by providing comparative data on 58 countries, including Russia and other economies in transition in Eastern Europe and the main

emerging industrial countries in Asia and Latin America. Special focus in the second edition will be directed towards the Mediterranean countries.

The structure of the second edition will remain unchanged, consisting of one section devoted entirely to text and another containing the statistical annex. Eurostat is in charge of the statistical annex of this edition. For this purpose, a team has been set up inside REDIS, which will not only collect the data, but also will review the methodological background and comparability of the data.

## Database

The data compiled for this annex will be included in a separate database, which will later be made available to the public. Details are still being worked out. As the Report also considers general macroeconomic context, the data refer not only to S&T, but also general macroeconomic variables and derived indicators of S&T.

Apart from basic and derived indicators, nowcasts will be provided for some indicators. A database will be set up containing all the collected variables with their methodological notes. The database will contain more than just S&T.

Geographically the data will cover nearly 60 countries. Apart from the OECD countries, coverage will include the economies in transition in Eastern Europe, the main emerging industrial countries in Asia and Latin America and some Mediterranean countries. The timespan covered will be from 1980 until the most recent year available, including nowcasts for the most recent years for some variables.

Methodological notes will be provided as well and the database is planned to be updated regularly. In the future, countries and/or variables can be added, and possibly the timespan may be extended. The way of presentation is still under consideration. For now the minimum will be on diskette in a current spreadsheet format. Thoughts are being given to producing a CD-ROM later.

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## Publications

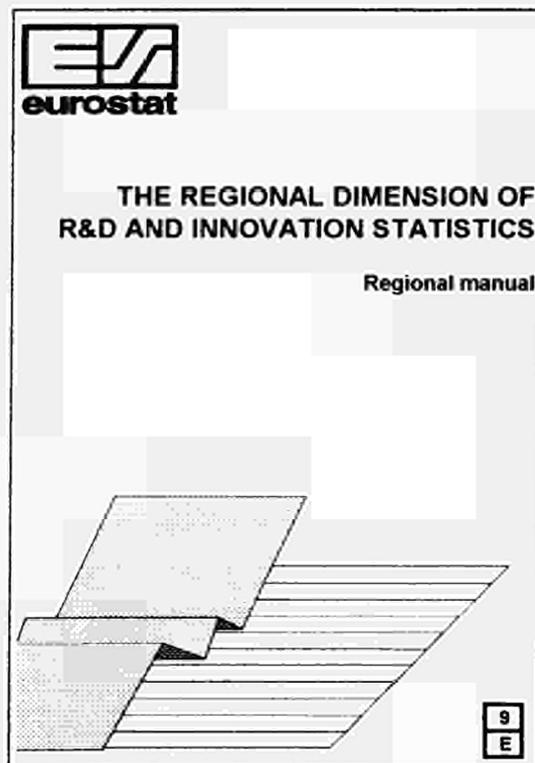
### Research and Development: Annual statistics

As at the time of going to press, work continued on the preparation of the 1996 edition of our annual publication. This year's issue promises to be even richer than the previous ones with the inclusion of national tables on R&D expenditure and personnel. You can obtain your copy through the usual source or through the Eurostat Data Shops in Luxembourg or Brussels. For the distribution point closest to you, please see page 11 of this newsletter.

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### Just Released !

The Regional Manual on R&D and Innovation Statistics, the fruit of years of hard work by several experts on this topic and our colleagues from the Member States, is now on the market.



For the first time, a manual is dedicated to describing the principles underlying the collection and analysis of regional R&D and Innovation indicators. This becomes the extension of the Frascati Manual of the OECD



session, with the aim of linking measurement to policies.

### **Some conclusions reached**

The Community Innovation Survey (CIS) opens up new possibilities for analysis. Analysis of the results is still going on. Preliminary results from the various analytical projects do not show any completely new results, but largely confirm results from previous research based on more limited sets of data.

The Conference clearly indicated that the Community Innovation Survey is working as a framework for analysis. The first round of innovation surveys were pilot surveys and could therefore not be perfect. Eurostat has already started the planning of the next round of the surveys by participating in the revision of the methodological framework in co-operation with the OECD, executing some pilot surveys and starting to develop a new harmonised questionnaire.

Future innovation surveys should include certain core questions comparable over time. In addition

it would be ideal if the survey results could answer more urgent needs of policy makers.

The first round of innovation surveys were restricted to the manufacturing industries. It is a general agreement that the second round should be extended to the service sector. The conference gave clear advice to Eurostat to be gradual in expanding the scope of the survey. In the next round only a few service industries should be included.

It was generally agreed that innovation measurement is important and will become even more so as more and more policy actions are directed towards improving the innovation process as a whole. Innovation is seen as a key component of growth and competitiveness on the level of the individual enterprise, the branch, a whole economy or the European Union as a whole.

