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Two decades of research on innovation in services: which place for public services?

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Abstract:

After a long period of disregard and underestimation, the issue of innovation in services is now being taken seriously in economic theory, as well as in public policy. This is not yet the case for innovation in public services. The objective of this paper is to propose a re-interpretation of the literature on innovation in services in the light of public services. Building on the interpretative framework of assimilation, demarcation, inversion and integration perspectives often used to analyze innovation in market services, we review how the major studies conducted during two decades of research on innovation in services explicitly address or can be extrapolated to address innovation in public services. We also seek to identify shortfalls in this literature and determine new avenues of research and action.

Introduction

Over the past two decades, after a long period of disregard, the question of innovation in services has continued to grow in importance in the economic literature and political agendas. This new field of “service innovation studies” attempts to free itself from technologist and industrialist conceptions, bridge the innovation gap in post-industrial economies and make invisible innovation visible (non-technological innovation in all its forms: organization, process, product, concept, social innovation, etc.). It also focuses on market services. This market bias visible at both the empirical and theoretical levels is also echoed in the international institutions. Thus, although significant efforts have been made to consider specific forms of innovation in services, in the context of the various revisions of the OECD Oslo Manual, public services are excluded from the scope of the Manual. To paraphrase Ian Miles (Miles, 1998), if services are the “Cinderella” of “innovation studies,” we can say that public services are the “Cinderella” of “service innovation studies.” This underestimation is sometimes even reflected in the vocabulary used to describe the dynamics of public services. They change, modernize, but do not innovate (or hardly at all).

The reasons for this paradoxical idea that public services (and more generally non-market services) are not (or less) concerned with the issue of innovation are numerous and well known, including the lack of competition (public services as “lazy” monopolies), the lack of resources, the free nature of the services, the rigidity, bureaucratic inertia and the nature of the regimes of ownership.

But, conversely, many arguments qualify or contradict this negative assessment of innovation in public services and advocate for raising their status in “services innovation studies.” Here is a brief review of some of these arguments:

- It is paradoxical to believe that public administrations are ambivalent: eager to support innovation, but ignoring innovation on their own behalf. We may instead hypothesize that an administration that is innovative for itself will be more effective in supporting innovation for other economic agents.
- Within public services, there are sectors whose innovation activities are indisputable and well documented in the literature. This is particularly true in the areas of health and public research laboratories.
- The respective perimeters of public services and private services are fluctuating in space and time, and there may be competition between public and private services. In addition, some public services can be outsourced to private providers or provided through public-private partnerships (PPPs).

- The economic crisis and demographic changes are also an important factor for innovation in public services, since they lead to rationalization of production and the emergence of new social demands.

The purpose of this paper is not to provide a new review of the literature on innovation in services (for a recent review see Droege et al., 2009; Gallouj and Djellal, 2010). We will examine how the major studies conducted during two decades of research on innovation in services explicitly address or can be extrapolated to address innovation in public services. We also seek to identify shortfalls in this literature and determine new avenues of research and action.

The field of “service innovation studies” involves four different theoretical perspectives (assimilation, demarcation, inversion and integration), which reflect different conceptions of the relationship vis-à-vis the dominant field of (industrial) innovation studies (Gallouj, 1994, 1998; Gallouj and Weinstein, 1997; Coombs and Miles 2000). The *assimilation* or *technologicalistic* perspective analyses innovation in services just as innovation in manufacturing, focusing on their relationships with technological systems. Insofar as it mainly focuses on innovation adopted from manufacturing sectors, the assimilation perspective is also a *subordination* one. The *differentiation (or demarcation)* perspective focuses on services specificities and aims to capture innovation activity where the traditional (technologist or assimilation) gaze perceives nothing. The *inversion* perspective reflects the “revenge” of the service sector: it emphasizes the active role of KIBS in other sectors’ innovations. The *integrative or synthetic* perspective seeks to provide the same analytical frameworks for both goods and services, and for both technological and non-technological forms of innovation.

To revisit the literature on innovation in services in the light of public services, we draw on these four theoretical perspectives that provide the outline of our paper. We examine the way public services are or can be addressed using the assimilation, demarcation, inversion and integration approaches.

1. Public services and technological innovation: the assimilationist perspective

Compared to the well-established and prolific field of “(industrial) innovation studies” in general, the field of “service innovation studies” is still relatively small. This field was formed by taking, first, a perspective that we have qualified as technologist, industrialist or assimilationist (Gallouj, 1994, 1998, see also Coombs and Miles, 2000). Indeed, to address the relatively new issue of innovation in services, this perspective naturally uses the tools inherited from the field of industrial innovation without considering the special nature of services. Thus, in essence, innovation is considered in its relations to material technical systems (their production and diffusion).

The assimilation perspective is largely dominant in the literature. The conception of innovation that it conveys is reflected in the innovation indicators used in OECD Manuals (Frascati and Oslo Manuals). Despite recent revisions, these Manuals still suffer from a technologist bias. Such a conception of innovation leads to a finding of clear inferiority and subordination of services relative to industry when it comes to innovation, because services generally produce few technological innovations. They simply adopt the technologies produced by manufacturing sectors.

“Services innovation studies” categorize the literature discussed according to this assimilationist perspective in three groups of unequal size. The first group, by far the most prolific and the most heterogeneous, brings together primarily empirical work devoted to analyzing the impact of the diffusion of exogenous technology on services. The other two groups bring together more theoretical studies (still very few in number) belonging to an evolutionary tradition: this involves, firstly, the reverse cycle model of Barras (1986, 1990), and, secondly, sectoral taxonomies that trace the trajectories of innovation in services. We will review this literature in the light of the issue of innovation in public services.

1.1 Innovation in services and the diffusion of (informational) technologies

Whether at the microeconomic or macroeconomic level, the issue of innovation in services has long been confined to discussing the impact of the introduction of technical systems. There is very extensive literature on innovation in services considered from this point of view (approach in terms of impacts). Such a conception of innovation may be particularly justified by the invasiveness of the introduction of ICTs in services over the past three decades, and the changes that these technologies have generated in business organization.

The historical diffusion of ICTs in services is often described, simplistically, through two innovation models, the first based on heavy computing and the second on distributed computing and networks, which follow each other and overlap. For given institutional contexts it is possible to construct a simple chart that reflects the main issues addressed by the extensive literature in terms of impacts, by crossing these two innovation models with a number of fundamental economic variables such as employment, productivity, skills and task organization, the tradable nature and quality of the “service”, etc. The studies in terms of impacts can be placed in one or more of the squares of the heuristic framework, to determine the impact of the innovation model considered (M_i) on one or more variables (v_j) (see Table 1).

	M_1	M_2
v_1		
v_2		
v_i		
...		
v_n		

Table 1: Matrix of the main analytical concerns when looking at innovation in terms of impacts

The literature on the introduction of ICTs in public organizations fits perfectly in this grid. Productivity gains and job cuts were the main reasons for the introduction of heavy computing in public administrations. The computerization of back offices helped reduce costs by standardizing tasks and achieving economies of scale. The second model (distributed computing and networks) had an impact both in terms of cost reduction and increased quality. It takes advantage of economies of scope, and many studies analyze its ability to re-skill the workforce (variety of tasks) and improve front-office service quality to users, especially in terms of speed, availability (disappearance of space) and integration of services (one-stop shops). One important issue, not addressed in the case of services in general, but which is relevant when it comes to the relationship between the introduction of ICTs and public services, is the digital divide (Attour and Longhi, 2009). It is important due to the specific missions of public services.

1.2 The reverse cycle model: a model also based on public services

The reverse cycle model (Barras, 1986, 1990) deserves special attention for at least two reasons. First, it represents the first attempt to construct a theory of innovation in services. In a way, it helps to unify and give coherence to the multitude of studies in terms of impacts. Second, it was developed on the basis of empirical research involving not only market services, but also public services (especially local governments).

