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Innovation surveys for service industries: a review

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Abstract :

Having been ignored for a long time, innovation in services is now the object of institutional surveys at both the national and international level. The aim of the present article is to review these surveys, which divide up into groups reflecting a range of different theoretical approaches to innovation. It also attempts to examine the methodological limits of these studies, and in particular to highlight the difficulties of comparison that they entail.

Innovation surveys for service industries: a review [1]

(Conference "Innovation and Entreprise Creation : Statistics and Indicators", European Commission, Eurostat, Valbonne, 23-24 November 2000)

Faridah Djellal, Faïz Gallouj [2]

Qualitative studies of innovation in services have proliferated in recent years (cf. Miles et al., 1995; C. and F. Gallouj, 1996, Sundbo, 1998; the EC SI4S project). The effect of these studies was to confound the notion that services are resistant to innovation and to highlight the specificities of innovation in services. In view of the importance of the service sector in our economies, an attempt to verify the statistical validity of the qualitative findings and their possible generalisation is undoubtedly a legitimate exercise. However, it is one that has proved extremely difficult to realise. It leads to often contradictory results that are a major headache to analyse.

This paper has several objectives: to take an inventory of the various surveys devoted to innovation in services, to examine their main methodological limitations, to highlight a certain number of paradoxes and contradictions arising out of the implementation of these surveys, and last, to attempt to answer the following question: should the survey method be abandoned as a means of apprehending innovation in services?

1. The various surveys of innovation in services

The early surveys wholly ignored innovation in services. They focused exclusively on (technological) innovation in manufacturing industry. Little by little, services were drawn into the purview of these studies of manufacturing industry (*subordination*). This subordination manifested itself in an exclusive concentration on technological innovation. Thus the questionnaires designed for use in manufacturing firms were also used in service firms. Attempts are now being made in several countries to design studies that are specific to services (*autonomy*), i.e. to adapt definitions, indicators and data-gathering and processing procedures to this area of economic activity.

1.1 "Subordinate" surveys

The first type of surveys that we describe as "subordinate" (cf. Table 1) confine themselves essentially to applying to services definitions and questionnaires intended for manufacturing activities. They are concerned solely with technological innovation.

a) Several of them place R&D at the heart of their analysis (of innovation) and take their definitions from the OECD's Frascati Manual. The initial hypothesis underlying the compilation of this manual is the notion that R&D is the main source and indicator of innovation and that it is actualised by clearly identifiable specialists. Thus the indicators in the Frascati Manual have contributed to the underestimation of innovation in services, since innovation in this type of activity is not necessarily technological and can be, and often is, realised without any prior R&D. R&D (and consequently innovation) is also underestimated, since it is seldom carried out in a designated R&D department.

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[1] For more details see Djellal and Gallouj (1999), Services and the search for relevant innovation indicators : a review of national and international surveys, *Science and Public Policy*, Vol. 26, n°4.

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Rather, it is usually diffuse, multilocational and linked to innovation projects implemented by flexible, temporary project groups.

b) However, the majority of surveys in this first group draw primarily on the Oslo Manual. The shift from the Frascati Manual to the Oslo Manual reflects the substitution of an interactive concept of innovation for a linear, Taylorist conception. Innovation is here conceived of as a collective process in which, at various points in time and by means of links of variable length and frequency, various chains (research, accumulated knowledge, innovation) are articulated (Kline and Rosenberg, 1986).

The guidelines proposed by the Oslo Manual (in the 1992 edition) are reductive in various respects:
- They take account only of manufacturing activities.
- They take account only of *technological* process and product innovation. The Oslo Manual excludes organisational innovations (except those linked to process innovations). Various difficulties emerge when attempts are made to apply such a concept of innovation to services. Firstly, 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.

The Dutch survey carried out in 1993-1994 occupies a particular position in this first group (cf. table 1). It is based on a slightly modified version of the questionnaire used in the first EC innovation survey. Whereas the questionnaire designed for use in manufacturing industry defines innovation as "the development or the introduction of new or technologically improved products or services", the word *technologically* is missing from the questionnaire intended for service firms. Despite this semantic precaution, which reveals an awareness of the fact that innovation in services is not necessarily technological, we classify this survey among "subordinate" surveys on different grounds:
- This "extended" general definition is rapidly called into question by supplementary definitions that are narrower in scope, such as the following: "innovation can be: the use of a new or improved *technology* (designed by you or by others) or an original application of an existing *technology*".
- The examples of innovation listed in the questionnaire are, without exception, technological to varying degrees.
- Organisational innovations are explicitly excluded.

