Voorburg Group Meeting, September 11-15, 1995
Voorburg, The Netherlands

INNOVATION IN SERVICE INDUSTRIES:

THE MEASUREMENT ISSUES

F.D. Gault
Services, Science and Technology Division
STATISTICS CANADA

and

W. Pattinson
Small Business and Science and Technology Section
AUSTRALIAN BUREAU OF STATISTICS

Abstract:

Current work is described on the revision of the OECD manual which provides guidance on the collection of data on the innovative activity of firms. Emphasis is given to plans to include service industries in the revised manual and members of the Voorburg Group are invited to comment on and contribute to these plans.

July 1995

1. INTRODUCTION

1. In 1994, The Voorburg Group accepted a proposal to add a module to measure innovation to its model surveys of service industries, but it deferred consideration of the questions to be used in the module to a later meeting. This outcome reflected the problems and lack of experience in measuring the activity of innovation in general and, particularly, in service industries.

2. It is the broader issue of measuring innovation in service industries that is raised here. The issue is not confined to the deliberations of the Voorburg Group as it is central to the revision of the manual used in the European Union(EU), and by the Organization of Economic Co-operation and Development(OECD), to guide the collection of information on innovation. The revision process is under the joint direction of the EU and the OECD and the intention is to produce a revised version of the 'Oslo Manual' by May, 1996.

3. One of the principal areas under consideration is the measurement of innovation in service industries and there is a 13 country Working Group reviewing the problems and preparing changes to the manual. The purpose of this paper is to invite contributions to the process by members of the Voorburg Group.

2. REVISING THE OSLO MANUAL

4. At the meeting of the OECD Committee of National Experts on Science and Technology Indicators (NESTI) in April, 1995 a decision was taken to revise the Oslo Manual[1] in light of the experience derived from conducting innovation surveys in member countries, and particularly from those participating in the Community Innovation Survey (CIS) supported by EUROSTAT. Several issues were identified for study as part of the revision and they were assigned to five Working Groups.

5. The groups and their lead countries or organizations are as follows:

Statistical Methodology	EUROSTAT
Conceptual Issues and Definitions	Norway
Services	Canada and Australia
Cost of Innovation	Germany
Other Issues	Finland.

6. Any attempt to provide guidelines on the measurement of innovation in service industries will involve issues considered by all other groups. To minimize this overlap, the Services Working Group is concentrating on what differentiates innovation in service industries from that in primary and secondary industries.

7. The schedule for revision calls for draft papers to be prepared by October 15, 1995 with final versions distributed prior to a workshop to be held in February 1996 to prepare a draft of the revised Oslo Manual.

3. REVISING THE EU/OECD QUESTIONNAIRE

8. In 1992, after the release of the Oslo Manual, the EU and the OECD agreed upon a common questionnaire for the measurement of innovation[2]. There is now considerable experience in using the questionnaire and this will be drawn upon in the revision of the questions which will be used in the next round of the CIS. To tie the Manual and the questionnaire more closely together than they were in 1992, the new questionnaire will be an appendix of the revised Manual, with the manual providing all of the necessary concepts, definitions and statistical methods to conduct a survey of innovation.

9. The significance of this is that changes to the existing manual will have a direct impact upon the questionnaire and upon the next generation of surveys. This will, in turn, have an impact on the data collected and on the international comparability of the resulting information.

4. MEASURING INNOVATION IN SERVICE INDUSTRIES: SOME ISSUES

10. To measure innovation, there must be a definition which can understood by respondents to surveys and which supports useful analysis of the resulting data. Classification systems are required for industries and for the commodities produced by the industries. In surveying firms, a decision must be taken about the unit of observation, whether it is the firm itself, or a production unit within the firm. Finally, there is the question of linkage and how innovative firms interact with other firms in the same industry, with firms in other industries, and with other sectors of the economy, such as government and higher education. It is this last question that leads to measures of the system of innovation, as well as the characteristics of innovative firms.

11. In 1994, the Voorburg Group accepted a proposal[3] to a add a module to measure innovation to its model surveys. In order to develop that module, members of the Voorburg Group are now invited to consider their response to the measurement issues which follow, and to contribute any other issues which, in their view, have not been identified. Contributions should reach the authors by mid-October, 1995.

4.1 Definitions of Innovation

12. The meaning of innovation varies. It can range from the first commercial use of an invention to the introduction of a new or improved product or process. Schumpeter [4] proposes five types of innovation: the introduction of a new good; the introduction of a new method of production; opening a new market; conquering a new source of supply; and, the reorganization of an industry. The present version of the Oslo Manual [1] deals only with the first two, modified to include significant technological change.

