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Innovation in services: concepts and measurements

Summary

The approach to innovation, influenced by the original work of J. Schumpeter, is very closely associated with an industrial view of the subject. The Oslo Manual takes a comparatively traditional approach to innovation: this is evident in the explicit references to the technological aspect and R&D activities, but is also implicit in the criteria that determine why innovation exists (improved performance, increased productivity). In the latest version of the manual, an attempt has been made to broaden the concept of innovation: however, this has resulted in a rather vague definition and many ideas that create ambiguities in the dividing lines between concepts (products/processes/organisation/ancillary activities). These ambiguities are quite logically found in the questions raised in Europe about the CIS surveys.

To be more precise, we think firstly that, even when the approach to innovation is based on improved performance of production processes associated with an improvement in capital ("technological approach"), consideration must be given nowadays to intangible assets. This means widening the scope of technological product innovations to several types of service products. Moreover, there are other forms of innovation brought in by firms which can be just as, if not more, crucial to a firm's existence than technological innovations, particularly in the tertiary sector. Finally, the emphasis currently placed on the technological nature of process innovations leads the Oslo manual to distinguish between organisational changes, which we do not think is relevant.

These limits are most harmful in tertiary activities, because of their specific nature. The INSEE also launched a specific enquiry in 2001 on the retail trade and some services in order to look at the innovation process in a different way. All aspects of innovation were taken into account: introduction of simultaneous changes of various types (concept, method or organisation), technological or not, in all spheres of a firm's business.

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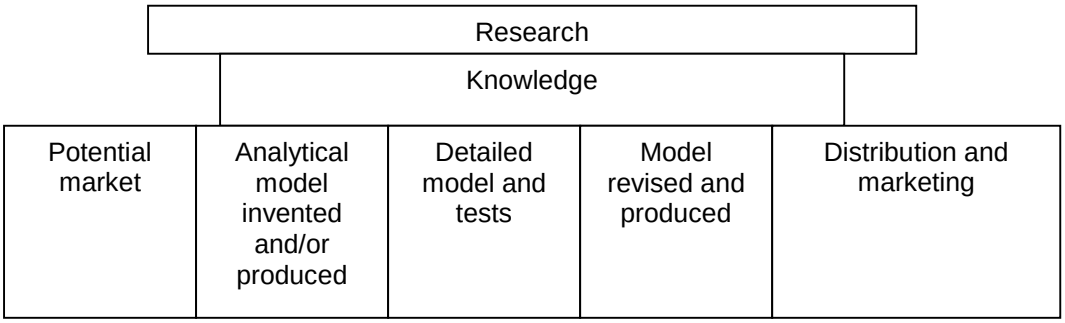
It is generally agreed that the development and distribution of new products (or processes) are crucial to increasing productivity and breaking into new markets. In this way, innovation is at the heart of economic change. According to the original work by J. Schumpeter on the subject, "radical" innovations shape the great changes in the world while "incremental" innovations feed the process of change in a more continuous way. In "The Theory of Economic Development" (1934), J. Schumpeter proposed a way of classifying innovations according to different types: introduction of a new product or a qualitative change in an existing product, introduction of a process innovation new to an industry, the opening of a new market, development of new sources of supply for raw materials or other inputs and finally, changes in industrial organisation.

Nevertheless, the process of innovation within a firm and its economic consequences are in the end rather misunderstood. A need has been felt for developing a conceptual framework that is common to all countries (at least in the OECD) and a great many industries, the objective being to collect the quantitative and qualitative information needed to design and evaluate the innovation policies implemented in most OECD countries. This is the objective of the Oslo Manual.

The work which resulted in the setting up of a specific survey in France of firms in the trade and services sector falls within the framework of the Oslo Manual[1], which describes "proposed guidelines for collecting and interpreting technological innovation data". However, the statisticians and researchers who have taken part in this work agree that, in numerous service activities as in trade, innovation is not regarded in the same way as in industry. Indeed, due to the specific nature of trade and service provision, concepts and measurement methods have to be adapted, a fact which should be taken into account when the Manual is revised.

The conceptual framework: the Oslo Manual

How is innovation generated within a firm? Numerous attempts have been made to construct models to shed light on this question. Kline and Rosenberg's [2] so-called "chain link" model is invaluable in this respect.



In this model, innovation is conceived as an interaction between the possibilities offered by the market on the one hand, and the knowledge base and capabilities available to the firm on the other. There is a retroactive effect between all parts of the process. The model also underlines the fact that in the end the process of innovation is complex, diverse and involves many interacting components: this is what the data sources must reflect (§ 89).