At the Conference it was argued that innovation surveys and other measurement of innovation should be developed to reach the same status as national accounts. That is an ambitious aim, which could probably be reached in the long term, if sufficient importance is devoted to development of the survey instruments.

Set out below is the abridged version of the speech by Mr. Yves Franchet to the participants at the International Conference on Innovation Measurement and Policies

### **Introduction**

It's always a pleasure to be present in a meeting which brings policy making, science and statistics together. At this conference we have brought together:

- those responsible for the data of the (CIS) Community Innovation Survey, such as Eurostat and the agencies responsible for data collection
- those responsible for innovation policy in Member States and the European Union, especially those responsible for the Green Book on Innovation
- academic analysts of innovation contracted by DGXIII (the Directorate General responsible for telecommunication, information market and exploitation of research) and other researchers in the field of innovation.

I hope that this conferences will challenge our thoughts and improve the quality of our further work in this field. The exchange of facts, experiences and opinions in this Conference should be profitable for all of us.

Innovation is a concept of growing interest all over the world. Innovation is one of the factors determining the competitiveness of a single enterprise or of a whole

economy. Therefore, this conference comes at the right time.

The Commission has just published a Green Book on innovation with a lot of recommendations. The need to continue innovation surveys has been stressed in that book. More generally, one of the recommendations is to establish a technology watch, a system for monitoring the development of technology.

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*Address by*  
**Mr. Yves Franchet**  
*Director General - Eurostat*

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This means that entities or objects to be watched have to be defined. This cannot be done using only old concepts. One of the key issues of this Conference is to identify what has to be watched in the field of innovation to satisfy new needs by policy makers.

In a period of budget cuts, more emphasis is being put on achievements, results and impact of public policy. R&D policy is not an exception in that respect. Policy makers are interested to know the effects and impacts of increasing investments in R&D. Have the investments in R&D resulted in better performance, better competitiveness, higher living standards, etc.?

New concepts have emerged, which call for new statistical approaches. The new concepts of information society, knowledge based society and national innovation systems have had an impact on policy making during the last years. There is a growing interest in the complex interactions between technology, growth and employment. Innovation is a key concept to understand this interaction. The innovation survey is one response to the need for new statistics to serve new policy needs. At the same time, we have to devote more and more attention to the development of other forms of statistics on intangibles in order to improve our ability to meet new policy needs. This has to be considered in revising existing statistical methodological frameworks and developing new ones.

### ***Eurostat's role in the field of research and innovation statistics***

What is the role of Eurostat in this new context? Eurostat has an important role to play in the field of research and innovation statistics. Its mission has been defined in general terms as "to provide the EU with a high quality statistical information service". As quality means ability to satisfy user needs, the concerns expressed by our policy makers have to be shared by Eurostat and more generally by the European Statistical System.

In the Council Decision on the framework program for priority actions in the field of statistical information 1993-1997, it is said that 'The competency for research and technological development vested in the Community by the virtue of the Single Act, strengthened by the Maastricht agreements and Community policy to promote innovation, calls for up-to-date and precise statistics'. In the Council Decision on the establishment of a multi-annual program for the development of Community statistics on research, technological development and innovation pilot surveys on innovation are explicitly mentioned.

In the past, the focus of technology statistics in the widest sense was put on statistics on research and development. Lacking methodological means for other issues, the attention was on the primary inputs, such as money and people devoted to R&D. It was recognized, however, that the process of innovation is not linear. Therefore, measuring the inputs in R&D was just not sufficient for measuring the whole process. The attention for outputs as patents and publications grew and eventually innovation was on the agenda.

For Eurostat, comparability of statistical information is a key issue. The meaning of a figure depends on the relation one can establish between the figure and other quantitative information. In order to be comparable, the information should therefore be based on statistical standards. Comparable information makes it possible to get some information on Europe as a whole but also gives meaning to the actual figures.

Comparability is needed, not only on the European level, but also with US, Canada and Japan and other countries outside Europe.

In 1993, a major step was taken to improve the available information on innovation. On the basis of a broad consensus of what needs to be known, a harmonised survey was launched. This survey, called the Community Innovation Survey (CIS), covered the old 12 Member States and Norway. It was based on a harmonised questionnaire developed by Eurostat in co-operation with OECD and various national experts. The questionnaire was used as a basis for national surveys in all participating countries.

This action by the Member States, DGXIII and Eurostat resulted in a huge database, established by Eurostat on the basis of data from the national surveys. It consists of 40.000 enterprises with about 200 variables per enterprise. The variables cover a very wide area. They deal with the information for, and objectives of innovation, acquisition of technology and the performance of research and development, with the costs of innovation and the obstacles to innovation, and finally with the impact of innovation.