Barras' model is a simple and suggestive model that is not a theory of innovation in services, as claimed by the author, but a theory of the diffusion of technological innovation from industry to services. Unlike the traditional industrial cycle (Abernathy and Utterback, 1978), characterized by a period of dominant product innovation, the conception of a dominant design, then a period of dominant process innovation, the cycle of services is dominated in its first two phases by incremental process innovation and radical process innovation, and in its

final phase by product innovation. Each phase of this cycle, it should be noted, is driven by different enabling technologies, corresponding to the different waves of computerization mentioned in the previous paragraph.

The reverse cycle model easily applies to all pre-industrial mass services whose activity is centered on information processing. It applies particularly well to administrative public services.

The first wave of computerization (introduction of mainframes) resulted in incremental process innovations in the back office activities of this type of organization, to increase efficiency and reduce costs. One example is the computerization of personnel records and salaries in both public and market services.

The second wave of computerization (mini and microcomputers) resulted in more radical process innovations involving the front-office functions of the administrations. The aim of these innovations was to improve effectiveness and quality of service. Examples include providing online administrative information or administrative forms, online registration for certain public procurement procedures, computerized management of housing waiting lists at city offices, and automated ticket machines (concerts, museums).

The last wave of computerization (networks) resulted in so-called product innovations, which include more sophisticated or more complete e-government experiments, in that much more if not all administrative procedures are made available online. This form of e-government essentially aims “to dematerialize the traditional administrative procedures” (Suire, 2007). For example in France, the Family Welfare Office (CAF) has a website where users can declare their income, access forms and track the status of their payments and reimbursements. The French National Health Insurance System (CNAM) also has a website where users can access information, forms and track online reimbursements (Bacache-Beauvallet et al. 2011). Arduini et al. (2010) examine the development and the forms of e-government in Italian cities, based on a number of contextual variables.

Recent developments in e-government provide new perspectives on this third phase of the cycle that enrich and strengthen Barras' initial model.

- We can probably include recent forms of innovations that establish stronger interaction between administrations and users and that give users a more active role in creating these services (in accordance with the spirit of Web 2.0). These innovations reflect an evolution from e-government focused on dematerialization to e-governance, which aims “to change the nature of the relationship by initiating a new form of more interactive partnership with the citizen-user” (Suire, 2007).

- In its third phase, Barras' model focuses primarily on e-services provided to the client or end user (in the case of public services, GtoC). One can easily extend the model to include other recipients: businesses (GtoB) and other government agencies (GtoG), both horizontally (service relationships with other public agencies) and vertically (relationships with higher administrative levels).

- Finally, in Barras' model, the teleservice phase is unidirectional in that it is the user or the individual consumer who uses ICTs to co-produce the service (home banking and shopping), but the inverse relationship may be considered when it is the provider that takes action remotely, using ICTs. Examples of this include telesurgery and distance teaching.

It may seem paradoxical to classify an innovation model that seems to highlight a specific behavior of service organizations in terms of innovation (*reverse* cycle) as an assimilationist approach and not a differentiating approach. The explanation is that although the cycle is reversed, it describes an exclusively technological innovation dynamic (for example, public services provide e-government, but no new non-technological service, and banks provide home banking, but no new financial products).

The technological bias is not the only limitation of this model when applied to public services and beyond. First, its technological orientation is itself limited, insofar as it relies exclusively on information processing technologies, whereas services in general and public services in particular can use other types of technologies, for instance physical or biological material processing technologies (cooking, refrigeration, transportation, handling, biotechnology, etc.). It is also based on a product/process distinction that is problematic in services, since these two dimensions are often inseparable because the product is defined as an act or a process.

1.3 Sectoral technological trajectories

Another interesting theoretical reference is noteworthy, namely the taxonomy of the technological behavior of service firms and sectors proposed by Soete and Miozzo (1990). This taxonomy is inspired by the pioneering work of Pavitt (1984), which it tries to correct to better take into account the heterogeneity of innovation behaviors in services. Pavitt's taxonomy raises several problems. First, it looks at all economic activities, excluding non-market services. Next, it classifies all (market) service activities in a single trajectory described as “supplier dominated.” Soete and Miozzo (1990), for their part, identify, in services, three different technological trajectories: 1) Supplier-dominated firms, 2) Physical and informational networks, 3) Specialized suppliers and science-based firms. In the taxonomy of Soete and Miozzo, all public services are included in the first category. This means that, essentially, they do not produce technologies, but simply adopt technological innovations provided by the capital goods manufacturing sectors. One might say that in the taxonomy of Soete and Miozzo, public services get the same homogenizing treatment as all services in Pavitt's taxonomy. We may plausibly assume that there are many technological trajectories within public services themselves: postal services or medical services do not have the same trajectories as social services or public administration.

The Community Innovation Surveys (CIS) have provided opportunities to try to empirically validate these taxonomies. Drawing on the Italian version of the CIS2, Evangelista (2000) and Evangelista and Savona (2003) consolidate the taxonomy of Soete and Miozzo, distinguishing between three homogenous sectoral technological trajectories in services:

- 1) The “technology users” that bring together weakly innovative sectors that are dependent on industrial suppliers of technologies (e.g., retail trade, hotels, catering, transportation, cleaning, etc.).
- 2) The “ICT users,” characterized by their intensive use of ICT (banks, insurance companies and other financial services, wholesale, advertising, etc.).
- 3) The “S&T-based sectors,” characterized by strong innovation activity (R&D, engineering, technical consulting, IT services).

Hipp and Grupp (2005) conducted a similar exercise for Germany. Unfortunately there is no empirical validation of the existence of similar technological trajectories for public services, since Community surveys do not cover these areas for now. But, considering the variety of public service sectors, and the similarities with some of the activities mentioned above, it is likely that public services can be broken down into the three trajectories identified. Thus, one can posit the hypothesis, which would need to be validated empirically, that, for example, public transportation belong to the category of “technology users,” mass public informational services (e.g. the tax administration) follow the technological trajectory of “ICT users,” and health services, education and research sectors are “S & T-based sectors.”

This theoretical recognition and the empirical validation of the diverse technological behaviors of firms and service organizations is an interesting step forward in understanding the dynamics of innovation in market and non-market services. Though it still maintains an assimilationist perspective (since only the technological trajectories are considered), it does however reduce the subordination dimension. Indeed, services not only adopt technologies, but some of them (especially those in the “S & T-based sectors”) also produce technologies.

A major limitation of this perspective in terms of technological trajectories is that it unilaterally associates the trajectories with organizations. However, different technological

trajectories can coexist and interact within the same organizations (Gallouj, 2002a). Moreover, besides the technological trajectories of material or information processing, there are service and relational (non-technological) trajectories. These various technological and non-technological trajectories can maintain multiple relationships and coexist separately or in hybrid fashion in private or public service organizations (Djellal and Gallouj, 2005, 2008).

1.4 Assimilationist perspective and industrialization (or industrial rationalization) of services

The assimilationist perspective can also be interpreted, from a strategic perspective, as an attempt to erase the specificities of services, so that they differ minimally from goods. This means making them less fuzzy or intangible, reducing or eliminating any interaction (i.e., the service relationship), and making them less immediate by implementing some form of stockability. The aim is to reduce the diversity of possibilities, to develop a product or quasi-product that can lead to an explicit contract. This is known as the industrialization of the service. The industrialization of service, be it a shift towards the production of tangible goods rather than intangible service delivery or the implementation of a certain mode of production (Gadrey, 1996), contributed to the success of the Fordist growth model.

From this standpoint, the assimilationist perspective is still present, and even dominant in many public services. Indeed, the industrial organization model based on the assumption that work is best done in the context of strongly hierarchical, segmented bureaucracies governed by rules is still topical. This form of rationalization, which reduces diversity (and ad hoc or tailor-made innovation) is considered not only as a source of efficiency but also fairness, since it ensures identical public services for everyone, everywhere.

1.5 Partial loosening of the assimilationist perspective: autonomization and endogenization

As we have repeatedly found in previous developments, the strict assimilationist perspective is being loosened in different ways, especially in more recent research. This loosening has two main forms.

