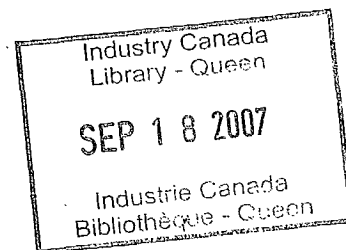


## Surveying Innovation in Service Industries: A Literature Review

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The service sector now accounts for more than 75% of GDP (Statistics Canada, 2000 data), and more than 11 million (or 74%) (Statistics Canada, 2001 data) Canadians are employed in this sector, yet our understanding of innovation processes, and firms' behaviour with respect to innovation in services remains poor. Innovation in services is characterised by properties that are different from those of other activities. For example, innovation is rarely organized through R&D departments but very frequently conducted on a project-specific basis.

In 1997, Statistics Canada released its first survey of innovation in selected service industries: *Survey of Innovation, 1996* (industries selected were communications firms, banks and trust companies, and life insurers). It has contributed significantly to our understanding of the innovation process in these particular industries. However, this survey was only a first step towards a better understanding of the service industries in Canada. There are important ongoing changes in the nature of services as well as in the innovation taking place in services. Industry Canada and Statistics Canada have agreed to conduct a second survey of innovation in service industries in the near future to increase our knowledge of these industries.

The aim of this literature review is to provide some insights on what should be the appropriate definition of innovation for the service industries, which selected service industries should be surveyed, and what information is needed on innovation for these particular industries in order to facilitate the questionnaire design of this new Statistics Canada's survey.

### Definition of innovation

Attempts are now being made in several countries to adapt the definition of innovation used for manufacturing industries to service industries. As pointed out by Djellal and Galloway (2000), the Oslo Manual definition of innovation is limited as it takes only into account technological process and product innovation. Various difficulties emerge when attempts are made to apply such a concept of innovation to services. First, the distinction between product and process innovation may prove difficult to apply. Secondly, innovation in services can be realised without recourse to technology, particularly organisational innovation, which may have a direct impact on the nature of the service and seems to play a very important role in this type of activity.

Tether and Miles (2000), in examining the European innovation survey, recommend that a wide variety of innovative actions be asked in innovation surveys for the service industries, not just technological innovation. They propose to consider product innovation, service innovation, process innovation, delivery and client interface innovation, and organisational innovation.

However, Guellec and Pattinson (2001) point out that the breadth of the service sector is so wide that it is likely that different concepts and understanding will often be applied. Given the heterogeneity of the service sector, it is not clear that applying the same definition to all industries will deliver comparable cross-industry results.

Djellal and Gallouj (2000) have identified two national innovation surveys that have taken into account, to some extent, the specificities of innovation in services. The 1995 German survey identifies three types of innovation: product, process and organisational innovations. The 1997 French survey, for its part, identifies four types of innovation: product-service innovation, defined broadly enough to encompass tangible and "intangible" products; process innovation; organisational innovation; and external relational innovation, defined as the establishment of particular relationships with a firm's partners (customers, suppliers, public authorities or competitors). Furthermore, in order to be able to encompass certain innovations that fall outside the preceding typology, the French survey makes attempt to deal with specific modes of innovation such as: ad hoc innovation, custom-made innovation, architectural innovation, and formalisation innovation.

The Voorburg group has engaged in some thinking on ways of amending the Oslo Manual to take better account of innovation in services (see Nielsen *et al*, 2001 for more details on the Voorburg group). Following these suggestions, Statistics Canada eliminated the reference to technology and introduced organisational changes in its definition of innovation in its 1996 Innovation Survey.

Another concern with respect to the definition of innovation in the service industries is the reference period used in the definition of innovation. The definition of innovation based on the Oslo Manual covers innovative activities undertaken in a three-year period. As stated by Guellec and Pattinson (2001), the three-year time frame was set in the first version of the Oslo Manual primarily because of the long period that sometimes elapsed before large manufacturing product or process innovations could be brought to the market or implemented into some large-scale manufacturing plant. While a three-year period has the advantage of ensuring that such innovations fall within the definition, it is likely that it is also bringing with it many other technological innovations that are much smaller.