This mine of information has to be exploited. Eurostat has already produced some preliminary descriptive analysis and DGXIII has asked a number of contractors to work on this data. They will report on their findings in this conference. I am looking forward to their conclusions.

Unfortunately, there is a great problem with analysing data like this. The data deals with sensitive information about individual enterprises. Therefore its confidential nature demands strict limits on dissemination. Yet, good policy making demands a wide public and academic discussion. For this, free access to the individual data would be desirable. Clearly this is impossible.

Eurostat attempts to find ways to access the data without hurting the confidentiality. We are working on solutions along three axes:

- firstly, the contractors of DGXIII have been supplied with micro-aggregated data, which are somewhat modified data that protect individual data, but remain useful in whatever aggregates.
- secondly, Eurostat is working on a publication of a large amount of tables from the CIS database

- thirdly, Eurostat attempts to find a modality of allowing researchers to work on confidential data in Eurostat under strict conditions.

### ***Future development of innovation surveys***

In addition to our work on the processing of data, and making them accessible to contractors, perhaps to others if Member States allow, we have started to further develop the methodology of innovation statistics. We have started the planning of a second harmonised survey.

The change in methodology that I mentioned before, means firstly the ongoing revision of the Oslo Manual. The revised version will be a joint OECD/Eurostat manual. Many of the people taking part in the revision of the Oslo Manual were involved in the first Community Innovation Survey.

Another important input for a second harmonised survey is the evaluation of the CIS ordered by DGXIII. The evaluation calls the Innovation Survey a success in the way that it was the first time such a large amount of firm level data on innovation was collected and stored in a data base. The shortcoming was insufficient international comparability due to the fact that several contractors modified the questionnaire, the sampling methods were not identical and there was an insufficient co-ordination of activities. A legal basis for innovation statistics would be a tool to solve this problem. Investigations on the feasibility and desirability of a legal framework have therefore already started. Preliminary discussions with Member States have taken place on possible content of legal framework.

In order to assist in the methodological development, Eurostat has completed two pilot surveys on innovation. One concerned the measurement of innovation costs, the other was on the possibilities to measure innovation in services. A second pilot on service innovation is still ongoing.

In the past, critics of innovation statistics have taken up the position that innovation is not measurable. I believe that the experience from the CIS survey based on the OECD methodology shows that their position is untenable.

Hopefully innovation surveys could in the future be undertaken on a regular basis in order to establish time series. Longitudinal studies on the basis of panels of enterprises will facilitate more detailed analysis of the relations between innovation and employment, innovation and profitability of firms, development of technological competitiveness, etc..

Another topic that might deserve attention is the role of small enterprises in the innovation process.

### ***Statistics on intangibles***

The innovation survey is, of course, only one piece of the information system supposed to serve the new policy needs. Other coordinated surveys exist, other statistics on intangibles are being put into place, studies on socio-economic impacts of S&T policies are found in the fourth framework program, to mention a few related activities.

Statistics of innovation are a part of statistics of intangible activities and investments. Development of statistics on intangibles will be more and more important in the future. There is a growing interest for questions on intangibles: What is the size of the production of information or knowledge? How is the management of change (whether organisational or innovation)? What are the effects of these intangibles?

One special aspect of statistics on intangibles is statistics on human resources for science and technology. Eurostat is, together with OECD, trying to develop new international statistics covering the stocks and flows of people with third level degrees or occupied in a position normally requiring a third level degree. The emergence of the need for information on intangibles creates a threat and an opportunity for existing statistics. A threat because of the diminishing value of existing statistics without a change of emphasis. An opportunity because of the challenging tasks ahead of us in building up a sophisticated statistical system to meet these new demands.

It is a good thing for us statisticians to see that there are enterprises trying to measure their intangible assets. That will help us in getting information on intangibles in the future. It even better to see that one has been found willing to speak on the topic during this session. I am looking forward to his presentation.

### ***Final comment***

I would like to conclude this introduction by a more general comment. Statistics is not only a tool for policy makers. In our modern democracy, more and more bodies are involved in decision making. Professional organisations, unions and different kinds of associations are channeling the opinions of citizens. These opinions have to be based on high quality information. The role of the statistician in the society is to respond to that need, by putting at the disposal of the citizen, clear, simple and informative statistics. We have to extract information and to present it in a way which is telling for our users. This type of conference is a unique opportunity to discuss the issues, to assess the statistics, to prepare the ground for a wide dissemination of our work. This is a challenge and I am sure, given the quality of the participants and of the work done so far, that we will succeed.

To receive a copy of the full text of the speech, please contact Edward Ojo (Tel. +352 34104044 Fax: +352 347 029)
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