The first is a certain *autonomization* vis-à-vis industrial innovation. Some service organizations (this also applies to public services) are no longer locked into an attitude of passive adoption of technological materials produced elsewhere. In certain cases, they can produce some of these techniques themselves, but more importantly, they can sometimes reverse the power relationship by exercising a decisive influence on industrial suppliers of equipment and effectively directing the technological trajectories (by imposing functional and technical specifications, etc.). In some cases, there may be a complete reversal of the power relationship, generating innovation trajectories that are no longer “supplier-dominated,” but “consumer or user-dominated” (see Section 3). Other public service activities (research laboratories, universities, health services) are basically producers of scientific and technological innovations and R&D. They can be described according to the assimilationist perspective, but obviously they are not dominated by industry, but are fundamentally autonomous. Industrial innovation models can easily be applied to them.

But it is the second form that reflects the most significant loosening of the assimilationist perspective. This form, namely the *endogenization* of ICT, has the greatest effect on services and public services in particular. Indeed, the relationship of services vis-à-vis ICT is no longer just a mere external relationship, considered in terms of impacts. The introduction of ICT at all levels of service organizations (back office and front office) is helping to change the nature of the product. Services and innovation in services appear increasingly as hybrid categories combining tangible and intangible informational technology and organizational engineering, that is to say, design and development of organizational forms (Djellal et al., 2003). This endogenization of ICT leads to new forms of interactivity and new spaces (national or international virtual proximity, etc.).

But despite the loosening of the assimilationist perspective brought about by autonomization and the endogenization of ICT, at this stage we cannot yet call it differentiation as defined in the next section.

2. Differentiation: the specificities of innovation in services

The first research strategy used to bridge the “innovation gap” opened by the assimilationist perspective and identify forgotten or hidden forms of innovation is the perspective we have also described elsewhere as the “*service-oriented*” or “*differentiation*” perspective (Gallouj and Weinstein, 1997). This research program focuses on the specificities of innovation (its nature, organization, determinants and ownership regimes), first deductively (that is to say, considering the analytical consequences of the specificities of services), then inductively by carrying out empirical studies.

2.1 The specificities of market and non-market services and their impact on innovation

Intangibility and interactivity are the two intrinsic technical characteristics generally ascribed to services to differentiate them from goods. Although they are now subject to debate, these characteristics provide a useful heuristic for deductively analyzing the impacts of the characteristics of services on innovation.

The intangibility of services is a characteristic noted by Adam Smith in *The Wealth of Nations*. It reflects the fact that the service cannot be stored, it is “consumed at the time it is produced,” and it is a “change of state” (Hill, 1977; Gadrey, 1992). Intangibility has several effects on innovation in services. It blurs the traditional distinction between product innovation, process innovation and organizational innovation. But it makes it possible to consider forms of intangible product innovations (not embedded in technical components), for example what we call “ad hoc innovation” (Gallouj and Weinstein, 1997) or forms of innovations aimed at making the product more tangible (formalization innovation). It impedes protection and facilitates imitation. It makes it difficult to assess the economic impact of the innovation.

The second characteristic, interactivity, means that the consumer, customer or user is involved, in one way or another, in producing the service. This characteristic leads to a number of analytical impacts for innovation in services, whether its nature, its organization or its ownership regime. Thus, co-production promotes forms of tailor-made innovation. It raises issues of ownership of the product of collective work. It implies an interactive organization of innovation rather than a linear organization.

Those two characteristics describe services in general, whether private or public. Adam Smith himself mentioned servants of the state as examples in his analysis of the specificities of services. Thus, the impacts on innovation discussed above also apply to public services.

However, beyond being “services,” public services are also “public.” So they have characteristics specific to public services, which also have impacts on innovation. These characteristics, which concern both the product and the organization that provides it, include: 1) the non-market and monopolistic nature, 2) debased property rights, 3) the principles of public services.

1) The non-market and non-competitive nature is often considered a hindrance to performance and innovation. The organizations (often referred to as bureaucracies), and the individuals in them (civil servants), are said to have no incentive to innovate because they operate in protected or monopolistic environments. In this context, public sector managers pursue other objectives than maximizing profits. These objectives are well documented in the literature,

and they have different impacts on the issue of innovation. Rees (1984) identifies four types of economic objectives for public services: allocative, distributive, financial and macroeconomic. The allocative objective of public service managers is to maximize service provision for a given volume of resources. Budget constraints encourage all cost reduction strategies, in other words, process and organization innovations (introduction of technical systems, streamlining production processes, implementation of NPM, introduction of public private partnerships etc.). Concern for efficiency in public services is a source of innovation aimed at rationalization, but, as noted by a number of studies (Potts, 2009, Koch et al., 2005), it is also a barrier to other forms of innovation. Contrary to private enterprise, public organizations are strongly risk averse and reluctant to experiment or fail (although failure may be beneficial).

But consideration is also given in the literature to the view that public sector managers can have other objectives that do nothing to encourage efficiency and innovation: for example, extending the scope of their power by increasing the number of people in their charge, increasing their budgets and spending capacity and focusing on the (new) most visible and most spectacular outputs at the expense of more useful but less visible ones (Lindsay, 1976).

2) In contrast to private property, the public sector is characterized by debased property rights, which are neither *exclusive* nor *transferable*. It is the political market, rather than shareholders, that maintains control, and it is the body of citizens as a whole that owns the public services, provision of which is entrusted to the government. Thus, the problems inherent in agency relationships are even more acute in public services than in market services: opportunities for control (by the ultimate owners who are citizens) and incentives to improve performance and innovate are considerably reduced.

3) The principles of public service (equality, fairness, continuity) can have positive or negative impacts on innovation. Organizations that provide public services are generally regarded as rigid or lacking flexibility. There are many explanations for this inertia. First, public service managers are obliged to adhere to rigid procedures that safeguard the principles of equality among citizens (in terms of location of infrastructure, recruitment, and so on). Second, they have less freedom to substitute resources (Knox Lovell, 2002), particularly between labor and capital. Furthermore, they have only limited resources to spend on building or acquiring equipment. Concerning the nature of the product, as Fox (1999) notes, public services managers have no control over the mix of services provided, unlike their private sector counterparts. They have only limited freedom to influence the nature of the product. In most cases, they cannot, on their own initiative, stop providing a service or offer a different one.

But the principles of public services can also have positive impacts on innovation. They can lead to specific non-technical and non-market forms of innovation, involving domestic, social and civic issues, that is to say which value interpersonal relationships, empathy, trust, concern for inclusion and equal treatment, and social-civic products. Thus, the rise of social innovation within or with the participation of public services is an important consequence of this third characteristic (which reflects the principles of public service: equality, fairness, continuity).

To conclude this point, we can say that innovation in public services can or should be considered from the perspective of “double differentiation”: differentiation vis-à-vis industrial innovation (as for market services), but also differentiation vis-à-vis market services themselves.

2.2 Empirical research to identify specific forms of innovation

Research on the specificities of innovation in services is primarily inductive. Thus, without ignoring technological innovations, many qualitative and some quantitative empirical studies have been conducted to try to identify the specific forms of innovation in services.

The first studies were devoted to “knowledge intensive business services” (KIBS), as well as to banking and insurance, with the assumption that if innovation in services is specific, it is in the purest services (that is to say the most intangible and most interactive), that the specificities are most likely to appear. This assumption is also supported by the idea that given the nature of their activity (knowledge processing), KIBS (especially consulting) are particularly sensitive to the issue of innovation, either because they themselves innovate, or because they bring about innovation by their clients.

Subsequently there was a sectoral shift of the analytical focus towards the specificities of innovations in services often considered less noble or less knowledge-intensive. Examples include hospitality, transportation, cleaning services, elderly care, etc.

It would be tedious and unnecessary to enumerate the many ad hoc typologies developed in the various activities. What it is important to take away from this research is that non-technological forms of innovation that are generally invisible to traditional tools are identified everywhere. For example, in the field of consulting, Gadrey and Gallouj (1998) do not use the product/process typology but instead distinguish three types of innovation: ad hoc innovation (co-constructing with the client a novel solution to a problem), new field of expertise innovation (detecting an emerging field of knowledge and providing consulting on this field), and formalization innovation (implementing methods to make the service less fuzzy).

