ANNEX 1

Brief History and Origins of the Present Manual

This annex provides a summary account of the six previous editions up to the current version of the *Frascati Manual*. It also acknowledges the contributions of the key individuals who helped make this a globally adopted standard. Those readers interested in consulting the original documents can find those on the manual's website (*http://oe.cd/frascati*).

Origins

Encouraged by the rapid growth of the amount of national resources devoted to research and experimental development (R&D), most OECD Member countries began to collect statistical data in this field around 1960. In doing so, they followed the pioneering efforts of a small number of countries, including the United States, Japan, Canada, the United Kingdom, the Netherlands and France. However, they encountered theoretical difficulties when starting R&D surveys, and differences in scope, methods and concepts made international comparisons difficult. The need for some attempt at standardisation of the kind undertaken for economic statistics was increasingly felt.

The OECD's interest in this question dates back to the Organisation for European Economic Co-operation (OEEC). In 1957, the Committee for Applied Research of the European Productivity Agency of the OEEC began to convene meetings of experts from member countries to discuss methodological problems. As a result, an Ad hoc Group of Experts was set up, under the auspices of the Committee for Applied Research, to study surveys of research and development expenditure. The Technical Secretary of the Group, Dr J. C. Gerritsen, prepared two detailed studies on the definitions and methods employed to measure R&D in the government sector of the United Kingdom and France and later of the United States and Canada. Other members of the Group circulated papers describing the methods and results of surveys in their own countries.

First edition

When the OECD Directorate for Scientific Affairs took over the work of the European Productivity Agency in 1961, the time was ripe for specific proposals for standardisation. At a meeting in February 1962, the Ad hoc Group decided to convene a conference to study the technical problems of measuring R&D. In preparation, the Directorate for Scientific Affairs appointed a consultant, Mr C. Freeman, to prepare a draft document; the document was circulated to Member countries in the autumn of 1962 and revised in the light of their comments. The "Proposed Standard Practice for Surveys of Research and Development" (OECD, 1963) was discussed, revised and accepted by experts from the OECD Member countries at the conference, which was held in Frascati, Italy, in June 1963.

Later in 1963, the OECD Directorate for Scientific Affairs invited the United Kingdom's National Institute for Economic and Social Research to undertake an experimental comparison of research efforts in five western European countries (Belgium, France, Germany, the Netherlands and the United Kingdom), the United States and the USSR. While the study (Freeman and Young, 1965) was based on statistics from surveys undertaken before international standards had been decided, it also tested the first draft definitions. It concluded that the available statistical information left a great deal to be desired. The main improvements suggested were:

- a more rigorous conceptual separation of research and experimental development and "related scientific activities"
- careful studies in the higher education sector to estimate the proportion of time devoted to research by teaching staff and postgraduate (PhD level) students
- a more detailed breakdown of R&D manpower and expenditure data to permit, *inter alia,* a more exact calculation of research exchange rates
- a more systematic measurement of expenditure flows between R&D sectors
- more data on flows of technological payments and on the international migration of scientific personnel.

In 1964, following the acceptance of the *Frascati Manual* by Member countries, the OECD launched the International Statistical Year (ISY) on Research and Experimental Development. Member countries returned data for 1963 or 1964. Seventeen countries took part, many of them conducting special surveys and enquiries for the first time (OECD, 1968).

Second edition

Following the publication of the Statistical Year findings, the OECD Committee for Science Policy requested the OECD Secretariat to prepare a revision of the *Frascati Manual* in the light of the experience gained. An outline of

suggestions was circulated to Member countries in March 1968. A draft revision, incorporating most of these suggestions, was examined at the meeting of national experts held in Frascati in December 1968. For this revision, particular attention was paid to making the manual conform, as far as possible, to existing United Nations' international standards such as the System of National Accounts (SNA) (United Nations, 1968) and the International Standard Industrial Classification (ISIC). A revised draft was examined by a small group of experts in July 1969, and a revised version of the manual was published in September 1970 (OECD, 1970).

Third edition

The second revision of the manual was influenced by two series of events. First, by 1973, Member countries had participated in four ISY surveys, and data accuracy and comparability had benefited greatly from this continued experience. National survey techniques had also greatly improved. Second, in 1972 the OECD Committee for Scientific and Technological Policy (CSTP) set up the first Ad hoc Review Group on R&D Statistics under the chairmanship of Mr Silver (United Kingdom) to advise it and the Secretariat on how to make optimal use, over the short term, of the restricted resources available for R&D statistics at the OECD while taking account of Member countries' priorities. Member countries were asked to draw up an inventory of their needs, and nearly all responded. In addition to giving absolute priority to a continuation of the ISY surveys, they made a number of recommendations touching on methodology, notably concerning the need for closer contacts between the OECD and other international organisations.