[1] Since it first appeared in 1992, the Oslo manual, drawn up by the OECD and the European Community, has been used as a reference for working out measurements of innovative activities in industry in most member countries of the European Union. Its translation into several languages has enabled many surveys to be published in other countries (Chile, China, Hungary etc.), based on standard concepts. The latest version of the manual, to which this paper refers, came out in 1997.

[2] Kline and Rosenberg (1986), « An overview of innovation », in Landau and Rosenberg (ed.), *The Positive Sum Strategy, Harnessing Technology for Economic Growth*, National Academy Press, Washington, DC, p. 289.

How innovation is defined in the Oslo Manual

The Oslo Manual is partly inspired by this model, while recognising that the objective is not to put forward one particular model of innovation which is regarded as the only one. It concentrates on **innovation at firm level** and covers the following sectors: manufacturing industry (NACE Rev.1 15 to 37), electricity, gas and water supply (NACE Rev.1 40+41), construction (NACE Rev.1 45), and the marketed services sectors (NACE Rev.1 50 to 74). It focuses on "the changes" which occur in firms taken individually. Innovations described as "major" or "radical" and considered within a wider framework by Schumpeter are ignored: for example, the opening of a new market or finding new sources of supply. These radical innovations are not the result of a firm's individual behaviour and so fall within an analytical framework that is quite different. Innovation according to the Oslo Manual is defined as follows:

130. **Technological product and process (TPP) innovations** comprise implemented technologically new products and processes and significant technological improvements in products and processes. A TPP innovation has been **implemented** if it has been introduced on the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial **activities**. **The TPP innovating firm** is one that has implemented technologically new or significantly technologically improved products or processes during the period under review.

131. The minimum entry is that **the product or process should be new** (**or significantly improved**) **to the firm** (it does not have to be new to the world).

132. TPP innovations **relating to primary and secondary activities** are included, **and so are process innovations in ancillary activities**.

A critical view of this definition

There are several elements to this definition and the areas it covers. We will see that some of these elements are sometimes difficult to interpret or are not particularly easy to adapt to the case of firms in trade and the service industries. This is no doubt due to a very "industrialist" view of innovation.

1. With a view to improving its productivity or business results, many changes can be made by a firm to types of products or to its production factors or even its working methods. But this manual deals only with « *changes which involve a significant degree of novelty for the firm* » (§ 20) and which affect the performance characteristics of products and processes. Furthermore: « *this innovation [...] requires an objective improvement in the **performance** of a product* » (§ 118). But what exactly are the objective performance characteristics of a good or service? They are not that easy to measure. The manual only says this excludes changes (made to products) which give the purchaser a subjective feeling of greater satisfaction (depending on his tastes, aesthetic judgement etc.) or satisfy a need to follow fashion[3].
2. Innovation affects **products or processes**. Products can be goods or services (§ 134). Innovations in services are therefore explicitly included but this ignores the fact that the characteristics of services are usually distinct from goods (intangible nature, relationship of joint production...) and therefore the characteristics of innovation or the extent it covers have every chance of being different. In particular, in numerous service activities, the dividing line between product and process or method of production is particularly blurred: the two are closely connected. The process or method of producing a service is often inseparable from the service itself. The manual acknowledges that services have specific features: « *The characteristics of innovation in the service industries are different from those in manufacturing industries. There is a*

[3] Although not regarded as innovations, these changes are thought to be important for some business sectors and are identified separately in European surveys under the heading "Other creative product improvements".

closer interrelationship between the development of new services and the processes to produce them » (§ 127).

3. The **technological aspect** plays a major part in the Oslo Manual's definition of innovation: it only concerns Technological Product and Process Innovations (TPP innovations). Products and processes must be "technologically" new or improved. However, there is a certain amount of ambiguity: the term "technological" is not defined as such: it therefore has shades of meaning which can vary from one country to another, and even from respondent to respondent within a country. The authors themselves admit that « *the meaning of the label "technological" [...] can be unclear".* It is even less clear when the authors say that « *[technological innovation] may involve changes in equipment, human resources, working methods or a combination of these.* » (§ 24).

   This raises the question then: how is the term "technology" interpreted when it comes to services? In particular, does the development and implementation of some innovative software have technological characteristics in the same way as the development of a new piece of equipment? If so, does this mean that new auditing or management methods, in the case of a management consultancy, are technological in nature? The Manual seems to confine itself to a more industrial definition of technology: the authors state that, in services, the term "technological" could be understood to mean « *using high-tech plant and equipment* ». On the face of it, this means that there is nothing technical about the act of providing a service, which is obviously simplistic. Limiting the definition to the introduction of technologically new or improved plant or equipment in the service industries excludes some "technical" innovations which are at the very heart of firms in the service industries.