This type of empirical research looking for specificities has also been conducted on public services. More recently, it is true, there has been renewed interest in innovation in public services, in a demarcation perspective (Mulgan and Albury, 2003; Hartley, 2005; Koch et al., 2005; Windrum and Koch, 2008; Becheikh et al., 2009; Fuglsang, 2010; Miles, 2012). Table 2 provides a number of recent illustrations of typologies of innovation in public services. All these typologies include the traditional categories of product, process and organization innovations. But they also introduce specific forms, some of which are identical but are expressed by different terminology: conceptual innovations, strategic innovations, radical changes of rationality, institutional innovations (or governance innovation), administrative innovation, rhetoric innovation, etc.

Table 2: typologies of innovation in the public sector

PUBLIN report D9 *On the differences between public and private sector innovation*, Thomas Halvorsen, Johan Hauknes, Ian Miles and Rannveig Røste (2005)

- *A new or improved service* (for example health care at home)
- *Process innovation* (a change in the manufacturing of a service or product)
- *Administrative innovation* (for example the use of a new policy instrument, which may be a result of policy change)
- *System innovation* (a new system or a fundamental change of an existing system, for instance by the establishment of new organizations or new patterns of co-operation and interaction)
- *Conceptual innovation* (a change in the outlook of actors; such changes are accompanied by the use of new concepts, for example integrated water management or mobility leasing)
- *Radical change of rationality* (meaning that the world view or the mental matrix of the employees of an organization is shifting)

Hartley (2005)

- *Product* : New products : New instrumentation in hospitals
- *Service* : New ways in which services are provided, new ‘scripts’. Ex. Online tax self-assessment forms
- *Process* : New procedures, organisational structures, systems. Ex. Administrative reorganisations
- *Position* : New contexts, customers or Partner. Ex. Connexions service for Young people
- *Strategic* : New goals, purposes or values. Ex Community policing, foundation hospitals
- *Governance* : New democratic institutions and forms of participation. Ex. Area forums, Devolved government
- *Rhetorical* : New language, concepts and definitions. Ex. Congestion charging, carbon taxes

Bekkers et al. (2006)

- *Product or service innovation*, focused on the creation of new public services or products.
- *Technological innovations* that emerge through the creation and use of new technologies, such as the use of mobile devices and cell broadcasting to warn citizens in the case of an emergency;
- *Process innovations*, focused on the improvement of the quality and efficiency of the internal and external business processes, like the direct filing and automated assessment of taxes;
- *Organizational innovations*, focused on the creation of new organizational forms, the introduction of new management methods and techniques, and new working methods. Examples are the creation of shared service centres or the use of quality systems;
- *Conceptual innovations*. These innovations occur in relation to the introduction of new concepts, frames of reference or even new paradigms, like the concept of New Public Management or the notion of governance; and
- *Institutional innovations*, which refer to fundamental transformations in the institutional relations between organizations, institutions, and other actors in the public sector. An example is the introduction of elements of direct democracy, through referenda in a representative democracy.

2.3 Indicators and surveys

Most empirical research in the field of innovation in services is qualitative in nature. Quantitative research was long hampered by inadequate (technologist and industrialist) innovation indicators. The Oslo Manual, which is the set of guidelines for collecting and using innovation data, has been revised several times. In its latest version (OECD, 2005), whose empirical applications are still relatively limited, the Manual includes “marketing innovations” and organizational innovations, in addition to technological product and process innovations. The successive Community Innovation Surveys (CIS) have opened up to more and more services and to certain “non-technological” forms of innovation. The *innovation gap* has tended to decrease, but there is still progress to be made, particularly in the areas of non-technological product innovations (a new insurance contract, a new financial product, a new area of expertise in consulting), non-technological process innovations (methods, protocols), ad hoc innovations and tailor-made innovations, innovations in complex “packages” of goods and services, also known as new concepts or new formulas (for example, in retail, hospitality, etc.).

Efforts must also be made in the field of public services. It is true that for public services like public science and technology institutions, measuring performance in terms of innovation (technological only) is a long-standing and essential practice. But, just as efforts were made to build innovation indicators tailored to services that take into account non-technological innovation, similar efforts are being made for public services. Given the specificities of public services, we cannot simply use the indicators and questionnaires developed for market services. Measuring innovation in public services raises new problems compared to innovation in private services, such as identifying the appropriate analysis entity (what level of government for example). Another problem is accounting for the major differences among countries regarding the organization of public services and their borders.

Indicators developed for sub-sectors of public services, such as the health sector (see Djellal and Gallouj 2005, Windrum and Koch, 2008), can be distinguished from broader indicators developed for all public services. One of the few national initiatives to measure innovation in public services is “the Korean Government Innovation Index,” introduced in 2005. More recently, in Europe, the recommendations of Clark et al. (2008) were implemented in 2011 (Hughes et al, 2011) as part of a pilot survey conducted in Britain in two sub-sectors: the NHS and Local Government. The MEPIN research project (Measuring Innovation in the Public Sector in the Nordic Countries) funded by the European Commission also launched a pilot survey on innovation in public services (Bugge et al., 2011). In 2010, the European Commission announced its intention to form a European Public Sector Innovation Scoreboard. To prepare for this, the Innobarometer 2010 was dedicated to innovation in the

public sector. A survey of over 4,000 public service organizations Europe-wide has confirmed the existence of significant innovation activity. This survey shows that (European Commission, 2011): 1) two-thirds of the public services surveyed introduced a new or significantly improved service during the three years covered by the survey; 2) the likelihood of innovation increases with the size of the institution; 3) the main driver of innovation is the introduction of new laws or regulations, followed by new policy priorities and E-government initiatives; and 4) the main mode of innovation is top-down rather than bottom-up, which is less frequent.

2.4 From the linear model to the open model

The innovation dynamic can be spontaneous (unpredictable) or planned (predictable). It is planned and predictable when it takes place within clearly identified structures (e.g. R&D departments, project groups) and in accordance with previously established processes. Planned innovation programs of this type are of course implemented by service organizations (Sundbo and Gallouj, 1999; Tidd and Hull, 2010). Thus in management sciences there is a fertile theoretical tradition advocating the application to services of new product development (NPD) methodologies, whereby new services are designed in accordance with planned, systematic processes developed by applying a theoretical perspective known as New Service Development (NSD) (Scheuing and Johnson, 1989; De Brentani, 1991).

However, the literature on innovation in services has emphasized the role of interactive structures and processes that are part of the general perspective of open innovation (Chesbrough, 2003) encompassing different cooperative models that are more or less sophisticated and formalized. The general perspective of open innovation includes the chain-linked or interactive model advanced by Kline and Rosenberg, which we have already mentioned. But it also covers a number of unplanned or emerging models such as the rapid application model, the practice-based model, “*bricolage*” innovation and ad hoc innovation. The rapid application model is a model in which planning does not precede production, as it does in the traditional linear model. Once the idea emerges, it is immediately developed as the service in question is being provided. Thus, the process of providing the service and the process of innovation are one and the same (Toivonen, 2010). The practice-based model involves identifying changes in service practices and developing and institutionalizing them. The *bricolage* model describes change and innovation as the consequences of unplanned activities carried out in response to random events and characterized by trial and error and ‘learning on the job’ (Sanger and Levin, 1992; Fuglsang, 2010, Styhre, 2009). For its part, ad hoc innovation (Gallouj and Weinstein, 1997) can be defined as the process of constructing a (novel) solution to a problem identified by the client company. This interactive process, which requires the participation of the customer himself, is described as ad hoc because it is “unplanned” or “emerging,” which means that it is consubstantial with the process of service provision from which it can be separated only in retrospect. Ad hoc innovation is recognized as such only after the fact.