4.1.1 Product and Process Innovation

13. The Oslo Manual definition of technological innovation is the following.

> **Technological innovations** comprise new products and processes and significant technological changes of products and processes. An innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). Innovations therefore involve a series of scientific, technological and organizational, financial and commercial activities.
>
> Oslo Manual, paragraph 90.(OM90)

14. The Manual defines product and process innovation and distinguishes between a major product innovation and an incremental product innovation. The definitions of a major product innovation and of a process innovation are the following.

> **Major product innovation** is a product whose intended use, performance characteristics, attributes, design properties or use of materials and components differs significantly compared with previous manufactured products. Such innovations can involve radically new technologies, or can be based on combining existing technologies in new uses.
>
> OM93
>
> **Process innovation** is the adoption of new or significantly improved production methods. These methods may involve changes in equipment or production organization or both. The methods may be intended to produce new or improved products, which cannot be produced using conventional plants or production methods, or essentially to increase the production efficiency of existing products.
>
> OM97

15. The current definitions in the Manual apply more readily to manufacturing of goods than to the production of services, and they emphasize technological change, although organizational change of the means of production is accepted as a process innovation. This emphasis on goods and technologies must be overcome if the definitions are to apply to innovation in service industries.

16. EUROSTAT has initiated a pilot survey of innovation in service industries as part of its preparation for the next harmonized innovation survey in the EU. In the model questionnaire for service industries, tested by Germany and the Netherlands, the following definitions of innovation, and of product and process innovations, were adapted for services.

> **Innovations** in the service sectors comprise new services and new ways of producing or delivering services as well as significant changes in services or their production of delivering. An innovation has been implemented if it has been introduced to the market (product innovation) or used in producing services (process innovation).
>
> **Product innovations** are services whose intended use or performance characteristics differ significantly from those already produced. Innovations should be results of the use of new or new combinations of technologies or other substantive investments in new knowledge.
>
> **Process innovations** are new or significantly improved ways of producing or delivering services.

17. These definitions are more applicable in the measurement of service industry innovation and they provide less emphasis on technology and add knowledge as a factor in production. They are being tested through interviews and the results of the tests will contribute to the final version of the definitions.

Some Questions on Product and Process Innovation

18. Can the basic definitions of product and process innovation be written in such a way as to apply to all industries or is it better to have separate definitions for different parts of the economy?

19. The Oslo Manual (OM89-OM97) distinguishes between product and process innovation and between major product innovation and incremental product innovation. Are any of these distinctions appropriate for service industries?

20. The Oslo Manual provides a classification of innovative activities (OM107-OM109) which are part of product and process innovation. They are the following: R&D; manufacturing start-up, marketing for new products; acquisition of disembodied technology; and, acquisition of embodied technology and design. How should these activities be changed for the service sector?

21. Organizational change, as an innovation, can be accommodated within the present definitions in the Oslo Manual, so long as it is linked directly to the commercialization of a product, or inclusion in a process. Other organizational changes, such as the changes in the accounts department, or the introduction of a new strategic vision for the firm, are not included. The Australian Bureau of Statistics has recently included such other organizational change in a survey of innovative activity and has suggested that other organizational changes be included in the revised manual[5]. What is the appropriate treatment for the service sector?

4.1.2 Market Development

22. Market development as an innovation is excluded by the Oslo Manual. Should it be included in the revision?

4.1.3 Inputs and Reorganization of the Industry

23. As far as service industries are concerned the conquering of a new source of supply has not been seen as a major concern and the reorganization of the industry through, for example, the creation of monopolies, or their destruction through anti-trust legislation, may not be appropriate for statistical analysis.

24. Should the revised manual take account of either of these activities when dealing with service industries?

4.2 Industrial Classification, Scope and Coverage

25. The Oslo Manual addresses the business enterprise sector of the economy and does not cover government, health and education, even though innovation, especially innovation in services, could take place in these areas. Within the business enterprise sector, service industries are not covered. (OM84)

26. Service industries are to be included in the revised manual. How comprehensive should this inclusion be?

27. The experience gained through the CIS and other innovation surveys has been in measuring innovation in the private sector. Should the revised manual be limited to guidelines for measuring innovation in private sector service firms or should it include the public sector, as the Frascati Manual [6] does for research and development?

28. The International Standard Industrial Classification[7], ISIC.rev3, has 11 sections devoted to services.

G Wholesale and Retail Trade
H Hotels and Restaurants
I Transport, Storage and Communication
J Financial Intermediation
K Real Estate, Renting and Business Activities
L Public Administration and Defence; Compulsory Social Security
M Education
N Health and Social Work
O Other Community, Social and Personal Service Activities
P Private Households and Employed Persons
Q Extra-Territorial Organizations and Bodies

29. Sections G-K and possibly O are in scope for a the measurement of innovation in marketed services firms. However, there are service industries classified to other sections of ISIC.rev3, such as A (Agriculture, Hunting and Forestry), B (Fishing) and F (Construction).