   Moreover, doesn't this conflict to a certain extent with the fact that innovation can also affect human resources or working methods and the organisation in general? The Manual recognises that "purely organisational" innovation is widespread and may result in « *significant improvements in the firm's performance* » (§ 21). However, this subject is not addressed as a main issue[4], because the authors believe they do not have enough practical experience on the subject. But they say that: « *in principle, organisational change counts as innovation only if there is a measurable change in output, such as increased productivity or sales.* » (§ 157). In § 159 the idea is taken up specifically for service industries: « *technological process innovation includes improved capabilities embodied in organisations and routines as long as these have resulted in a measurable change in output* ». Appendix 2 states that organisational change comes within the remit of innovation according to the Manual if « *there is a measurable change to a firm's output, either production or sales* » (§ 433). In this case, the criterion of product performance takes precedence over the criterion of technology used to define the scope of technological innovation.

4. According to the Manual, technological innovation not only involves products and production processes but also **ancillary** and support **activities** such as purchasing, sales, accounting, IT and maintenance. As the authors state, it is very difficult in practice to identify a product innovation in ancillary activities but « *technological process innovation in ancillary activities is included* » (§ 132, 153 and 154). However, one wonders whether these ancillary activities fall within the scope of innovations. In fact, a change in ancillary activities does not usually improve the performance of the final product (reference to § 118). The only criterion which determines whether a change in ancillary activities can be regarded as an innovation is the technological novelty of the equipment used: but insofar as equipment can only be a relatively incidental element of the innovation which has been brought in, this criterion does not necessarily apply to ancillary activities.

   For example, in the case of a firm that introduces new software for its accounts department, this might be regarded as a TPP innovation (process innovation in ancillary activities - § 154). However, if the firm brings in a new management method, this is not innovation as defined by the Manual if there is no measurable consequence on output. But it is not very logical to regard the first change as an innovation and not the other. Both will have an impact, not on output or volume of sales directly, but probably in the longer term on operating costs and labour productivity.

[4] Although not the central theme, this subject is discussed in Appendix 2, but from the very specific angle of non-technological innovation.

So, the question of knowing whether to include organisational innovations or not, the problems of dividing lines between process innovations, the interrelationship between products and processes and the ambiguity of including ancillary activities result in a certain amount of vagueness when it comes to measuring innovation in trade and the service industries. The thinking in France on the concept of innovation in trade and services has revolved around these various aspects and has led us to introduce a specific survey.

A measurement of innovation suitable for tertiary activities

The plan to publish a third edition of the CIS European survey was the impetus behind a special working party set up in France for sectors involving tertiary activities. It has brought together the statistics departments of various French universities where innovation in services and trade is studied. Two research centres, IFRESI, the Federal Institute of Research into Industrial Economies and Societies, and CERIDICE, the Centre of International Study and Research into Distribution and Electronic Commerce, have taken an active part. When the work they have carried out[5] and questionnaires CIS2 and CIS3 are compared, the specific nature of the approach to innovation in firms in the industrial sector (industry, wholesale trade, some services for firms) soon becomes apparent. Like the Oslo Manual, innovation is mainly technological here. However, although innovation is one of the key factors in a firm's strategy for survival, this does not necessarily mean, in the case of some service sectors or retail trade, the introduction of a new machine or the use of the latest technology. The concepts of multiplex cinemas or extended opening hours for shops are good examples of major innovations that do not fit this picture.

This observation has had two consequences: firstly, it has confirmed the need to widen the scope of potentially innovative firms included in the observation and, in particular, the bias taken in approaching innovation in these firms by differentiating it from the traditional approach through its technological dimension.

Two distinct innovation surveys

- Third Community Innovation Survey, CIS3

The approach taken by the European survey has been retained to observe firms in the wholesale trade, and the following sectors supplying services to firms: IT services (Nace 72), telecommunications services (Nace 64), architectural and engineering activities (Nace 74.2), and technical analyses and tests (Nace 74.3). It seems to fit in well with the system of evaluating innovation policies, with the departments of industry and research and development being the driving force behind this project.

Based on the common core of variables required by EUROSTAT, an attempt was made to adapt the questionnaire with a view to removing the aforementioned ambiguities of the recommendations made in the Oslo manual and to widen the range of questions to collect information over a wider area than the Oslo Manual definition. The exercise turned out to be rather complicated as the results still had to be broken down according to the European definition of scope of innovation.