Research on how innovation is organized in public services is rare (except for research on the role of public research services, including hospitals). For the rest of public services, the dominant idea is that change and innovation are mainly top-down, planned and formalized processes. This is confirmed by the results of the Innobarometer 2010 survey discussed in section 2.3. Despite this formalized character, to our knowledge, the literature makes no mention of any practical applications of the linear NSD perspective to this type of public services. However, awareness of the existence and importance of what we have called invisible innovation has significantly changed the perspective by identifying particular modes of organization of particular forms of innovation. These tend to be “bottom-up” modes and they include all unplanned and informal models mentioned above (ad hoc model, practice-based model, *bricolage* model, rapid application model, etc.). These new modes include a particular kind of innovation network, as yet relatively unknown, which is developing against the background of economies dominated by service industries, namely Public Private

Innovation Networks in Services (PPINS)¹. PPINS involve collaborations (cooperative ventures) between public, private and third-sector service organizations in the field of innovation (Gallouj, Rubalcaba and Windrum, 2012). They differ from traditional innovation networks in several ways. Firstly, the relationships between *public and non-market actors* and *private actors* lie at the heart of the analysis. Secondly, *service providers* are the main actors in them. Finally (and this is the corollary of the preceding characteristic), *non-technological innovation (service innovation)*, which is often overlooked in the literature, is taken into account.

2.5 Differentiation perspective and professional rationalization

While the assimilation perspective is associated with the industrialization of services (see Section 1.4), the differentiation perspective is another form of rationalization geared toward innovation, which Gadrey (1996) describes as professional or cognitive rationalization, as opposed to industrial rationalization. This *cognitive rationalization*, which is carried out, for example, in some consulting firms, can be divided into three strategies: *typification* of cases, *formalization* of problem-solving procedures (methods), and the use of individual or organizational *routines*.

In public services too, we see this tension between industrial rationalization and professional rationalization. In professional rationalization, the dominant principle is that the policy should set broad guidelines and not impose particular pathways or working methods. This must be left to the discretion of the public actors (at all levels: managers, but also basic agents), who should have more flexibility and freedom of interpretation and action at the local level. The differentiation perspective reflects a shift from the provision of a mass service (long dominant) to the provision of a more personalized service.

3. Inversion: The role of services in their customers' innovations

The literature on innovation in services has recently introduced a new perspective to describe innovation in services. This perspective breaks with the idea of services dominated by industry in terms of innovation, going even further than just autonomization or demarcation. Indeed, services could tip the balance of power and be in a position where they dominate industry. This inversion perspective describes the innovation activities of certain KIBS (especially research and development, engineering and consulting), which do not just innovate for themselves, but also play an extremely important role in their industrial and service clients' performance and innovation. This inversion can happen at the microeconomic level (the basic service transaction), but also at the macroeconomic level. There is thus, for EU countries, a positive correlation between the percentage of KIBS in total employment and performance in terms of innovation as measured by the Summary Innovation Index (European Commission, 2008). Public services that support economic activities, as well as public services in research and education have always participated in this inversion perspective. But in some cases this perspective is also at work in other service activities.

3.1 Business services and their customers' innovations: a Schumpeter Mark III model

Knowledge-intensive business services (KIBS) are among the most innovative services. As we noted above, the first demarcation analyses were conducted on KIBS. But these strategic services carry out their innovation in another way: they assist in their clients' innovation processes. They are information and knowledge processing machines to produce information and knowledge in the form of technological solutions, but also organizational, strategic, legal, fiscal and other solutions. They constitute an external source of knowledge and innovation for

¹ These innovation networks were studied under the European project ServPPIN (The Contribution of Public and Private Services to European Growth and Welfare, and the Role of Public-Private Innovation Networks, FP7).

their customers (Miles et al. 1994; Djellal, 1995; Bessant and Rush (1995), Muller and Zenker, 2001; Czarnitzki and Spielkamp, 2003; Toivonen, 2004; Wood, 2005).

The service economy analyzes these activities as a new possible area of expression of the Schumpeterian concept of entrepreneurship. This is known as a Schumpeter Mark III model or consultant-assisted innovation model or more generally interactional innovation model (Gallouj, 2002b and 2002c), which would complement the well-known models of Schumpeter Mark I (the individual entrepreneur) and Schumpeter Mark II (endogenized entrepreneurship and innovation).

3.2 Public services' relationship to the innovation of others

The actors in this Schumpeter Mark III model are not confined to private services. In some cases, public services also fit into this model (to varying degrees). The role of public services in the innovation of other economic actors can be viewed from three perspectives: 1) public service policies supporting innovation in other economic activities, 2) as consumers and users of innovations, 3) as passive providers of informational inputs to the private sectors. Recently, however, a more interactive relationship between public and private services has developed, which seems to fit the Schumpeter Mark III model. This is the case for the development of public-private innovation partnerships, in particular the PPINS we discussed in Section 2.4.

1) Public services policies supporting innovation are well known and widely documented. Suffice it to mention here a recent and important issue for public services policies supporting innovation in private services. The question is posed in terms of three of the analytical perspectives proposed for innovation in services, namely: assimilation, demarcation and integration (European Commission, 2003; Rubalcaba, 2006). Indeed, service innovation policies emphasize an assimilationist perspective, that is to say they simply extend industrial policies (mainly scientific and technical) to services. These policies are insufficient and it is necessary to implement demarcation policies that take into account the specificities of services mentioned above (Section 2.1): the interactive aspect of innovation in services and the inability to distinguish the product from the process, a lesser role of R&D than in industry, less visible results because of the intangible nature of the service, higher risks and stronger market failures, and a problem of ownership of the innovation.

2) The second well-known role of public services as drivers of innovation in other activities is that of consumer and user of these innovations. This role can be seen as more or less active or passive. Public services, like any other businesses, need computers, transportation, and so on, which they buy from industrial suppliers, in which case they are “passive” consumers. This type of innovation falls within the assimilationist perspective mentioned earlier. But consumption and demand can also be used to guide technological trajectories. This is the case, for example, for public procurement (Edler and Georghiou, 2007; Aschhoff and Sofka, 2009). Thus, the Innobarometer 2010 survey (discussed in Section 2.3) indicates that over half of public service organizations consider that “procurements” contributed to innovative service solutions. This also applies to situations where public services act as “lead-users” (Dalpe et al., 1991).

3) Public services can also passively provide information to private sectors. This is the case, for example, of public agencies specializing in the dissemination of scientific and technical information.

4) But public services may also play a more active role in the co-production of innovation. In this case, they are more firmly part of what we call the Schumpeter Mark III model or interactional innovation model. From this perspective, traditional innovation networks involving public services as co-producers are well known (Callon, 1991; Hakansson, 1989; Lundvall, 1992). But other, less well known networks have arisen or have been recognized more recently, namely Public-Private Innovation Networks in Services (see Section 2.4).

To conclude this point, we can say that while public services can indeed fall with the Schumpeter Mark III model of service-assisted innovation, the inversion perspective should nonetheless be considered as a misnomer in certain concrete manifestations of the model. Indeed, the idea of inversion is inappropriate in long-standing and well-documented situations where public services drive innovation in other economic sectors. Essentially, one cannot really use the term inversion perspective when examining the role of public services in other firms' innovations. In this case, private “knowledge-intensive services” are simply the second (and new) knowledge infrastructure layer that supplements and competes with the traditional infrastructure consisting mainly of public education and research institutions (Bilderbeek, Den Hertog, 1997).

4. Integration: the same innovation model for private and public goods and services

The final perspective used to address the issue of innovation in services is integration or synthesis (Gallouj and Weinstein, 1997). This perspective attempts to construct an analytical framework that encompasses the dynamics of innovation in all forms (technological and non-technological) in both goods and services. It is driven by a blurring of boundaries between goods and services. The integration perspective can easily be extended to public services, especially as the boundaries between public services and market services are also becoming blurred, particularly as a result of deregulation policies.

4.1 Blurring of sectoral boundaries

The literature shows some convergence between goods and services, that is to say, a dialectic between the industrialization of services and “servitization” of goods (Vandermerwe and Rada, 1998), reflecting an increase of service and the service relationship in the industrial and agricultural goods sectors. An increasing number of contemporary studies point to a blurring of boundaries between sectors and as to the nature of “products” (Barcet and Bonamy, 1999). Some research (Broussolle, 2001) shows that ICT (as a technical system shared by industry and services) contributes to this “blurring.”