c) The set of national surveys recently carried out as part of the second Community Innovation Survey (CIS-2) also belong to this "subordinate" group of service innovation surveys. These surveys are based upon the 1997 revised version of the Oslo Manual. In the revised version, the concern with services is manifested in three main changes: the introduction of a paragraph stating that the "the term "product" is used to cover both goods and services", a warning about the difficulty of distinguishing, in some cases, between product and process innovations and the introduction of a box listing some examples of innovation in services. As we will see (§ 1.2), paradoxically, the pilot surveys carried out in order to revise the Oslo Manual and to prepare the CIS-2 rather belong to the "autonomous" surveys group.

Institutions, actors, counties concerned	**Year of commencement o periodicity** ***Period or year covered***	**Population size : (PS) Sample size(SS), Response rate (RR)**	**Sectors involved**
Dutch Ministry of Economic Affairs	1989 *1988*	PS : 7500 (half = service sector) SS : 4352, RR : 58,1%	Manufacturing and service sectors as a whole
Dutch Ministry of Economic Affairs. Extension to services of CIS : pilot survey	1993-1994 *1990-1992*		Public utilities, building, retailing and wholesale, hotels, restaurants, transport, communication, bank, insurance, other commercial services, other non commercial services
National research council	March-July 1995	9 interviews	Banking and financial services, insurance, waste disposal, power supply, telecommunications, market research

Austria (CIS-2)	*1994-96 or 1996*	SS: 1003 RR : 39%	CIS-2 sectors : Wholesale trade and commission trade, Transport and telecommunications, Financial intermediation, Computer and related activities-Engineering services
Belgium (CIS-2)	*Id.*	SS : 1394, RR : 65%	CIS-2 sectors
Denmark (CIS-2)	*Id.*	SS : 1073, RR : 28%	CIS-2 sectors
Finland (CIS-2)	*Id.*	SS: 964, RR : 71%	CIS-2 sectors
France (SESSI, INSEE) (CIS-2)	1997 *id.*	PS : 500, RR : 54%, PS : 3000, RR : 85%	- Banking and insurance - Transport, Telecommunication, engineering and IT services
Germany (CIS-2)	*Id.*	SS: 5951, RR: 22%	CIS-2 sectors
Greece (CIS-2)	*1995-97 or 1997*	SS : 1000	-
Iceland (CIS-2)	*Id.*	SS: 300, RR: 60%	Transport and telecommunications Real Estate, Renting and Business activities
Ireland (CIS-2)	*1994-96 or 1996*	SS: 967, RR: 29%	CIS-2 sectors
Italy (CIS-2)	November 1996 February 1997 *1993-1995*	SS : 6005, RR:29%	Market services : Wholesale and retail trade, Transport, storage and communication, Financial intermediation, Real Estate, Renting and Business activities
Luxembourg (CIS-2)	*1994-96 or 1996*	SS: 238, RR : 81%	CIS-2 sectors
Netherlands (CIS-2)	*Id.*	SS: 3590, RR: 74%	CIS-2 sectors + others
Norway (CIS-2)	*1995-97 or 1997*	SS: 1102, RR: 90%	CIS-2 sectors + others
Portugal (CIS-2)	*Id.*	SS: 2469, RR: 72%	CIS-2 sectors
Sweden (CIS-2)	*1994-96 or 1996*	SS: 1108, RR: 72%	CIS-2 sectors + others
United Kingd. (CIS-2)	*Id.*	SS: 2114, RR:36%	CIS-2 sectors + others
Innovation Research Center, Hungary	30 march 1999 15 June 1999 *1998*	SS: 1000 RR: 25%	Financial intermediation, Wholesale and retail trade (excluding motor vehicle repair), Communications and related activities, Research and Development, Engineering and other technical activities (excluding architectural activities)
Consejo Nacional de Ciencia y Tecnologia, Mexico	mid June 1997 mid august 1997 *1994-96 or 1996*	SS: 205 RR: 87%	Telecommunications Financial intermediation Computer and related activities
Federal Office for Economic Devlpt and employment (Switzerland)	*1994-96 or 1996*	SS: 2200 RR: 32%	Private services
State Institute of Statistics (Turkey)	May1998-August 1998 *1995-97 or 1997*	SS: 1224 RR:40%	Telecommunications, Financial intermediation, computer and related activities
INSEE (French statistic Office), France	1997 *Comparison 1997 –1994*	PS : 1616 RR : 76%	Accountancy firms

Table 1 : The "subordinate" surveys

1.2 The "autonomous" surveys

These various surveys all share a desire to take account, to some extent, of *the specificities of innovation in services*. They do not confine themselves to compiling inventories of technological innovation, but seek, in their various ways, to take other aspects of innovation into account.