In this way,

- The first two groups of questions concern the introduction of product innovation or concept innovation in the previous three years. In order to encourage the respondent to widen the scope of his answers to a non-technological innovation, the following additional question was inserted into each group:

[5] « A propos de la nature de l'innovation dans les services: les enseignements d'une enquete postale », F.DJELLAL, F.GALLOUJ.
« L'innovation dans la distribution, son implication dans les relations industrie-commerce », M.DUPUIS.

1.2 For your company, at least one of these concepts or services :

- is technologically new or significantly changed	**Yes** ☐	**No** ☐
- is new, but contains nothing technologically new	**Yes** ☐	**No** ☐
- is new, but has no technological content (neither new, nor old)	**Yes** ☐	**No** ☐

The aim was to remove the ambiguity existing between definitions referring to technology and the title of the survey itself which changed from "Technological innovation" in 1998 (CIS2) to "Innovation" in 2001 (CIS3).

- A group of questions about changes in related organisations was moved to third place, just after the two types of innovation (products/processes). From its title, "Other organisational changes", we can see that the reference is not to product or process innovations; from its position in the questionnaire, the respondent is encouraged to mention them, at least under the status of associated innovations.

- The R&D issue was raised late in the questionnaire on purpose so that there was even greater freedom from the technological aspect of research and development.

However,

- there is still some ambiguity in the respective definitions of product and process innovations,
- the status of innovations in the ancillary activities of a firm is still vague: in order to find out about them, the following question has simply been introduced into the set about process innovations: "Are these new production processes immediately apparent to the customer? "

- General innovation: French questionnaire

A completely different questionnaire was designed for the retail trade and services to which the CIS3 questionnaire did not necessarily refer. This French "General innovation" questionnaire is the first time the INSEE has seen innovation measured more generally, moving beyond the recommendations of the Oslo Manual. In particular, the definition of innovation makes no reference to technology.

The main framework is as follows:

I.CHARACTERISTICS OF FIRM INNOVATIONS IN THE LAST 3 YEARS

An innovation is a significant change of a commercial, organisational, structural, logistical or relational type which has a noticeable impact on the company's business and its competive environment.
Innovation must be new to the company, but it does not necessarily have to be new to the market.

4. During the period 1999-20 01, did the company introduce :

new concepts in sales or services ? New concept means something new for the customer, such as the design of sales outlets, location, range, a price policy etc. *For example: a new logo,a new type of consultancy, a new type of catering.* **Yes** ☐ **No** ☐	**new methods of managing flows of** merchandise, information or services? New methods of managing flows can speed up stock rotation, reduce handling times, supply or delivery deadlines, etc *For example : internet orders, automation of warehouses, automatic reading of documents,new cooking or refrigeration systems, methods of study or analysis* . **Yes** ☐ **No** ☐	**re-organisation ?** Re-organisation means a change in the structures affecting the internal running of the company (including internal relations, legal status and financial aspects) or its external relations (with suppliers, partners,the group, the network etc.) . *For example : introduction of management by category internally, creating a franchised chain externally or any other legal structure* . **Yes** ☐ **No** ☐

The decision was made to design a short questionnaire (4 pages) which asked questions about innovations brought into the firm in the previous three years; and a so-called principal innovation is then described in more detail. This was a compulsory questionnaire sent to 3,600 firms in the service industries and retail sector. The questionnaire was sent to hypermarkets, central buying offices and to larger firms in specialised mass marketing, as well as to firms providing services to firms not surveyed by CIS3 and services to individuals. The survey was well received and 76% of the firms sent questionnaires replied.

In this survey, it was decided to put any change that can alter the firm's activity on the same level. There is no distinction here between the "core business" of the firm and its ancillary activities. Anything which stimulates the firm to survive in its competitive environment qualifies as an innovation.

The difficulty of the exercise that the Insee set itself is twofold: defining exactly what we include in the concept of innovation [which refers to what we define as an innovative firm], and expressing it in a general way in a postal questionnaire.

The initial findings of the French survey: the case of trade

In the trade sector, firms were specifically chosen to include those that have to be innovative in order to survive in a highly competitive market. The "general innovation" survey was posted to about 1,300 trading firms. Three players in the mass marketing sector were chosen to show that non-technological innovations exist, and that innovation must be part of a firm's survival strategy. Hypermarkets, central buying offices and large firms in specialised mass marketing were all sent surveys. 72% of the firms replied to the questionnaire. The results at this stage concern only those firms which replied.

The initial findings of this survey are positive. The target we set has been achieved: firms describe significant changes introduced into the firm as the principal innovation:

- traditional changes which are part of the trader's usual activity (dressing a shop window) are not described as innovations by traders. There is no longer any confusion between the concepts "being an innovative firm in trade" and "selling innovative products".
- firms have grasped the spirit in which the questionnaire was conducted and have described innovations in mass marketing which are not specifically technological. Nearly 70% of the innovations described are not purely technological innovations, so they would certainly not have been picked up using CIS-type questions.