The blurring of boundaries and the trend towards “all service” are manifested in different ways. For example, information and service play an increasing role in the value of most goods (industrial and agricultural). Whether potatoes, fragrance or calculators, service and information (R&D expenditures, transportation, distribution, marketing, etc.) have become major components of the value produced. The widespread trend toward “services around the product” (pre-sales services, sales services, after-sales services, etc.) (Furrer, 1997) also blurs the distinction. More generally, the need for integration is based on the finding that goods and services are decreasingly sold and consumed independently, but increasingly as solutions, systems, functions or experience. The blurring is also driven by the transformation of iconic industrial enterprises (e.g. IBM, Benetton) into service companies, to the extent that now most of their revenue comes from this type of activity. Another example of the blurring of boundaries is the new business model of certain industrial enterprises, which now lease their goods rather than selling them (Rank Xerox copiers) or refurbish or recycle goods rather than manufacturing them.

Along with this blurring of boundaries, a new message is appearing whereby certain businesses now no longer define themselves as goods manufacturers, but as providers of solutions, functions or experiences. New theoretical research prospects have emerged, including the functional economy (Stahel, 1997), experience economy (Pine and Gilmore, 1999), and characteristic-based approaches (Gallouj and Weinstein, 1997).

4.2 The characteristics-based approach: an integrative analytical framework for goods and services (including non-market services)

To develop an integrative analytical framework for goods and services and their multiple forms of innovation, drawing on the work of Saviotti and Metcalfe (1984), Gallouj and Weinstein (1997) apply the Lancasterian model of goods to services. They define the product (whether it is a good or a service) as a set of vectors of characteristics: internal technical characteristics [T] and external technical characteristics [T']², final or service characteristics [Y], internal competences [C] and external competences [C'] (see. Figure 1).

Thus a service can be defined as the mobilization of internal or external competences and internal or external techniques (tangible or intangible) to produce final or service characteristics (that is to say use values). Figure 1 can thus apply to several product configurations: a pure good (a car or a computer), an intangible product (an insurance contract, a financial product, a consulting service), a self-service outcome ([C']—[T]—[Y]), and hybrid solutions (goods and services): for example, a car and different types of associated services provided upstream or downstream (insurance, maintenance, financing, warranties, etc.).

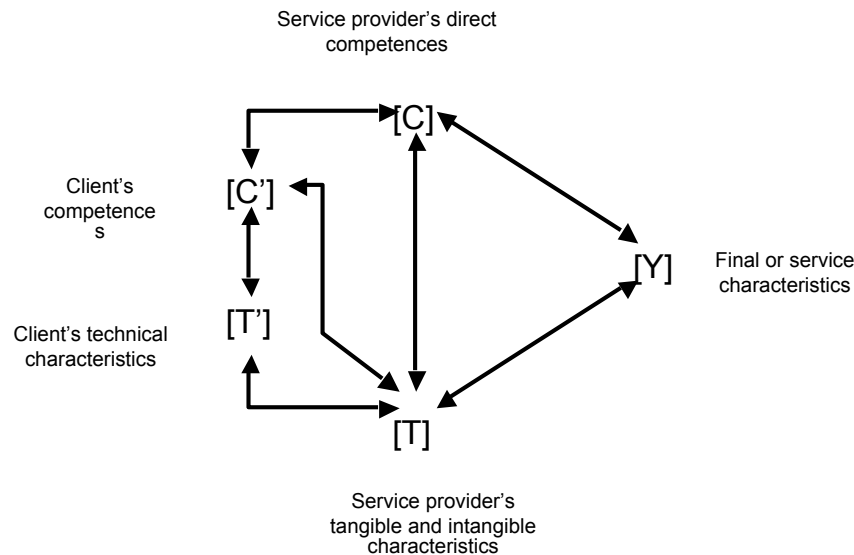


Figure 1: The product as the conjunction of vectors of characteristics and competences (after Gallouj and Weinstein, 1997)

In this representation, innovation reflects various changes to the characteristics: addition, subtraction, association, dissociation or formatting. These changes may be the result of natural learning processes or formalized R&D, design and innovation activities. Different types of changes to the characteristics result in different models of innovation:

- Radical innovation which describes the creation of a new set of characteristics $S = \{[C'^*], [C^*], [T'^*], [T^*], [Y^*]\}$
- Improvement innovation reflecting an increase in the prominence (or quality) of certain characteristics without changing the structure of the system of competences.
- Incremental innovation, which denotes the addition (and also possibly the elimination or replacement) of characteristics.
- Recombination innovation. This form of innovation is based on the basic principles of dissociation and association of the final and technical characteristics.
- Formalization innovation that is based on the formatting and standardization of characteristics.

² The inclusion of clients' technical characteristics was suggested by De Vries (2006) in order to take into account the new channels of consumption and delivery (e.g. when consumers use their own technologies to access a service on the web).

4.3 Improving the model to better reflect public services

This characteristics-based model of products and innovation has been amended several times, in some cases with the explicit goal of (better) reflecting public services.

Windrum and Garcia-Goni (2008) suggest including the government in the model and developing a multi-agent model.

In a prior work (Gallouj, 2002a), we suggested associating a conventionalist approach to products with the Lancasterian characteristics-based model in order to take into account certain social and civic characteristics that are particularly important in public services, but that can be applied beyond these services. The conventionalist perspective (inspired by the work of Boltanski and Thévenot, 1991) suggests that products can be defined in terms of “worlds” based on different sets of justificatory criteria:

- the industrial and technical world, the outputs of which are described and estimated mainly in terms of volumes, flows and technical operations;
- the market and financial world, the ‘output’ of which is envisaged in terms of value and monetary and financial transactions;
- the relational or domestic world, which values interpersonal relations, empathy and relationships of trust built up over time and regards the quality of relationships as a key factor in estimation of the ‘output’;
- the civic world, which is characterized by social relations based on a concern for equal treatment, fairness and justice.

To integrate the diversity of the worlds in our characteristics-based model, it is possible either to add characteristics from these different worlds to the different vectors, or to juxtapose several vectors of characteristics (service, technical characteristics) and competences referring to the different worlds within the meaning of Boltanski and Thévenot. Thus, in this second case, we replace our initial (simplified) product model (Figure 2), in which the service characteristics (which fall within the technical or industrial world, world I) are obtained by mobilizing competences and technical (and process) characteristics, with a new model (Figure 3) where the indices I, II, III, IV correspond to each of the worlds mentioned (industrial, market, domestic and civic).

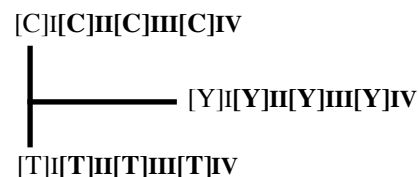


Figure 2 : The initial (simplified) representation of the product

Figure 3: A representation of the product incorporating different justificatory worlds

It may seem paradoxical to consider technical and process characteristics according to different worlds. One would think that these characteristics would fall within the technical world only. Our hypothesis is that the techniques are not neutral, and their relevant characteristics can fall within different worlds. As potential producers of service characteristics, they can be considered based on different value systems and viewpoints. Some technical solutions are fairer (or deemed to be fairer) than others (e.g. techniques adapted for the disabled). With regard to intangible technical characteristics (methods, organization modes), one can easily imagine that certain organizational arrangements may fall within the domestic and civic worlds (arrangements to ensure anonymity, confidentiality, discretion, fairness in the order in which requests are processed).

The same is true for competences. The vector of competences must take into account what could be called *social and civic competences*, that is to say, the ability to provide a service or simply to maintain a relationship with customers in sometimes severely difficult socio-economic situations. Such social and civic competences can be accepted or promoted by the organization or they can be repressed. The competences of certain customers [C_k] may be particularly weak (socioeconomically disadvantaged customers, cultural and cognitive disabilities). This weakness can or should be compensated by the social and civic competences of empathy and “translation” on the part of front-office agents ([C_k]IV).