This group of surveys can be divided into two subgroups:

a) *National surveys*. We will limit ourselves to two examples in order to illustrate the relatively extensive definitions of innovations used: the 1995 Germany survey (Hipp et al., 1996) and the 1997 French survey (Djellal and Gallouj, 1998). The German survey identifies three types of innovation: product, process and organisational innovations. In the first two categories, account is also taken of technological intensity and degree of novelty. 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, again defined in such a way as to include technical systems and more intangible processes; (internal) organisational innovation; 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, formalisation innovation (Gallouj, Weinstein, 1997).

b) *Experimental mini-surveys*. The Voorburg group has engaged in some interesting thinking on ways of amending the Oslo Manual in such a way as to take better account of innovation in services. As part of its deliberations, the Australian and Canadian statistical services have suggested, using a broad definition of innovation that eliminates all references to technology and introduces types of innovation not taken into account by the Oslo Manual (cf. table 2).

The various pilot surveys on innovation in services launched by Eurostat (and with which The Netherlands, Germany and Italy were entrusted) are based on the following definitions : (Gault and Pattinson, 1995):
- Innovations in the service sector comprises new services and new ways of producing or delivering services as well as significant changes in services or their production or 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 of other substantive investments in *new knowledge*.
- Process innovations are new or significantly improved ways of producing or *delivering* services.

These definitions of innovation give rise to the following observations:
- They do not view innovation solely from the point of view of its technological characteristics. Only the definition of product innovation contains an explicit reference to the technological aspect. Further, the introduction of the notion of knowledge considerably extends this definition of innovation.
- They maintain the distinction between product and process innovation and introduce a new, subtle distinction, namely innovation in "delivery".
- They do not take organisational innovation into account.

Institutions, actors, countries concerned	**Year of commencement or periodicity** ***Period or year covered***	**Population size: (PS) Sample size (SS), Response rate (RR)**	**Definition of innovation**
Australian Bureau of Statistics	1994 *1st July 1993-30 June 1994*		Oslo manual, important adaptations in order to take account of different types of nontechnological innovations (organisational innovations, new advanced management techniques, substantially new corporate directions or strategies).
Statistics Canada, Results not published to our knowledge	1994		Idem
Swiss pilot survey, carried out by ETH for Bundesamt für Konjonkturfragen	1994	SS : 77 firms	
Statistics Netherlands for Eurostat, Pilot survey	1995	13 interviews	
ZEW et Stifterverband, Germany for Eurostat., Pilot survey	1995	20 interviews	
Statistics Sweden for Eurostat, Pilot survey	29 April-7 June 1996	20 interviews	
ZEW; FhG-ISI and Infas Survey commissioned by BMBF	1995 *1993-1995*	PS : 11 000 firms SS : 3000 firms RR : 27%	Oslo manual definitions adapted : enlarged definition of innovation (open question in order to let the firm representative decide), distinction product/process, technology just one of the possible characteristics of products and processes, organisational innovation
ZEW ; FhG-ISI and Infas. Survey commissioned by BMBF	1997 *1994-1996*	PS : 11 000 SS : 2500 RR : 23%	idem
DIW, Deutsches Institut für Wirtschaftsforschung	1996	TE : 775 firms	Frascati and Oslo manuals adapted. Introduction of organisational innovations. Enlarged definition of R-D. This survey is devoted to innovation in services in Berlin only.
France, EC DG XII (SI4S project)	June 1997-october 1997 *1992-1997*	PS: 3500 firms SS : 324 firms RR : 10%	Large definitions taking non technological dimensions into account Product, process, organisation and external relationship innovations. But also tailor made, association, dissociation innovations.