30. Once a decision is taken on coverage of service industries, should there be guidance be given in the revised manual on the service industries of most importance in their innovative activity?

31. Within industries, the propensity to innovate varies with size of the firm [8]. Should there be guidance on size classification and on the smallest classification to be included in surveys of service industries?

32. Finally, there is a question of frequency of measurement. The present recommendation is every three years (OM266), while recognizing that annual measures would be preferable (OM265). Should the recommendation be changed? If it is kept, what criteria should be adopted to distinguish innovative firms which come into existence in the three year period from new firms which are not innovative?

4.3 Product Classification

33. The use of a product classification in the measurement of innovation is not covered in the Oslo Manual. However, it may concern the Voorburg Group as part of its purpose is to develop the Central Product Classification (CPC) for services.

34. Product innovations will not appear in any classification if they are truly innovative, but their rate of creation will influence the rate of revision of the CPC for a particular industry. A process innovation may alter the cost of products, or the speed with which they can be produced, and these changes will be reflected in changes in the relative importance of the products produced.

35. The number of new products introduced as a percentage of products classified to an industry, or the revenue from new products as a percentage of total revenue from an industry could provide indicators of the relative dynamism of service industries.

36. Should there be reference to product classification in the revised manual?

4.4 Statistical Unit

37. In measuring innovation there are at least two units of observation: the innovation; and, the firm.

38. In the first case, information is collected about actual innovations and their characteristics, such as their success, costs, barriers to development, and sources of ideas and technologies. The Australian [5] survey collected data about the most significant innovation of the firm over a three year period and this was successful.

39. The Oslo Manual recommends that the firm be the unit of observation (OM88) and that the questions be directed at establishing the characteristics of the firm. In sample surveys, these characteristics can be used to estimate the characteristics of firms in the industry and comparisons can be made between those firms which are innovative and those which are not.

40. In the EU/OECD Questionnaire, it may be appropriate to consider which approach is appropriate for capturing the best information and, in the case of questions addressed to the firm, there is a question of whether the appropriate statistical unit is a group of companies under common ownership, the individual firm, or a production unit within the firm.

4.5 Measuring the System

41. Innovation does not take place in isolation. Firms interact with other firms in the same and other industries, with governments, with the higher education and health sectors. The multinational firms have links throughout the world.

42. A current preoccupation of students of the industrialized economies is how the national systems of innovation differ and, where they differ, how they could be improved as a means of capturing and creating ideas and converting them into jobs, wealth and quality of life. Measuring the innovative characteristics of firms is but one step in understanding the system of innovation and there is a need for guidelines on measuring the entire system in a way that admits international comparability. Should this be addressed in the revised manual?

4.6 Guide to the Questions Posed

43. Thirteen questions have been posed in this Section. Here, the paragraph numbers and the headings of the sub-sections are listed to facilitate response.

4.1 Definition of Innovation

4.1.1 Product and Process Innovation
18-21

4.1.2 Market Development
22

5. CONCLUSION

44. This paper has outlined the process being followed for the revision of the Oslo Manual and it has invited contributions from the members of the Voorburg Group to that part of the revision concerned with the inclusion of service industries. The revised manual will include the next version of the CIS questionnaire and the Voorburg Group may wish to review that questionnaire before deciding on questions to add to the module on measuring of innovation in service industries which it approved in 1994.

REFERENCES

1. OECD Proposed Guidelines for Collecting and Interpreting Technological Innovation Data, OECD/GD(92)26, Paris (1992).

2. EC Harmonized Innovation Surveys 1992/1993: Final Questionnaire, Commission of the European Communities, Directorate-General XIII, Luxembourg (1992).

3. F.D. Gault and W. Pattinson, Model Surveys of Service Industries: The Need to measure Innovation, Proceedings of the Voorburg Group Meeting, Sydney, Australia (1994).

4. J. Schumpeter, The Theory of Economic Development, Harvard University Press, Cambridge, Mass (1934).

5. Innovation in Industry Pilot Survey, Working Paper, Australian Bureau of Statistics, Catalogue No. 8116.0.00.001, Belconnen (February 1994).

6. Proposed Standard Practice for Surveys of Research and Experimental Development: The Frascati Manual 1993, OECD, Paris, 1994.

7. International Standard Classification of All Economic Activity, Statistical Papers Series M. No. 4, Rev. 3, United Nations, New York (1990).

8. W. Pattinson, J. Ovington and E. Finlay, Innovation in Selected Australian Industries - 1994, Australian Bureau of Statistics, Belconnen (August 1995).