As a result, the third edition of the *Frascati Manual* went more deeply into some subjects and addressed new ones. The scope of the manual was expanded to cover research in the social sciences and humanities, and greater stress was placed on "functional" classifications, notably the distribution of R&D by "objectives". A draft was discussed at a meeting of experts held at the OECD in December 1973, and the final text was adopted in December 1974 (OECD, 1976).

Fourth edition

For this edition, national experts recommended undertaking only an intermediate revision exercise, with no significant changes to be made in key concepts and classifications. The main stress was to be placed on improving drafting and layout. However, a number of revisions were in fact made to reflect the recommendations of the second Ad hoc Review Group on R&D Statistics, which met in 1976 under the chairmanship of Mr J. Mullin (Canada), the experience gained by the OECD Secretariat from its international surveys, and analytical reports and suggestions from national experts on R&D statistics. Revision proposals were presented at the annual meeting of national experts in December 1978. The Ad hoc Expert Group met at the OECD Secretariat in July 1979 for more detailed discussions of a draft prepared by a consultant. A

revised version incorporating the Group's and the Secretariat's suggestions was discussed in December 1979, and the text was finally adopted in autumn 1980 (OECD, 1981).

The Higher education sector does not appear in the System of National Accounts (SNA) adopted by the United Nations and the OECD. The OECD and UNESCO, however, introduced the sector early in their collection of R&D statistics because of policy makers' interest in the role of universities and other third-level colleges and institutions in national research efforts. Nonetheless, the problems associated with the collection of accurate data for this sector are significant. They were discussed at the seminar on S&T indicators for this sector held at the OECD in June 1985. The experts felt that, while the manual gave general guidance, it sometimes gave insufficient practical advice. Therefore, at their annual meeting in December 1985, the Group of National Experts on Science and Technology Indicators (NESTI) agreed to prepare a supplement to the *Frascati Manual* to address these problems and to make recommendations on improving future survey practice. A first draft was discussed in December 1986, and the amended text was then adopted by NESTI and, subject to some final adjustments, it was recommended for derestriction in December 1987 (OECD, 1989).

Fifth edition

By the late 1980s, it was clear that the *Frascati Manual* guidelines needed to be revised to address changes in policy priorities and to obtain the data needed to inform the policy-making process. Many issues were involved, notably developments in the S&T system and our understanding of it. Some of these issues emerged in the context of the OECD's Technology-Economy Programme – TEP (*e.g.* internationalisation, software, transfer sciences, etc.). Others concerned data on environmental R&D, analytical needs for R&D data that can be integrated with other economic and industrial series, and the revisions of the international standards and classifications applied to R&D statistics in the manual.

As a result, an expert conference took place in Rome in October 1991 to discuss proposals for revisions to the *Frascati Manual*, hosted by the Italian Ministry for Universities and Scientific Research. For the first time, experts from the Eastern European countries attended. Following the conference, a draft revised version of the manual, incorporating much of the text of the supplement on higher education, was formally discussed by NESTI at its April 1992 meeting. After further revision by a small editorial group in light of the recommendations made there, the draft was adopted early in 1993 (OECD, 1994).

Sixth edition

The rationale for undertaking a fifth revision of the *Frascati Manual* (OECD, 2002) included the need to update various classifications together with an increasing need for data on R&D in the services sector, on the globalisation of

R&D and on human resources for R&D. Various benchmarking projects carried out at the time also increased the need for comparable data. NESTI took the decision to revise the *Frascati Manual* at its 1999 meeting, and various topics for revision were discussed at a special meeting in March 2000. At the meeting in 2000, 19 topics were identified for further investigation. For each of these, a small group was established, with a lead country or the OECD Secretariat in charge of the work. The groups' reports were discussed at a meeting hosted by the Italian authorities in Rome in May 2001. At the subsequent NESTI meeting in Rome, decisions were taken on the substantial revisions to be made. Proposals for changes in wording were discussed at a meeting in October 2001. The revised manual was adopted in late 2002. The sixth edition of the manual was published in both paper and electronic versions.

In this edition of the manual, an explicit effort was made to strengthen various methodological recommendations. As in the previous revisions, recommendations in the System of National Accounts (SNA) were followed as far as possible and feasible for the purposes of R&D surveys while continuing to take steps towards bringing R&D statistics closer to the SNA. These efforts were subsequently justified by the decision adopted in the 2008 SNA to adopt the Frascati definition of R&D and treat these investments as capital formation (EC et al., 2009).