DTI Denmark, 1997, EC DG XII (SI4S project)	1997 *1993-1997*	SS = 637 firms	Large definitions taking non technological dimensions into account Product, process, organisation and external relationship innovations.
Australian Bureau of Statistics	Mid-August 97-End Sept 97 *1-7-94 to 30-6-97*	SS: 2600 RR: 95%	Oslo Manual (1997) + organisational and managerial innovations
Statistics Canada	February 97 End May 97 *1994-96 or 1996*	SS: 6150 RR: 88%	Oslo Manual (1997) + organisational changes

Table 2 : The "autonomous" surveys

2. Some difficulties of comparison and some paradoxes

Most of the questions relating to the nature of innovation produce such widely divergent responses that the validity of any comparative analysis seems to be seriously compromised. We will restrict ourselves here to examining the following three areas: R&D, the relative frequency of the various types of innovation and comparisons between manufacturing and services.

2.1 R&D

a) The estimates produced by OECD (according to Gault, 1995) show that, in the USA in 1992, service activities accounted for almost 25% of all R&D carried out in firms, compared with only a little more than 4% ten years earlier, in 1982.

Should it be concluded from this that investment in R&D carried out in firms increased sixfold over ten years? Our response to this question is as follows. 1) While R&D activities in service firms have indeed increased, it is perhaps not solely because of the increased investment in R&D and 2) it is likely that this increase is actually considerably greater than the figures given above.

In fact, there has not necessarily been any increase in R&D activity, but rather an improvement in our perception of it, i.e. in the sharpness of our analytical apparatus: changes in the definition of R&D, institutional changes affecting the statistical classifications and nomenclatures for manufacturing and service activities and changes in the categories to which given activities are allocated (e.g., the R&D department in a large manufacturing firm, now regarded as a service provider).

However, it may also be the case that even this degree of acuity is inadequate. The definition of R&D used in most of the surveys seldom takes into account R&D in human and social sciences which seems to play a relatively important role in services. Further, this definition of R&D fails to take account of the role of consultants in the course of some of their clients' innovation processes. And, despite a certain amount of progress, it still fails to take sufficient account of certain aspects of software development. Finally, it should be noted that R&D in services is frequently "diffuse", in that it seldom takes place in R&D departments but is often devolved to flexible project groups.

b) There can be contradictions even among surveys conducted in the same country. Thus according to the 1993-94 Dutch survey, 25.1% of manufacturing firms engaged in some R&D activity in 1992 (in-house or subcontracted), compared with 8.1% of service firms. On the basis of the 1989 survey, however, Kleinknecht and Reijnen (1991) show that the number of firms engaged in R&D activities is virtually the same in manufacturing and in services. These authors also note that there are many more firms with fewer than 20 employees engaged in R&D in the service sector than in manufacturing. More generally, it would seem that R&D is underestimated in small firms. According to the 1993-94 innovation survey, the share of small firms engaged in R&D activities is significantly greater than the R&D surveys carried out by the Dutch statistical service would suggest.

2.2 Intersectoral comparisons

One conclusion emerges, implicitly or explicitly, from many of the surveys, particularly from those of the "subordinate" type, namely that *manufacturing industry is said to be more innovative than services*. This conclusion is an ambiguous one, since it applies only to technological innovation. Within the service sector itself, moreover, the most innovative firms (in the technological sense of the term) are those most closely linked to information and telecommunications technologies (computer services firms, telecommunications companies, etc.). The survey conducted in France by SESSI as part of CIS-2 clearly shows that the frequency of innovation in this area of activity is greater than in manufacturing industry as a whole.

On the other hand, if a broader definition of innovation is used, as in the "autonomous" surveys, then the conclusions may be significantly different.

2.3 Comparison between different types of innovation

Examination of the findings produced by different surveys shows that, depending on the case in question, the frequency of a given type of innovation may be greater than that of another. At present, this observation does not seem to have any real economic significance. Indeed, the variety of definitions used by those conducting the surveys, and the diverse ways in which these definitions are interpreted by the survey "subjects", combine to make any comparison a tricky matter.

For example, the 1997 French survey identifies four types of innovation: product innovation, process innovation, organisational innovation and innovation in external relations. It finds that these various types of innovation are declining in frequency. In reality, the problems of defining the boundaries between the various categories reduces the import of such a finding. Using the same questionnaire, the Danish survey produces not only significantly different frequencies but also a completely different classification, since the most frequent forms of innovation in Denmark are organisational and external relational innovations, while product innovation is the least frequent.

Two relatively large-scale surveys conducted in the same country - Germany - produce contradictory results. In the ZEW survey, the hierarchy of frequency is as follows: process innovations (53%), product innovations (34%) and organisational innovations (13%). In that conducted by the DIW, which focuses on Berlin, the hierarchy is completely reversed: organisational innovations (40%), product innovations (38%) and process innovations (22%).