These authors argue that a shorter time period is intuitively better for the measurement of innovation in the service sector, which appears to undergo a fairly high turnover of firms.

### Industries to be surveyed

Service industries encompass a large variety of activities. Annex 1 gives a list of service industries as defined by Industry Canada on Strategis. Almost all service industries exhibited strong growth in recent years<sup>1</sup>. According to the Service Industries Branch, Industry Canada, the service sector is divided into 3 categories: "producer services" include transportation and storage, communications, wholesale trade, finance, insurance and real estate, and business services; "consumer services" include retail trade, accommodation, food and beverage service industries; "government or non-

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<sup>1</sup> Source: Service Industries Branch, Industry Canada, based on Statistics Canada's data.

market services" include government services, education, and health and social services. However, "producer services" are predominant in the Canadian economy in terms of share of GDP compared with the two other types of service mentioned above, and are growing at a much faster rate than other services. Among this category, transportation, communications and business services are some of the more technology intensive service industries.

The 1996 Survey of Innovation conducted by Statistics Canada targeted communications firms, banks and trust companies, as well as life insurers. The European Innovation Survey on service industries (CIS-2) also targeted "producer services" with wholesale trade, transportation (excluding ancillary transport services such as travel agents), computer services, telecommunications (excluding postal services), and technical services (excluding all "other business services").

Given the fact that "producer services" are predominant in the Canadian economy, we may wish to expand our coverage of these particular service industries in the next Statistics Canada's survey. In analysing the CIS-2 results on service industries, Tether and Miles (2000) argue that, given that some sectors were only partially included, this means less than half of "producer services" (weighted by employment) were included in the European survey. They recommend expanding the coverage of "producer services" to better assess innovation in the service industries. They also recommend investigating the nature of innovation in non-market services such as education and health. However, this should be undertaken in an other (and adapted) survey.

#### Size threshold

Firms in service industries are usually small firms with very few employees. For example, more than two-thirds of the self-employed work in the service sector. The incidence of self-employment is notably high in business services, with self-employment accounting for 32% of employment<sup>2</sup>.

There seem to be considerable difficulties with surveying very small enterprises. The 1996 Survey of Innovation, Statistics Canada includes only enterprises with 20 or more employees. The European CIS-2 only includes enterprises with 10 or more employees. According to Tether and Miles (2000), this size threshold for the CIS-2 excludes almost 95% of service enterprises in the European Union and 40% of employment in "producer services". Therefore, this presents a serious limitation of the innovation survey in the service industries. These authors have suggested to Eurostat to reduce the size threshold of service enterprises in future surveys to take into account firms with 5 or more employees. Discussions should also be undertaken with Statistics Canada to see whether it is possible to reduce the size threshold in the next innovation survey on service industries.

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<sup>2</sup> Source: Service Industries Branch, Industry Canada, based on Statistics Canada's data.

### Questionnaire Design

Tether and Miles (2000) recommend some changes to the European innovation survey (CIS-2) questionnaire to increase its usefulness, both from an analytical and a policy perspective. These recommendations could be taken into account in the design of the innovation survey questionnaire for the service industries in Canada. First, these authors argue that the relevance of the questions on sources of information, collaborations, etc., would be much more informative if focussed on a particular innovation. For example, they report that among large enterprises which have introduced numerous innovations, a large number of information sources are usually identified as "relevant" or even "very important", quite possibly because different types of innovation have been introduced which depended on different sources of information. They therefore suggest that the survey ask about these matters in relation to the enterprise's single *most important innovation*.

However, Anderson (2001) points out that "many of the goals of an innovator in services concern increasing the flexibility, speed or reliability of a product, perhaps in terms of delivery or logistics, or improving the long-term relationship between the firm and its customers or providers; that is, the purpose may be to provide a better package for an activity as a whole. This implies that it may often not be possible to gauge the effects on an individual product; rather the innovation needs to be studied in the context of a much broader package and with a view to the nature of what is being achieved."

Tether and Miles (2000) also argue that innovation surveys often do not contextualise the innovative activities undertaken by the enterprise. They argue it is only by understanding the context of innovation that analysts can properly understand the innovative activities of the enterprise, and from this derive policy conclusions which take account of the diversity of behaviour amongst enterprises.