This analytical framework for products and innovation has been applied in a number of public services: The French Post office (postal and financial services), the French family welfare offices (CAF) and the French public employment service (ANPE). In this extended representation, innovation is also envisaged in terms of various changes in the characteristics.

Conclusion

Although the association of the terms “service” and “innovation” may long have seemed incongruous (service had the negative connotations of servitude and public services), this is no longer the case today. This paper aimed to examine the issue of innovation in public services in light of the literature on innovation in services. In recent years the literature has examined different theoretical perspectives, which correspond to a life cycle of analytical concerns: assimilation, demarcation, inversion and synthesis (ADIS).

Our main conclusions are as follows: First, in general, we can say that the ADIS analytical framework is a heuristic that can be applied without too much difficulty to public services, but generally with a different time-scale and a number of nuances.

Thus in the case of the assimilationist perspective, for example, it is important to consider a certain dualism in the public sector. We must distinguish two different groups: first, the science-based public services (public research laboratories, universities, certain aspects of hospital services) and, secondly, all other activities. The first group is at the heart of today's scientific and technical innovation dynamic. It consists of activities that actively and autonomously produce scientific and technical innovations. The idea of assimilation seems inappropriate in this case, since this type of innovation is actually identical to innovation in industry and because the mainly technological focus is largely justified. The dynamics of innovation in the second group, the other public service sectors (e.g., governments) fit better into the traditional assimilationist perspective as manifested in market services. This is a perspective centered on technological innovation that is adopted rather than produced, instead of other more specific, non-technological forms of innovation.

The inversion perspective also requires a nuanced interpretation. It is obvious that public services influence innovation in other sectors in different ways and they can fit into an interactional innovation model (Schumpeter Mark III). This is true not only for science-based public services (public laboratories, etc.), but also government agencies that support innovation or governments that use public procurement to guide innovation trajectories. However, the idea of inversion can be a misnomer. It presupposes a “normal” (non-inverted) situation in the past, which is not the case for the examples cited. For instance, public policies supporting innovation have always existed. The fact remains that some of the public services mentioned fit perfectly into what we call a Schumpeter Mark III model.

The issue of innovation in public services has also been discussed recently from the perspectives of demarcation and synthesis. As in the case of market services, but with a significant difference in time-scale, recent studies look at the specificities of innovation in public services from both a qualitative and quantitative standpoint. These specificities (whether they concern the nature of the innovation or the organizational methods) are considered from a “double differentiation” perspective: differentiation with respect to

manufacturing and differentiation with respect to market services. We also attempt to fit public services into the integrative theoretical models. **Characteristics-based approaches provide interesting avenues of research for that purpose.**

Bibliography

- Abernathy W., Utterback J. (1978), Patterns of industrial innovation, *Technology Review*, 80, p. 41-47.
- Arduini D., Belotti F., Denni M., Giungato G., Zanfei A. (2010), Technology adoption and innovation in public services the case of e-government in Italy, *Information Economics and Policy*, 22, p. 257-275
- Aschhoff B., Sofka W. (2009), Innovation on demand: can public procurement drive market succes of innovation? *Research Policy*, 38, 1235-1247.
- Attour A., Longhi C. (2009), Fracture numérique, le chaînon manquant : les services d'e-administration locale dans les communes françaises, *Les Cahiers du numérique*, 2009/1, Vol. 5, p. 119-146.
- Bacache-Beauvallet M., Bounie D., François A. (2011), Existe-t-il une fracture numérique dans l'usage de l'administration en ligne ? *Revue économique*, 2011/2, Vol. 62, p. 215-235.
- Barcet A., Bonamy J. (1999), Eléments pour une théorie de l'intégration biens/services, *Économies et Sociétés*, série EGS, n°1, 5, p. 197-220.
- Barras R. (1986), Towards a Theory of Innovation in Services, *Research Policy*, 15, p. 161-173.
- Barras R. (1990), Interactive Innovation in Financial and Business Services: The Vanguard of the Service Revolution, *Research Policy*, 19, p.215-237.
- Becheikh N., Halilem N., Jbilou J., Landry R. (2009), Vers une conceptualisation de l'innovation dans le secteur public, *Economies et Sociétés*, série EGS, n°10, 4/2009, p. 579-614.
- Bekkers V., van Duivenboden H., and M. Thaens (2006), *Public Innovation and Communication technology: relevant backgrounds and concepts*, in Bekkers V. van Duivenboden H. and Thaens M. (eds), *Information and Communication Technology and Public Innovation*, IOS Press, Amsterdam/Berlin/Oxford/Tokyo/Washington DC, p. 3–21.
- Bessant J., Rush H., (1995), Building bridges for innovation: the role of consultants in technology transfer, *Research Policy*, 24, p. 97-114.
- Bilderbeek R., Den Hertog P., (1997), *The new knowledge infrastructure*, SI4S project, European Commission, TSER programme.
- Boltanski, L. et Thévenot, L. (1991), *De la justification. Les économies de la grandeur*, Gallimard, Paris.
- Broussolle D. (2001), *Les NTIC et l'innovation dans la production de biens et services : des frontières qui se déplacent*, 11th RESER international conference, Groupe ESC-Grenoble, October.
- Bugge M., Mortensen P., Bloch C. (2011), *Measuring Public Innovation in Nordic Countries*, NIFU, Norway.
- Callon M., 1991, «Réseaux technico-économiques et irréversibilité», in Boyer., et al. (ed), *Figures de l'irréversibilité en économie*, Paris, Edition de l'EHESS, p.195-230.
- Chesbrough H., (2003) *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Boston: Harvard Business School Press.
- Clark J., Good B., Simmonds P. (2008), *Innovation Index Working Paper*, Innovation in the Public and Third Sectors, September, Nesta.

- Coombs R. and Miles I. (2000), *Innovation measurement and services : the new problematic*, in Metcalfe S. and Miles I. (eds) *Innovation systems in the service economy. Measurement and case study analysis*, Kluwer, Boston, p. 85-103.
- Czarnitzki, D., Spielkamp A. (2003), Business services in Germany: Bridges for innovation, *The Service Industries Journal*, 23 (2), p.1-30.
- Dalpe R., DeBresson C., Xiaoping H. (1992), The public sector as first user of innovations, *Research Policy*, 21, p. 251-263.
- De Brentani U. (1991), Success factors in developing new business services, *European Journal of marketing*, 25(2), p. 33-59.
- De Vries, E. (2006), Innovation in services in networks of organizations and in the distribution of services, *Research Policy*, Volume 35, Issue 7, p. 1037-1051.
- Djellal F., (1995), *Changement technique et conseil en technologie de l'information*, L'Harmattan, Paris.
- Djellal F., Francoz D., Gallouj C., Gallouj F., Jacquin Y. (2003), Revising the definition of research and development in the light of the specificities of services, *Science and Public Policy*, 30/6, p. 415-430.
- Djellal F., Gallouj F. (2005), Mapping innovation dynamics in hospitals, *Research Policy*, Vol. 34, p. 817-835.
- Djellal F., Gallouj F. (2008), A model for analysing the innovation dynamic in services: the case of architectural-type services, *International Journal of Services Technology and Management*, 9 (3/4), 285-304.
- Droege H., Hildebrand D., Heras Forcada M. (2009), Innovation in services: present findings, and future pathways, *Journal of Service Management* vol 20(2), p. 131-155.
- Edler J., Georghiou L. (2007), Public procurement and innovation : resurrecting the demand side, *Research Policy*, 36, 949-963.
- European Commission (2003), *The competitiveness of business-related services and their contribution to the performance of European enterprises*, Communication from the Commission to the Council and the European Parliament, COM (2003):747, EU, Brussels.
- European Commission (2008), European innovation scoreboard.
- European Commission (2011), Flash Eurobarometer n°305, 2010 Innobarometer.
- Evangelista R. (2000). Sectoral patterns of technological change in services, *Economics of innovation and new technology*, 9, p. 183-221.
- Evangelista R., Savona M. (2003), Innovation, employment and skills in services: firm and sectoral evidence, *Structural Change and Economic Dynamics*, 14, p. 449-474.
- Fox, K.J. (1999), "Efficiency at different levels of aggregation: public vs. private sector firms", *Economic Letters*, 65 (2), p. 17-176.
- Fuglsang L. (2010), Bricolage and invisible innovation in public service innovation, *Journal of Innovation Economics*, 2010/1, n°5, p. 67-87.
- Furrer O. (1997), « Le rôle stratégique des "services autour des produits" », *Revue française de gestion*, mars-avril-mai, p. 98-107.
- Gadrey J. and Gallouj F. (1998), The provider-customer interface in business and professional services, *The Service Industries Journal*, Vol. 18, n°2, April, p. 1-15.
- Gadrey J., 1992. *Socio-économie des services*, La Découverte, Paris ; 3rd edition, 2003.
- Gadrey, J., *Services : la productivité en question*, Desclée de Brouwer, 1996a.
- Gallouj F. (1994). *Economie de l'innovation dans les services*, Editions L'Harmattan, Logiques économiques, Paris.
- Gallouj F. (1998), Innovating in reverse : services and the reverse product cycle, *European Journal of Innovation Management*, Vol. 1, n°3, 123-138.
- Gallouj F. (2002a), *Innovation in the service economy : the new wealth of nations*, Edward Elgar, Cheltenham, Northampton.