The second finding concerns the three types of classification used in the questionnaire to describe innovation. This came about after comparing several classification methods used to characterise innovative activities in the service industries and trade. The respondents were guided by several examples.

Some examples of principal innovations

Concept of sales or service	▪ Introduction of own brand products ▪ Introduction of customer loyalty schemes ▪ Creating a new logo ▪ Installing an answering service for customers
Method of managing flows of merchandise, information and services	▪ Installing an "intranet" computer network ▪ Installing a system of exchanging computerised information with partners ▪ New method of managing deliveries ▪ Computer-assisted ordering
Organisation	▪ Setting up a cooperative system with member ▪ Creating a management structure for a retailers' cooperative ▪ Reorganisation of structures, revised job descriptions

Source: Insee, « Innovation Générale des entreprises du commerce », 2001

However, the logic behind this classification method has actually been misunderstood. When the description of the principal innovations described in the survey is broken down, we can see that they have been quite badly classified compared to the typology defined in principle by the working group. Thus, the example of ordering over the Internet, which appears on the questionnaire as an example of innovation in methods of managing flows, is classed as a concept, even an organisational innovation.

This is quite a drawback. If the questionnaire had been completed by the person conducting the survey, he could have put the innovation in the right category. In this case (postal method), the analytical task was left to the respondent who was not necessarily able to grasp what the designers of the survey were looking for. This stumbling block could have been avoided by designing the questionnaire as a set of simple questions (yes/no) so that the innovation process could be characterised subsequently.

This is what happened to the questions about the technological dimension of the principal innovation and the processes of innovation implemented (research and development, tests, etc.). When the next "general innovation" survey is conducted, the type of innovation will be identified by breaking it down into straightforward elements.

In order to identify an innovation in the questionnaire which has nothing to do with the problems of innovation policies, research and development activities are not measured. In fact, one of the specific features of the process of innovation design in service industries concerns the question of laboratories. "The absence of a laboratory does not mean there is no research work going on but that it is not isolated in an ad hoc structure whose only purpose is to produce innovations" (BARCET, 98[6]). In the CIS2 survey, the questions began by describing the firm's research and development facilities, thus implying that innovation was dependent on R&D.

The main results of innovation in trade

Most of the strategic changes brought in by the commercial firms surveyed are not purely technological innovations. The principal innovation[7] is described as a technological change (innovation is a new technology) in only 31% of cases. In 43% of cases it is a change in which technology really plays no part. 26% of principal innovations are considered to be non-technological but still could not have been brought in without recourse to technology.

The players in the mass marketing sector are innovative. In fact, 62% of the firms that replied are or have been involved in innovation problems in recent years. Distributors (68% of innovative firms in the specialist large retail sector) are noticeably more innovative than central buying offices (55% of innovative firms in central buying offices for non-food products). During the last three years in particular, 46% of firms asked have introduced a significant change, described as an innovation. 23% of firms have been involved in the process of innovation in recent years and 1/3 are thinking about innovating in the future.

Innovation is complex in form: firms which have innovated in the last three years have mostly introduced simultaneous changes of different types (concept, method or organisation). In 73% of cases, the principal innovation has also resulted in changes of a different type. Innovation in these firms is called architectural. So it is not surprising that the innovation put forward by the firm is a new business concept (63% of cases). In fact, the firm's main objective is to introduce a new concept and it implements new methods of managing flows or changes the organisation within the network in order to do this. It also interesting that, in spite of all the care taken to put the three types of innovation on the same level, the principal innovation is only re-organisation in 11% of cases. This confirms the idea that the latter mostly occur in combined innovations.

[6] « *Problématique et enjeux de l'innovation de service* », A.BARCET, UMR GATE CNRS, Dec 98.

[7] The importance of which is measured by its impact on the firm's business as a whole, and also by its ability to be reproduced or applied generally.

The innovation projects described are mostly the idea of the firm itself (56% of cases). We should moderate this statement by saying that the specialist large retailers surveyed are large multi-establishment firms where the innovation process is more like that found in a group or network. If we add the 34% of firms where innovation is the idea of a group or network, the proportion of firm innovations outside organised commerce is comparatively low in this survey.

Finally, it is interesting to note that it is forms of investment in innovation other than research and development which stand out: tests (56%), prototypes (29%) and benchmarking (24%). On the other hand, R&D in natural sciences is only used in 2% of innovations introduced.