They suggest that innovative activities be contextualised in at least two dimensions: (1) the enterprise's current position vis-à-vis its principal competitors and with respect to customer requirements; (2) the enterprise's strategic intent, i.e. what is the management's ambition for the enterprises in the context of its current position vis-à-vis its competitors and customer requirements.

Third, they propose that a series of questions be asked about the use of different information technologies and how this is affecting the enterprise in terms of the products and services it provides, as well as the process and organisation of production. They argue that information technologies are having a major impact on service sector activities and the relationship between IT and firm's innovation performance is an important issue for policy makers.

Fourth, Tether and Miles (2000) stress that we need to know more about the nature of service employment and the changing skills requirements of service employers since the "human element" of services is at the heart of the innovation process. They propose that a series of questions be asked about the structure of employment by skills, how these are likely to change due to innovation, and the difficulties experienced in relation to recruiting labour with suitable skills.

Finally, Mohnen and Rosa (1999) offer a detailed analysis on barriers to innovation in the service

industries based on question #34 of the 1996 Innovation Survey conducted by Statistics Canada. Among other results, they note that the sign and magnitude of correlations between obstacles are a function of their proximity in the questionnaire. Their study points to intra-group complementarities, the groups being those defined in the survey questionnaire. They also find complementarities between impediments related with costs and risks, and between problems of internal and external governance. This means that solving one of these obstacles will probably require a solution to its complementary obstacle. They propose that if certain questions are in fact responded in the same way, it might be possible to eliminate some of them to simplify the questionnaire. Also with respect to barriers to innovation, Tourigny and Le (2002) have found that the impediments listed in innovation surveys seem to capture respondent's awareness of obstacles to innovation rather than the actual impact of the different obstacles in preventing or slowing down innovation. However, more analysis need to be done on this issue in order to better design the question on obstacles to innovation in future surveys.

**Bibliography**

Andersson, T., 2001, Chapter 7, Summary of the Issues, Innovation and Productivity in Services, OECD: pp. 147-153.

Djellal, F. and Gallouj, F., 2000; *Innovation Surveys for Service Industries: a Review*, in Innovation and Enterprise Creation: Statistics and Indicators, European Commission, Innovation papers no 18: pp.70- 76.

Guellec, D. and Pattinson, B., 2001, Innovation Surveys: Lessons From OECD Countries' Experience, OECD, STI Review no. 27: pp. 77-101.

Howells, J., 2000, *The Nature of Innovation in Services*, report presented to the OECD "Innovation and Productivity in Services Workshop" 31 October- 3 November 2000, Sydney, Australia.

Mohnen, Pierre and Julio Rosa, 1999, Barriers to Innovation in Services Industries in Canada, Cat. No.88F0017MIE99007, Statistics Canada. Ottawa, Canada.

Nielsen, P., Meguerdichian, A., Riccardini, F., Roussel, P., 2001, *Proposal for the future work of the Voorburg Group on services statistics for 2002-2004*, draft version from the XVth meeting in Sweden in 2001.

Tether, B. and Miles, I., 2000, *Surveying Innovation in Services. Measurement and Policy Interpretation Issues*, in Innovation and Enterprise Creation: Statistics and Indicators, European Commission, Innovation papers no 18: pp.77- 87.

Tourigny, D. and Le, Can D., 2002, *Impediments to Innovation Faced by Canadian Manufacturing Firms*, paper presented at Statistics Canada's 2002 Economics Conference, Ottawa, May 2002

**APPENDIX**

Industry Canada, in *Strategis*, lists the following as service industries:

accounting services;  
advertising;  
architectural services;  
commercial education and training;  
construction contracting;  
consulting engineering;  
customs brokers;  
design;  
developers;  
electric power services;  
electronic commerce;  
environmental industry;  
franchising;  
geomatics;  
health services;  
information services;  
legal services;  
logistics;  
management consulting;  
marketing services;  
new media industries;  
railway companies;  
retail trade;  
retail, Internet;  
retail, non-store;  
security, industrial;  
software;  
supply chain management;  
trading houses;  
translation services;  
trucking services;  
urban planning;  
warehousing;  
wholesale.