- Gallouj F. (2002b), *Interactional innovation : a neoschumpeterian model*, in Sundbo J. et Fuglsang L. (eds.), *Innovation as strategic reflexivity*, Routledge, London, New York, p. 29-56.
- Gallouj F. (2002c), *Knowledge intensive business services : processing knowledge and producing innovation*, in Gadrey J., Gallouj F. (eds.), *Productivity, Innovation and knowledge in services*, Edward Elgar Publishers.
- Gallouj F., Djellal F. (eds) (2010), *The Handbook of Innovation and Services: a multidisciplinary perspective*, Edward Elgar Publishers.
- Gallouj F., Rubalcaba L. Windrum P. (2012), *Public Private Innovation Networks in Services*, Edward Elgar (forthcoming).
- Gallouj F., Weinstein O. (1997), Innovation in services, *Research Policy*, 26 (4-5), p. 537-556.
- Hakansson H. (1989), *Corporate technological behavior, cooperation and networks*, Londres, Routledge.
- Halvorsen T., Hauknes J., Miles I., R. Rannveig (2005), *On the differences between public and private sector innovation*, PUBLIN report D9.
- Hartley J. (2005) Innovation in governance and public services: Past and present. *Public Money and Management*, 25 (1), January, 27-34.
- Hill P. (1977), On goods and services, *Review of Income and Wealth*, Vol. 23, n°4, December p. 315-338.
- Hipp C., Grupp H. (2005), Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies, *Research Policy*, 34, 4, 517-535.
- Hughes A., Moore K., Kataria N. (2011), *Innovation in Public Sector Organisations: A pilot survey for measuring innovation across the public sector*, London: NESTA.
- Knox Lovell C.A.(2002), "Performance assesment in the public sector", in Fox, K. (ed.), *Efficiency in the public sector*, Dordrecht, Kluwer Academic Publishers, p. 11-35.
- Koch P., Cunningham P., Schwabsky N., Hauknes J. (2005), *Innovation in the Public sector. Summary and policy recommendations*. Oslo: Publin Report n° D24.
- Lindsay C.M., (1976) "A theory of government enterprise", *Journal of political economy*, 84(5), p. 1061-1077.
- Lundvall B.-A. (ed) (1992) *National systems of innovation*, Pinter Publishers.
- Miles I. (1998), *Services, Systems and Innovation – Cinderella comes to the ball*, Services and Systems Worksop, CRIC, Manchester, March.
- Miles I. (2012), *Public Service Innovation: What messages from the collision of Innovation Studies and Services Research*, in Osborne S.P. and Brown L. (eds) *Handbook of Innovation and Change in Public Sector Services* (forthcoming).
- Miles I. et al., (1994), *Knowledge-Intensive Business Services: Their Role as Users, Carriers and Sources of Innovation*, PREST, Manchester University.
- Mulgan G., Albury D. (2003) *Innovation in the Public Sector*, Strategy Unit, Cabinet Office UK.
- Muller E. and Zenker A. (2001), Business services as actors of knowledge transformation: The role of KIBS in regional and national innovation systems, *Research Policy*, 30 (9), p. 1501-1516.
- OECD (2005), *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*, 3rd Edition, OECD, Paris
- Pavitt, K. (1984). 'Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory', *Research Policy* 13: 343-374.
- Pine, J., Gilmore, J. (1999) *The Experience Economy*, Harvard Business School Press, Boston.
- Potts J. (2009), The innovation deficit in public services: The curious problem of too much efficiency and not enough waste and failure.

- Rees R. (1984), *Public enterprise economics*, 2nd éd., London, Weidenfeld and Nicholson.
- Rohit Lekhi (2007), *Public Service Innovation*, Research Republic LLP, The work foundation, London.
- Rubalcaba L. (2006), Which policy for innovation in services? *Science and Public Policy*, Vol. 33, n°10, p. 745-756.
- Sanger M. B., Levin M. A. (1992), Using Old Stuff in New Ways: Innovation as a Case of Evolutionary Tinkering, *Journal of Policy Analysis and Management*, 11(1), p. 88-115.
- Saviotti P.P., Metcalfe J.S. (1984), A theoretical approach to the construction of technological output indicators, *Research Policy*, 13, p. 141-151.
- Scheuing E.E, Johnson E.M. (1989), A proposed model for new service development, *Journal of service marketing*, 3(2), p. 25-35.
- Scott-Kemmis D. (2009), *Assessing Policies, Programs and Other Initiatives to Promote Innovation in the Public Sector: International Case Studies*, Management Advisory Committee Report 9 - ANNEX 1, November 2009.
- Soete, L. and M. Miozzo (1990), *Trade and Development in Services: a Technological Perspective*. Maastricht Economic Research Institute on Innovation and Technology (MERIT) Working paper 89-031.
- Stahel, W. (1997). *The Functional Economy: Cultural and Organizational Change*, in Richards D.J. (ed) *The industrial green game: implications for environmental design and management*. Washington DC, National Academy Press, p. 91-100.
- Styhre A. (2009), Tinkering with material resources: Operating under ambiguous conditions in rock construction work. *The Learning Organization* 16 (5), p. 386-397.
- Suire R. (2007), Encastrement social et usages de l'Internet : une analyse jointe du commerce et de l'administration électronique, *Economie et Prévision*, 2007/4, n°180-181, p. 161-174.
- Sundbo J., Gallouj F. (1999), Innovation as a loosely coupled system in services, *International Journal of Services Technology and Management*, Vol. 1, n°1, p. 15-36.
- Tidd J., Hull F. (2010), *Service innovation: development, delivery and performance*, in Gallouj F. Djellal F. (eds), *The handbook of innovation and services*, Edward Elgar, p. 250-278.
- Toivonen M. (2004), *Expertise as business : Long-term development and future prospects of knowledge-intensive business services*, PhD, Helsinki University of Technology.
- Toivonen M. (2010), *Different types of innovation processes in services and their organisational implications*, in Gallouj F. Djellal F. (eds), *The handbook of innovation and services*, Edward Elgar, p. 221-249.
- Vandermerwe, S. et Rada J. (1988). "Servitization of Business: Adding Value by Adding Services." *European Management Journal* 6(4), p. 314-324.
- Windrum P. and Koch P. (eds), 2008, *Innovation in public sector services. Entrepreneurship, Creativity and Management*, Cheltenham and Northampton, MA: Edward Elgar.
- Windrum P., Garcia-Goni M. (2008) *A neo-Schumpeterian model of health services innovation*, *Research Policy*, 37, p. 649-672.
- Wood P. (2005), A service-informed approach to regional innovation - or adaptation? *The Service Industries Journal*, 25 (4), p. 429-445.