3. Conclusion: should surveys be abandoned?

As far as national and international surveys on innovation are concerned, thinking on methodology, and the corresponding experiments, have followed the same cycle as theoretical deliberations. As already noted, strictly technological concerns (conveyed by the innovation indicators adopted by national and international organisations) have been followed, though not replaced, by questioning about the specificities of innovation in services and a desire to take account of these various types of concerns without sacrificing either the technological dimension or the question of the specificities of innovation in services.

The debates that took place in the course of the project to revise the Oslo Manual opened up a number of new and very fruitful paths, some service-oriented, others more integrative in scope. However, these new paths have not been taken into account in the most recent edition of the Oslo Manual. The revised manual retains the restrictive and technologist definitions of innovation.

Various types of argument might be advanced to justify this institutional choice:
- It endorses the argument that, ultimately, only technological innovation is of any importance.
- The undeniable rise to prominence of information technologies in services is indicative of a trend towards a reduction in the importance of the non-technological dimension.
- The choice is intended to keep open certain opportunities for international comparisons. In a way, a form of integration has taken place, a minimalist form in which account is taken of technological innovation in both the manufacturing and the service sectors.

For our part, we would argue in favour of a more extensive form of integration that would take account of both technological innovation and non-technological forms of innovation (not only in services but in manufacturing industry as well). Certain areas of activity that are now of considerable importance in our economies (hotels and catering, tourism, etc.) have their origins in very simple ideas wholly devoid of technological content. In other words, technology is important, but organisation and other forms of innovation that are not necessarily technological are equally important. The rise to prominence of information technologies should not be considered within the framework of a zero-sum game. On the contrary, there is a wealth of examples (in distribution, financial services etc.) that illustrate the existence of a dialectical relationship between the all-pervasive use of information technologies and the increase in service levels.

If it is necessary at all, pragmatism should be used not in restricting the object of analysis but in changing survey practices. It is likely, for example, that tailor-made processing and questionnaires are currently preferable to more general questionnaires covering all service activities. In other words, in attempting to come to terms with the extreme heterogeneity of the service sector, it would seem useful to construct questionnaires tailored to relatively homogeneous "sub-groups", e.g. intellectual services, operational and manual services, informational and relational services, etc. The main conclusion of this paper is that we don't only need to encourage what we have called "autonomous surveys" but we need to make them even more autonomous. Qualitative studies conclude that a too large amount of R-D and innovation activities remains invisible to our surveys. Dealing with this issue requires revising again our official indicators, in other words being much more innovative (even if this involves some risk) in the field of innovation evaluation.

References

F Djellal, F Gallouj (1998), *Innovation in services : the results of a postal survey*, SI4S project, TSER programme, European Commission, University of Lille I, july.

C Gallouj, F Gallouj (1996), *L'innovation dans les services,* Economica, Paris.

F Gallouj, O Weinstein (1997), Innovation in Services, *Research Policy*, 26, p. 537-556.

FD Gault (1995), *R-D in a service economy : canadian statistics*, Voorburg group meeting, 11-15 september, Voorburg, The Netherlands.

FD Gault, W Pattinson (1995), *Innovation in service industries : the measurement issues*, Voorburg Group Meeting, 11-15 september, Voorburg, The Netherlands.

C Hipp, M Kukuk, G Licht, G Muent (1996), *Innovation in services : results of an innovation survey in the german service industry*, Conference "the new indicators of S-T", OECD.

A Kleinknecht, J O N Reijnen (1991), More evidence on the undercounting of small firm R-D, *Research Policy*, vol. 20, p. 579-587.

I Miles, N Kastrinos, K Flanagan, R Bilderbeek, P Den Hertog, W Huntik, M Bouman, (1995) *Knowledge-Intensive Business Services : Users, Carriers and Sources of Innovation*, Report for DG13 SPRINT-EIMS, March.

OECD (1992), *Proposed guidelines for collecting and interpreting technological innovation data, Oslo manual,* OECD, Paris

OECD (1993), *Proposed standard practice for surveys of research and experimental development Frascati manual*, OECD, Paris.

OECD (1997), *Proposed guidelines for collecting and interpreting technological innovation data, Oslo manual,* OECD, Paris.

J Sundbo (1998), *The organisation of innovation in services*, Roskilde University Press.