The manual incorporated new sections on R&D in software, the social sciences and services, the SNA, globalisation and co-operation on R&D, as well as detailed examples on types of R&D. The guidance on R&D personnel was substantially revised, including new proposals to report data by gender and age. This edition also provided detailed recommendations on the reporting of sources of funds and of extramural expenditure. A number of recommendations adopted by Eurostat since the previous revision of the manual were integrated, and the NABS classification was adopted as the basic classification by socio-economic objective. New annexes were introduced in the sixth edition on R&D in some specific fields of interest, such as ICT, health and biotechnology. One annex containing guidelines on the regionalisation of R&D variables was added.

Key contributors to previous editions

All the editions of the manual have been prepared in co-operation between experts from Member countries and international organisations, notably UNESCO, EU and Nordforsk/the Nordic Industrial Fund, and the OECD Secretariat, especially Ms A. Young and Mr Y. Fabian (for the first four editions). Particular debts of gratitude are due to the National Science Foundation, which pioneered the systematic measurement of R&D.

Among those who must be mentioned in connection with the first edition of the manual are Dr J. Perlman, Professor C. Freeman and the French Délégation Générale à la Recherche Scientifique et Technique (DGRST).

Mr H. E. Bishop chaired the 1968 Frascati meeting, and Mr H. Stead (Statistics Canada), Mr P. Slors (Netherlands Central Bureau of Statistics) and Dr D. Murphy (Irish National Science Council) made major contributions to the second edition.

Among those who helped to prepare the third version, thanks are due to Mr K. Sanow (National Science Foundation), Mr J. Mitchell (Office of Fair Trading, United Kingdom) and Mr K. Perry (United Kingdom Central Statistical Office), as well as to Mrs K. Arnow (National Institutes of Health, United States), Chairperson of the 1973 meeting of experts, and to Mr T. Berglund (Swedish Central Statistical Office), Mr J. Sevin (DGRST) and Dr F. Snapper (Netherlands Ministry of Education and Science), who chaired discussions on special topics.

The fourth edition owed a great deal to the work of Mr H. Stead (Statistics Canada). Chairing the various expert meetings involved were Mr G. Dean (Central Statistical Office, United Kingdom) in 1978 and Mr C. Falk (National Science Foundation, United States) in 1979. The Higher Education Supplement was prepared by Ms A. FitzGerald (EOLAS – Irish Science and Technology Agency, Ireland). The section on time-budget studies drew heavily on work by Mr M. Åkerblom (Central Statistical Office of Finland). The 1985 Conference on S&T Indicators for the Higher Education Sector was chaired by Mr T. Berglund (Statistics Sweden).

The fifth edition was largely prepared by Ms A. FitzGerald (EOLAS) on the basis of work by a large number of national experts. Particular thanks are due to Mr T. Berglund (Statistics Sweden), Mr J. Bonfim (Junta Nacional de Investigaçao Cientifica e Tecnologica, Portugal), Ms M. Haworth (Department of Trade and Industry, United Kingdom), Mr A. Holbrook (Industry, Science and Technology Canada, Canada), Mr J.-F. Minder (Ministère de la Recherche et de la Technologie, France), Prof. F. Niwa (National Institute of Science and Technology Policy, Japan), Dr E. Rost (Bundesministerium für Forschung und Technologie, Germany), Mr P. Turnbull (Central Statistical Office, United Kingdom) and Mrs K. Wille-Maus (Norges Allmennvitenskaplige Forskningrad, Norway). Mr G. Sirilli (Consiglio nazionale delle ricerche, Italy) was Chairman of the Group of National Experts on Science and Technology Indicators during this period and also organised the conference held in Rome.

The sixth edition was largely prepared by Mr M. Åkerblom (Statistics Finland; OECD Secretariat for the drafting phase) on the basis of work on specific topics by a large number of national experts. Particular thanks are due to Mr D. Byars (Australian Bureau of Statistics); Ms D. Francoz (Ministère de la Recherche et de la Technologie, France); Mr C. Grenzmann (Stifterverband, Germany); Mr J. Jankowski (National Science Foundation, United States); Ms J. Morgan (ONS, United Kingdom); Mr B. Nemes (Statistics Canada); Mr A. Sundström (Statistics Sweden); Mr H. Tomizawa (NISTEP, Japan); and Ms A. Young (consultant to Statistics Canada). Mr G. Sirilli (Consiglio nazionale delle ricerche, Italy) was

NESTI Chairman during this period and also organised the conference held in Rome. The manual's sixth edition was completed under the stewardship of Mr F. Gault (Statistics Canada) as Chair of NESTI.

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